

The Hello World of Neural Networks

Like every first app, you should start with something super simple that shows the overall scaffolding for how your code works. In the case of creating neural networks, one simple case is where it learns the relationship between two numbers. So, for example, if you were writing code for a function like this, you already know the 'rules':

```
def hw_function(x):  
    y = (2 * x) - 1  
    return y
```

So how would you train a neural network to do the equivalent task? By using data! By feeding it with a set of x's and y's, it should be able to figure out the relationship between them.

This is obviously a very different paradigm from what you might be used to. So let's step through it piece by piece.

Imports

Let's start with the imports. Here, you are importing [TensorFlow](#) and calling it `tf` for convention and ease of use.

You then import a library called `numpy` which helps to represent data as arrays easily and to optimize numerical operations.

The framework you will use to build a neural network as a sequence of layers is called `keras` so you will import that too.

```
In [ ]: import tensorflow as tf  
import numpy as np  
from tensorflow import keras  
  
print(tf.__version__)
```

2.11.0

Define and Compile the Neural Network

Next, you will create the simplest possible neural network. It has 1 layer with 1 neuron, and the input shape to it is just 1 value. You will build this model using Keras' [Sequential](#) class which allows you to define the network as a sequence of [layers](#). You can use a single [Dense](#) layer to build this simple network as shown below.

```
In [ ]: # Build a simple Sequential model
model = tf.keras.Sequential([
    keras.layers.Dense(units=1, input_shape=[1])
])
```

Now, you will compile the neural network. When you do so, you have to specify 2 functions: a [loss](#) and an [optimizer](#).

If you've seen lots of math for machine learning, here's where it's usually used. But in this case, it's nicely encapsulated in functions and classes for you. But what happens here? Let's explain...

You know that in the function declared at the start of this notebook, the relationship between the numbers is $y=2x-1$. When the computer is trying to 'learn' that, it makes a guess... maybe $y=10x+10$. The `loss` function measures the guessed answers against the known correct answers and measures how well or how badly it did.

It then uses the `optimizer` function to make another guess. Based on how the loss function went, it will try to minimize the loss. At that point maybe it will come up with something like $y=5x+5$, which, while still pretty bad, is closer to the correct result (i.e. the loss is lower).

It will repeat this for the number of *epochs* which you will see shortly. But first, here's how you will tell it to use [mean squared error](#) for the loss and [stochastic gradient descent](#) for the optimizer. You don't need to understand the math for these yet, but you can see that they work!

Over time, you will learn the different and appropriate loss and optimizer functions for different scenarios.

```
In [ ]: # Compile the model
model.compile(optimizer='sgd', loss='mean_squared_error')
```

Providing the Data

Next up, you will feed in some data. In this case, you are taking 6 X's and 6 Y's. You can see that the relationship between these is $y=2x-1$, so where $x = -1$, $y=-3$ etc.

The de facto standard way of declaring model inputs and outputs is to use `numpy`, a Python library that provides lots of array type data structures. You can specify these values by building numpy arrays with `np.array()`.

```
In [ ]: # Declare model inputs and outputs for training y = 2x - 1
xs = np.array([-1.0, 0.0, 1.0, 2.0, 3.0, 4.0], dtype=float)
ys = np.array([-3.0, -1.0, 1.0, 3.0, 5.0, 7.0], dtype=float)
```

Training the Neural Network

The process of training the neural network, where it 'learns' the relationship between the x's and y's is in the `model.fit()` call. This is where it will go through the loop we spoke about above: making a guess, measuring how good or bad it is (aka the loss), using the optimizer to make another guess etc. It will do it for the number of `epochs` you specify. When you run this code, you'll see the loss on the right hand side.

```
In [ ]: # Train the model
model.fit(xs, ys, epochs=500)
```

Epoch 1/500
1/1 [=====] - 0s 337ms/step - loss: 7.8261
Epoch 2/500
1/1 [=====] - 0s 5ms/step - loss: 6.3535
Epoch 3/500
1/1 [=====] - 0s 7ms/step - loss: 5.1909
Epoch 4/500
1/1 [=====] - 0s 6ms/step - loss: 4.2723
Epoch 5/500
1/1 [=====] - 0s 7ms/step - loss: 3.5457
Epoch 6/500
1/1 [=====] - 0s 6ms/step - loss: 2.9702
Epoch 7/500
1/1 [=====] - 0s 7ms/step - loss: 2.5138
Epoch 8/500
1/1 [=====] - 0s 5ms/step - loss: 2.1510
Epoch 9/500
1/1 [=====] - 0s 6ms/step - loss: 1.8621
Epoch 10/500
1/1 [=====] - 0s 6ms/step - loss: 1.6312
Epoch 11/500
1/1 [=====] - 0s 6ms/step - loss: 1.4462
Epoch 12/500
1/1 [=====] - 0s 7ms/step - loss: 1.2973
Epoch 13/500
1/1 [=====] - 0s 7ms/step - loss: 1.1769
Epoch 14/500
1/1 [=====] - 0s 6ms/step - loss: 1.0790
Epoch 15/500
1/1 [=====] - 0s 7ms/step - loss: 0.9987
Epoch 16/500
1/1 [=====] - 0s 7ms/step - loss: 0.9326
Epoch 17/500
1/1 [=====] - 0s 7ms/step - loss: 0.8775
Epoch 18/500
1/1 [=====] - 0s 8ms/step - loss: 0.8312
Epoch 19/500
1/1 [=====] - 0s 6ms/step - loss: 0.7919
Epoch 20/500
1/1 [=====] - 0s 5ms/step - loss: 0.7581
Epoch 21/500
1/1 [=====] - 0s 6ms/step - loss: 0.7288
Epoch 22/500
1/1 [=====] - 0s 6ms/step - loss: 0.7030

Epoch 23/500
1/1 [=====] - 0s 6ms/step - loss: 0.6800
Epoch 24/500
1/1 [=====] - 0s 6ms/step - loss: 0.6593
Epoch 25/500
1/1 [=====] - 0s 54ms/step - loss: 0.6405
Epoch 26/500
1/1 [=====] - 0s 5ms/step - loss: 0.6232
Epoch 27/500
1/1 [=====] - 0s 7ms/step - loss: 0.6071
Epoch 28/500
1/1 [=====] - 0s 6ms/step - loss: 0.5921
Epoch 29/500
1/1 [=====] - 0s 7ms/step - loss: 0.5779
Epoch 30/500
1/1 [=====] - 0s 6ms/step - loss: 0.5645
Epoch 31/500
1/1 [=====] - 0s 6ms/step - loss: 0.5516
Epoch 32/500
1/1 [=====] - 0s 6ms/step - loss: 0.5393
Epoch 33/500
1/1 [=====] - 0s 7ms/step - loss: 0.5275
Epoch 34/500
1/1 [=====] - 0s 7ms/step - loss: 0.5160
Epoch 35/500
1/1 [=====] - 0s 7ms/step - loss: 0.5049
Epoch 36/500
1/1 [=====] - 0s 7ms/step - loss: 0.4942
Epoch 37/500
1/1 [=====] - 0s 7ms/step - loss: 0.4837
Epoch 38/500
1/1 [=====] - 0s 7ms/step - loss: 0.4736
Epoch 39/500
1/1 [=====] - 0s 6ms/step - loss: 0.4637
Epoch 40/500
1/1 [=====] - 0s 7ms/step - loss: 0.4540
Epoch 41/500
1/1 [=====] - 0s 7ms/step - loss: 0.4445
Epoch 42/500
1/1 [=====] - 0s 7ms/step - loss: 0.4353
Epoch 43/500
1/1 [=====] - 0s 7ms/step - loss: 0.4263
Epoch 44/500
1/1 [=====] - 0s 7ms/step - loss: 0.4175
Epoch 45/500
1/1 [=====] - 0s 7ms/step - loss: 0.4089
Epoch 46/500
1/1 [=====] - 0s 7ms/step - loss: 0.4005
Epoch 47/500
1/1 [=====] - 0s 6ms/step - loss: 0.3922
Epoch 48/500
1/1 [=====] - 0s 6ms/step - loss: 0.3841
Epoch 49/500
1/1 [=====] - 0s 6ms/step - loss: 0.3762
Epoch 50/500
1/1 [=====] - 0s 6ms/step - loss: 0.3685
Epoch 51/500
1/1 [=====] - 0s 8ms/step - loss: 0.3609
Epoch 52/500
1/1 [=====] - 0s 7ms/step - loss: 0.3535
Epoch 53/500

```
1/1 [=====] - 0s 8ms/step - loss: 0.3462
Epoch 54/500
1/1 [=====] - 0s 8ms/step - loss: 0.3391
Epoch 55/500
1/1 [=====] - 0s 6ms/step - loss: 0.3321
Epoch 56/500
1/1 [=====] - 0s 10ms/step - loss: 0.3253
Epoch 57/500
1/1 [=====] - 0s 7ms/step - loss: 0.3186
Epoch 58/500
1/1 [=====] - 0s 8ms/step - loss: 0.3121
Epoch 59/500
1/1 [=====] - 0s 8ms/step - loss: 0.3057
Epoch 60/500
1/1 [=====] - 0s 59ms/step - loss: 0.2994
Epoch 61/500
1/1 [=====] - 0s 6ms/step - loss: 0.2932
Epoch 62/500
1/1 [=====] - 0s 9ms/step - loss: 0.2872
Epoch 63/500
1/1 [=====] - 0s 7ms/step - loss: 0.2813
Epoch 64/500
1/1 [=====] - 0s 7ms/step - loss: 0.2755
Epoch 65/500
1/1 [=====] - 0s 7ms/step - loss: 0.2699
Epoch 66/500
1/1 [=====] - 0s 6ms/step - loss: 0.2643
Epoch 67/500
1/1 [=====] - 0s 6ms/step - loss: 0.2589
Epoch 68/500
1/1 [=====] - 0s 5ms/step - loss: 0.2536
Epoch 69/500
1/1 [=====] - 0s 6ms/step - loss: 0.2484
Epoch 70/500
1/1 [=====] - 0s 6ms/step - loss: 0.2433
Epoch 71/500
1/1 [=====] - 0s 6ms/step - loss: 0.2383
Epoch 72/500
1/1 [=====] - 0s 5ms/step - loss: 0.2334
Epoch 73/500
1/1 [=====] - 0s 6ms/step - loss: 0.2286
Epoch 74/500
1/1 [=====] - 0s 5ms/step - loss: 0.2239
Epoch 75/500
1/1 [=====] - 0s 6ms/step - loss: 0.2193
Epoch 76/500
1/1 [=====] - 0s 5ms/step - loss: 0.2148
Epoch 77/500
1/1 [=====] - 0s 6ms/step - loss: 0.2104
Epoch 78/500
1/1 [=====] - 0s 6ms/step - loss: 0.2060
Epoch 79/500
1/1 [=====] - 0s 6ms/step - loss: 0.2018
Epoch 80/500
1/1 [=====] - 0s 6ms/step - loss: 0.1977
Epoch 81/500
1/1 [=====] - 0s 5ms/step - loss: 0.1936
Epoch 82/500
1/1 [=====] - 0s 7ms/step - loss: 0.1896
Epoch 83/500
1/1 [=====] - 0s 5ms/step - loss: 0.1857
```

```
Epoch 84/500
1/1 [=====] - 0s 5ms/step - loss: 0.1819
Epoch 85/500
1/1 [=====] - 0s 6ms/step - loss: 0.1782
Epoch 86/500
1/1 [=====] - 0s 6ms/step - loss: 0.1745
Epoch 87/500
1/1 [=====] - 0s 6ms/step - loss: 0.1709
Epoch 88/500
1/1 [=====] - 0s 6ms/step - loss: 0.1674
Epoch 89/500
1/1 [=====] - 0s 5ms/step - loss: 0.1640
Epoch 90/500
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Epoch 91/500
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Epoch 92/500
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Epoch 93/500
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Epoch 94/500
1/1 [=====] - 0s 6ms/step - loss: 0.1478
Epoch 95/500
1/1 [=====] - 0s 6ms/step - loss: 0.1448
Epoch 96/500
1/1 [=====] - 0s 5ms/step - loss: 0.1418
Epoch 97/500
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Epoch 99/500
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Epoch 100/500
1/1 [=====] - 0s 5ms/step - loss: 0.1305
Epoch 101/500
1/1 [=====] - 0s 7ms/step - loss: 0.1278
Epoch 102/500
1/1 [=====] - 0s 5ms/step - loss: 0.1252
Epoch 103/500
1/1 [=====] - 0s 6ms/step - loss: 0.1226
Epoch 104/500
1/1 [=====] - 0s 6ms/step - loss: 0.1201
Epoch 105/500
1/1 [=====] - 0s 5ms/step - loss: 0.1177
Epoch 106/500
1/1 [=====] - 0s 7ms/step - loss: 0.1152
Epoch 107/500
1/1 [=====] - 0s 8ms/step - loss: 0.1129
Epoch 108/500
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Epoch 109/500
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Epoch 110/500
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Epoch 111/500
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Epoch 112/500
1/1 [=====] - 0s 5ms/step - loss: 0.1017
Epoch 113/500
1/1 [=====] - 0s 8ms/step - loss: 0.0997
Epoch 114/500
```

1/1 [=====] - 0s 60ms/step - loss: 0.0976
Epoch 115/500
1/1 [=====] - 0s 7ms/step - loss: 0.0956
Epoch 116/500
1/1 [=====] - 0s 11ms/step - loss: 0.0936
Epoch 117/500
1/1 [=====] - 0s 14ms/step - loss: 0.0917
Epoch 118/500
1/1 [=====] - 0s 10ms/step - loss: 0.0898
Epoch 119/500
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Epoch 120/500
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Epoch 121/500
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Epoch 122/500
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Epoch 123/500
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Epoch 124/500
1/1 [=====] - 0s 5ms/step - loss: 0.0793
Epoch 125/500
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Epoch 126/500
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1/1 [=====] - 0s 6ms/step - loss: 0.0686
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Epoch 133/500
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Epoch 134/500
1/1 [=====] - 0s 7ms/step - loss: 0.0644
Epoch 135/500
1/1 [=====] - 0s 6ms/step - loss: 0.0631
Epoch 136/500
1/1 [=====] - 0s 7ms/step - loss: 0.0618
Epoch 137/500
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Epoch 138/500
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Epoch 141/500
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Epoch 142/500
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Epoch 143/500
1/1 [=====] - 0s 7ms/step - loss: 0.0535
Epoch 144/500
1/1 [=====] - 0s 10ms/step - loss: 0.0524

```
Epoch 145/500
1/1 [=====] - 0s 7ms/step - loss: 0.0513
Epoch 146/500
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Epoch 147/500
1/1 [=====] - 0s 9ms/step - loss: 0.0492
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Epoch 149/500
1/1 [=====] - 0s 61ms/step - loss: 0.0472
Epoch 150/500
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Epoch 151/500
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Epoch 152/500
1/1 [=====] - 0s 11ms/step - loss: 0.0444
Epoch 153/500
1/1 [=====] - 0s 8ms/step - loss: 0.0434
Epoch 154/500
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Epoch 155/500
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Epoch 156/500
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Epoch 157/500
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Epoch 158/500
1/1 [=====] - 0s 6ms/step - loss: 0.0392
Epoch 159/500
1/1 [=====] - 0s 6ms/step - loss: 0.0384
Epoch 160/500
1/1 [=====] - 0s 5ms/step - loss: 0.0376
Epoch 161/500
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Epoch 162/500
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Epoch 163/500
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Epoch 164/500
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Epoch 165/500
1/1 [=====] - 0s 5ms/step - loss: 0.0339
Epoch 166/500
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Epoch 167/500
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Epoch 168/500
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Epoch 169/500
1/1 [=====] - 0s 5ms/step - loss: 0.0312
Epoch 170/500
1/1 [=====] - 0s 6ms/step - loss: 0.0305
Epoch 171/500
1/1 [=====] - 0s 6ms/step - loss: 0.0299
Epoch 172/500
1/1 [=====] - 0s 5ms/step - loss: 0.0293
Epoch 173/500
1/1 [=====] - 0s 5ms/step - loss: 0.0287
Epoch 174/500
1/1 [=====] - 0s 5ms/step - loss: 0.0281
Epoch 175/500
```



```
1/1 [=====] - 0s 6ms/step - loss: 0.0275
Epoch 176/500
1/1 [=====] - 0s 6ms/step - loss: 0.0270
Epoch 177/500
1/1 [=====] - 0s 6ms/step - loss: 0.0264
Epoch 178/500
1/1 [=====] - 0s 60ms/step - loss: 0.0259
Epoch 179/500
1/1 [=====] - 0s 6ms/step - loss: 0.0253
Epoch 180/500
1/1 [=====] - 0s 21ms/step - loss: 0.0248
Epoch 181/500
1/1 [=====] - 0s 6ms/step - loss: 0.0243
Epoch 182/500
1/1 [=====] - 0s 8ms/step - loss: 0.0238
Epoch 183/500
1/1 [=====] - 0s 4ms/step - loss: 0.0233
Epoch 184/500
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Epoch 186/500
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Epoch 188/500
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Epoch 189/500
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Epoch 190/500
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Epoch 191/500
1/1 [=====] - 0s 9ms/step - loss: 0.0197
Epoch 192/500
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Epoch 193/500
1/1 [=====] - 0s 9ms/step - loss: 0.0189
Epoch 194/500
1/1 [=====] - 0s 5ms/step - loss: 0.0186
Epoch 195/500
1/1 [=====] - 0s 11ms/step - loss: 0.0182
Epoch 196/500
1/1 [=====] - 0s 7ms/step - loss: 0.0178
Epoch 197/500
1/1 [=====] - 0s 5ms/step - loss: 0.0174
Epoch 198/500
1/1 [=====] - 0s 13ms/step - loss: 0.0171
Epoch 199/500
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Epoch 200/500
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Epoch 201/500
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Epoch 202/500
1/1 [=====] - 0s 5ms/step - loss: 0.0157
Epoch 203/500
1/1 [=====] - 0s 5ms/step - loss: 0.0154
Epoch 204/500
1/1 [=====] - 0s 7ms/step - loss: 0.0151
Epoch 205/500
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```
Epoch 206/500
1/1 [=====] - 0s 9ms/step - loss: 0.0145
Epoch 207/500
1/1 [=====] - 0s 10ms/step - loss: 0.0142
Epoch 208/500
1/1 [=====] - 0s 5ms/step - loss: 0.0139
Epoch 209/500
1/1 [=====] - 0s 8ms/step - loss: 0.0136
Epoch 210/500
1/1 [=====] - 0s 6ms/step - loss: 0.0133
Epoch 211/500
1/1 [=====] - 0s 7ms/step - loss: 0.0130
Epoch 212/500
1/1 [=====] - 0s 5ms/step - loss: 0.0128
Epoch 213/500
1/1 [=====] - 0s 6ms/step - loss: 0.0125
Epoch 214/500
1/1 [=====] - 0s 58ms/step - loss: 0.0122
Epoch 215/500
1/1 [=====] - 0s 6ms/step - loss: 0.0120
Epoch 216/500
1/1 [=====] - 0s 31ms/step - loss: 0.0118
Epoch 217/500
1/1 [=====] - 0s 12ms/step - loss: 0.0115
Epoch 218/500
1/1 [=====] - 0s 7ms/step - loss: 0.0113
Epoch 219/500
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Epoch 220/500
1/1 [=====] - 0s 10ms/step - loss: 0.0108
Epoch 221/500
1/1 [=====] - 0s 5ms/step - loss: 0.0106
Epoch 222/500
1/1 [=====] - 0s 7ms/step - loss: 0.0104
Epoch 223/500
1/1 [=====] - 0s 6ms/step - loss: 0.0102
Epoch 224/500
1/1 [=====] - 0s 10ms/step - loss: 0.0100
Epoch 225/500
1/1 [=====] - 0s 12ms/step - loss: 0.0097
Epoch 226/500
1/1 [=====] - 0s 9ms/step - loss: 0.0095
Epoch 227/500
1/1 [=====] - 0s 7ms/step - loss: 0.0094
Epoch 228/500
1/1 [=====] - 0s 8ms/step - loss: 0.0092
Epoch 229/500
1/1 [=====] - 0s 12ms/step - loss: 0.0090
Epoch 230/500
1/1 [=====] - 0s 6ms/step - loss: 0.0088
Epoch 231/500
1/1 [=====] - 0s 9ms/step - loss: 0.0086
Epoch 232/500
1/1 [=====] - 0s 14ms/step - loss: 0.0084
Epoch 233/500
1/1 [=====] - 0s 11ms/step - loss: 0.0083
Epoch 234/500
1/1 [=====] - 0s 6ms/step - loss: 0.0081
Epoch 235/500
1/1 [=====] - 0s 6ms/step - loss: 0.0079
Epoch 236/500
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1/1 [=====] - 0s 5ms/step - loss: 0.0078
Epoch 237/500
1/1 [=====] - 0s 15ms/step - loss: 0.0076
Epoch 238/500
1/1 [=====] - 0s 5ms/step - loss: 0.0074
Epoch 239/500
1/1 [=====] - 0s 8ms/step - loss: 0.0073
Epoch 240/500
1/1 [=====] - 0s 5ms/step - loss: 0.0071
Epoch 241/500
1/1 [=====] - 0s 9ms/step - loss: 0.0070
Epoch 242/500
1/1 [=====] - 0s 8ms/step - loss: 0.0069
Epoch 243/500
1/1 [=====] - 0s 8ms/step - loss: 0.0067
Epoch 244/500
1/1 [=====] - 0s 8ms/step - loss: 0.0066
Epoch 245/500
1/1 [=====] - 0s 10ms/step - loss: 0.0064
Epoch 246/500
1/1 [=====] - 0s 8ms/step - loss: 0.0063
Epoch 247/500
1/1 [=====] - 0s 9ms/step - loss: 0.0062
Epoch 248/500
1/1 [=====] - 0s 10ms/step - loss: 0.0060
Epoch 249/500
1/1 [=====] - 0s 11ms/step - loss: 0.0059
Epoch 250/500
1/1 [=====] - 0s 8ms/step - loss: 0.0058
Epoch 251/500
1/1 [=====] - 0s 8ms/step - loss: 0.0057
Epoch 252/500
1/1 [=====] - 0s 7ms/step - loss: 0.0056
Epoch 253/500
1/1 [=====] - 0s 7ms/step - loss: 0.0055
Epoch 254/500
1/1 [=====] - 0s 8ms/step - loss: 0.0053
Epoch 255/500
1/1 [=====] - 0s 8ms/step - loss: 0.0052
Epoch 256/500
1/1 [=====] - 0s 7ms/step - loss: 0.0051
Epoch 257/500
1/1 [=====] - 0s 10ms/step - loss: 0.0050
Epoch 258/500
1/1 [=====] - 0s 5ms/step - loss: 0.0049
Epoch 259/500
1/1 [=====] - 0s 7ms/step - loss: 0.0048
Epoch 260/500
1/1 [=====] - 0s 19ms/step - loss: 0.0047
Epoch 261/500
1/1 [=====] - 0s 8ms/step - loss: 0.0046
Epoch 262/500
1/1 [=====] - 0s 6ms/step - loss: 0.0045
Epoch 263/500
1/1 [=====] - 0s 6ms/step - loss: 0.0044
Epoch 264/500
1/1 [=====] - 0s 8ms/step - loss: 0.0043
Epoch 265/500
1/1 [=====] - 0s 6ms/step - loss: 0.0043
Epoch 266/500
1/1 [=====] - 0s 5ms/step - loss: 0.0042

```
Epoch 267/500
1/1 [=====] - 0s 5ms/step - loss: 0.0041
Epoch 268/500
1/1 [=====] - 0s 5ms/step - loss: 0.0040
Epoch 269/500
1/1 [=====] - 0s 6ms/step - loss: 0.0039
Epoch 270/500
1/1 [=====] - 0s 6ms/step - loss: 0.0038
Epoch 271/500
1/1 [=====] - 0s 6ms/step - loss: 0.0038
Epoch 272/500
1/1 [=====] - 0s 5ms/step - loss: 0.0037
Epoch 273/500
1/1 [=====] - 0s 6ms/step - loss: 0.0036
Epoch 274/500
1/1 [=====] - 0s 5ms/step - loss: 0.0035
Epoch 275/500
1/1 [=====] - 0s 4ms/step - loss: 0.0035
Epoch 276/500
1/1 [=====] - 0s 6ms/step - loss: 0.0034
Epoch 277/500
1/1 [=====] - 0s 6ms/step - loss: 0.0033
Epoch 278/500
1/1 [=====] - 0s 5ms/step - loss: 0.0032
Epoch 279/500
1/1 [=====] - 0s 10ms/step - loss: 0.0032
Epoch 280/500
1/1 [=====] - 0s 5ms/step - loss: 0.0031
Epoch 281/500
1/1 [=====] - 0s 6ms/step - loss: 0.0030
Epoch 282/500
1/1 [=====] - 0s 7ms/step - loss: 0.0030
Epoch 283/500
1/1 [=====] - 0s 7ms/step - loss: 0.0029
Epoch 284/500
1/1 [=====] - 0s 7ms/step - loss: 0.0029
Epoch 285/500
1/1 [=====] - 0s 5ms/step - loss: 0.0028
Epoch 286/500
1/1 [=====] - 0s 6ms/step - loss: 0.0027
Epoch 287/500
1/1 [=====] - 0s 5ms/step - loss: 0.0027
Epoch 288/500
1/1 [=====] - 0s 10ms/step - loss: 0.0026
Epoch 289/500
1/1 [=====] - 0s 6ms/step - loss: 0.0026
Epoch 290/500
1/1 [=====] - 0s 7ms/step - loss: 0.0025
Epoch 291/500
1/1 [=====] - 0s 10ms/step - loss: 0.0025
Epoch 292/500
1/1 [=====] - 0s 25ms/step - loss: 0.0024
Epoch 293/500
1/1 [=====] - 0s 12ms/step - loss: 0.0024
Epoch 294/500
1/1 [=====] - 0s 10ms/step - loss: 0.0023
Epoch 295/500
1/1 [=====] - 0s 13ms/step - loss: 0.0023
Epoch 296/500
1/1 [=====] - 0s 10ms/step - loss: 0.0022
Epoch 297/500
```

1/1 [=====] - 0s 9ms/step - loss: 0.0022
Epoch 298/500
1/1 [=====] - 0s 10ms/step - loss: 0.0021
Epoch 299/500
1/1 [=====] - 0s 9ms/step - loss: 0.0021
Epoch 300/500
1/1 [=====] - 0s 7ms/step - loss: 0.0021
Epoch 301/500
1/1 [=====] - 0s 7ms/step - loss: 0.0020
Epoch 302/500
1/1 [=====] - 0s 10ms/step - loss: 0.0020
Epoch 303/500
1/1 [=====] - 0s 10ms/step - loss: 0.0019
Epoch 304/500
1/1 [=====] - 0s 6ms/step - loss: 0.0019
Epoch 305/500
1/1 [=====] - 0s 6ms/step - loss: 0.0019
Epoch 306/500
1/1 [=====] - 0s 7ms/step - loss: 0.0018
Epoch 307/500
1/1 [=====] - 0s 7ms/step - loss: 0.0018
Epoch 308/500
1/1 [=====] - 0s 7ms/step - loss: 0.0017
Epoch 309/500
1/1 [=====] - 0s 7ms/step - loss: 0.0017
Epoch 310/500
1/1 [=====] - 0s 8ms/step - loss: 0.0017
Epoch 311/500
1/1 [=====] - 0s 9ms/step - loss: 0.0016
Epoch 312/500
1/1 [=====] - 0s 8ms/step - loss: 0.0016
Epoch 313/500
1/1 [=====] - 0s 8ms/step - loss: 0.0016
Epoch 314/500
1/1 [=====] - 0s 5ms/step - loss: 0.0015
Epoch 315/500
1/1 [=====] - 0s 7ms/step - loss: 0.0015
Epoch 316/500
1/1 [=====] - 0s 6ms/step - loss: 0.0015
Epoch 317/500
1/1 [=====] - 0s 6ms/step - loss: 0.0014
Epoch 318/500
1/1 [=====] - 0s 7ms/step - loss: 0.0014
Epoch 319/500
1/1 [=====] - 0s 6ms/step - loss: 0.0014
Epoch 320/500
1/1 [=====] - 0s 5ms/step - loss: 0.0014
Epoch 321/500
1/1 [=====] - 0s 7ms/step - loss: 0.0013
Epoch 322/500
1/1 [=====] - 0s 5ms/step - loss: 0.0013
Epoch 323/500
1/1 [=====] - 0s 6ms/step - loss: 0.0013
Epoch 324/500
1/1 [=====] - 0s 5ms/step - loss: 0.0012
Epoch 325/500
1/1 [=====] - 0s 6ms/step - loss: 0.0012
Epoch 326/500
1/1 [=====] - 0s 6ms/step - loss: 0.0012
Epoch 327/500
1/1 [=====] - 0s 5ms/step - loss: 0.0012

```
Epoch 328/500
1/1 [=====] - 0s 6ms/step - loss: 0.0011
Epoch 329/500
1/1 [=====] - 0s 7ms/step - loss: 0.0011
Epoch 330/500
1/1 [=====] - 0s 6ms/step - loss: 0.0011
Epoch 331/500
1/1 [=====] - 0s 6ms/step - loss: 0.0011
Epoch 332/500
1/1 [=====] - 0s 4ms/step - loss: 0.0011
Epoch 333/500
1/1 [=====] - 0s 7ms/step - loss: 0.0010
Epoch 334/500
1/1 [=====] - 0s 5ms/step - loss: 0.0010
Epoch 335/500
1/1 [=====] - 0s 5ms/step - loss: 9.9421e-04
Epoch 336/500
1/1 [=====] - 0s 5ms/step - loss: 9.7379e-04
Epoch 337/500
1/1 [=====] - 0s 5ms/step - loss: 9.5379e-04
Epoch 338/500
1/1 [=====] - 0s 6ms/step - loss: 9.3419e-04
Epoch 339/500
1/1 [=====] - 0s 6ms/step - loss: 9.1500e-04
Epoch 340/500
1/1 [=====] - 0s 5ms/step - loss: 8.9621e-04
Epoch 341/500
1/1 [=====] - 0s 6ms/step - loss: 8.7780e-04
Epoch 342/500
1/1 [=====] - 0s 6ms/step - loss: 8.5977e-04
Epoch 343/500
1/1 [=====] - 0s 5ms/step - loss: 8.4211e-04
Epoch 344/500
1/1 [=====] - 0s 5ms/step - loss: 8.2481e-04
Epoch 345/500
1/1 [=====] - 0s 6ms/step - loss: 8.0787e-04
Epoch 346/500
1/1 [=====] - 0s 5ms/step - loss: 7.9127e-04
Epoch 347/500
1/1 [=====] - 0s 53ms/step - loss: 7.7502e-04
Epoch 348/500
1/1 [=====] - 0s 7ms/step - loss: 7.5910e-04
Epoch 349/500
1/1 [=====] - 0s 13ms/step - loss: 7.4351e-04
Epoch 350/500
1/1 [=====] - 0s 9ms/step - loss: 7.2824e-04
Epoch 351/500
1/1 [=====] - 0s 6ms/step - loss: 7.1328e-04
Epoch 352/500
1/1 [=====] - 0s 5ms/step - loss: 6.9863e-04
Epoch 353/500
1/1 [=====] - 0s 5ms/step - loss: 6.8428e-04
Epoch 354/500
1/1 [=====] - 0s 6ms/step - loss: 6.7022e-04
Epoch 355/500
1/1 [=====] - 0s 6ms/step - loss: 6.5646e-04
Epoch 356/500
1/1 [=====] - 0s 5ms/step - loss: 6.4297e-04
Epoch 357/500
1/1 [=====] - 0s 5ms/step - loss: 6.2977e-04
Epoch 358/500
```

1/1 [=====] - 0s 6ms/step - loss: 6.1683e-04
Epoch 359/500
1/1 [=====] - 0s 6ms/step - loss: 6.0416e-04
Epoch 360/500
1/1 [=====] - 0s 6ms/step - loss: 5.9175e-04
Epoch 361/500
1/1 [=====] - 0s 6ms/step - loss: 5.7959e-04
Epoch 362/500
1/1 [=====] - 0s 5ms/step - loss: 5.6769e-04
Epoch 363/500
1/1 [=====] - 0s 7ms/step - loss: 5.5603e-04
Epoch 364/500
1/1 [=====] - 0s 5ms/step - loss: 5.4460e-04
Epoch 365/500
1/1 [=====] - 0s 5ms/step - loss: 5.3342e-04
Epoch 366/500
1/1 [=====] - 0s 6ms/step - loss: 5.2246e-04
Epoch 367/500
1/1 [=====] - 0s 5ms/step - loss: 5.1173e-04
Epoch 368/500
1/1 [=====] - 0s 6ms/step - loss: 5.0122e-04
Epoch 369/500
1/1 [=====] - 0s 5ms/step - loss: 4.9093e-04
Epoch 370/500
1/1 [=====] - 0s 6ms/step - loss: 4.8084e-04
Epoch 371/500
1/1 [=====] - 0s 5ms/step - loss: 4.7097e-04
Epoch 372/500
1/1 [=====] - 0s 6ms/step - loss: 4.6129e-04
Epoch 373/500
1/1 [=====] - 0s 5ms/step - loss: 4.5181e-04
Epoch 374/500
1/1 [=====] - 0s 5ms/step - loss: 4.4254e-04
Epoch 375/500
1/1 [=====] - 0s 5ms/step - loss: 4.3344e-04
Epoch 376/500
1/1 [=====] - 0s 5ms/step - loss: 4.2454e-04
Epoch 377/500
1/1 [=====] - 0s 4ms/step - loss: 4.1582e-04
Epoch 378/500
1/1 [=====] - 0s 5ms/step - loss: 4.0728e-04
Epoch 379/500
1/1 [=====] - 0s 6ms/step - loss: 3.9892e-04
Epoch 380/500
1/1 [=====] - 0s 6ms/step - loss: 3.9072e-04
Epoch 381/500
1/1 [=====] - 0s 6ms/step - loss: 3.8270e-04
Epoch 382/500
1/1 [=====] - 0s 6ms/step - loss: 3.7484e-04
Epoch 383/500
1/1 [=====] - 0s 6ms/step - loss: 3.6714e-04
Epoch 384/500
1/1 [=====] - 0s 5ms/step - loss: 3.5960e-04
Epoch 385/500
1/1 [=====] - 0s 6ms/step - loss: 3.5221e-04
Epoch 386/500
1/1 [=====] - 0s 5ms/step - loss: 3.4497e-04
Epoch 387/500
1/1 [=====] - 0s 6ms/step - loss: 3.3789e-04
Epoch 388/500
1/1 [=====] - 0s 5ms/step - loss: 3.3095e-04

Epoch 389/500
1/1 [=====] - 0s 5ms/step - loss: 3.2415e-04
Epoch 390/500
1/1 [=====] - 0s 5ms/step - loss: 3.1749e-04
Epoch 391/500
1/1 [=====] - 0s 5ms/step - loss: 3.1097e-04
Epoch 392/500
1/1 [=====] - 0s 5ms/step - loss: 3.0459e-04
Epoch 393/500
1/1 [=====] - 0s 5ms/step - loss: 2.9833e-04
Epoch 394/500
1/1 [=====] - 0s 7ms/step - loss: 2.9220e-04
Epoch 395/500
1/1 [=====] - 0s 6ms/step - loss: 2.8620e-04
Epoch 396/500
1/1 [=====] - 0s 7ms/step - loss: 2.8032e-04
Epoch 397/500
1/1 [=====] - 0s 6ms/step - loss: 2.7456e-04
Epoch 398/500
1/1 [=====] - 0s 6ms/step - loss: 2.6892e-04
Epoch 399/500
1/1 [=====] - 0s 6ms/step - loss: 2.6340e-04
Epoch 400/500
1/1 [=====] - 0s 8ms/step - loss: 2.5799e-04
Epoch 401/500
1/1 [=====] - 0s 6ms/step - loss: 2.5269e-04
Epoch 402/500
1/1 [=====] - 0s 6ms/step - loss: 2.4750e-04
Epoch 403/500
1/1 [=====] - 0s 5ms/step - loss: 2.4242e-04
Epoch 404/500
1/1 [=====] - 0s 5ms/step - loss: 2.3744e-04
Epoch 405/500
1/1 [=====] - 0s 5ms/step - loss: 2.3256e-04
Epoch 406/500
1/1 [=====] - 0s 5ms/step - loss: 2.2778e-04
Epoch 407/500
1/1 [=====] - 0s 5ms/step - loss: 2.2310e-04
Epoch 408/500
1/1 [=====] - 0s 30ms/step - loss: 2.1852e-04
Epoch 409/500
1/1 [=====] - 0s 13ms/step - loss: 2.1403e-04
Epoch 410/500
1/1 [=====] - 0s 5ms/step - loss: 2.0964e-04
Epoch 411/500
1/1 [=====] - 0s 6ms/step - loss: 2.0533e-04
Epoch 412/500
1/1 [=====] - 0s 6ms/step - loss: 2.0111e-04
Epoch 413/500
1/1 [=====] - 0s 6ms/step - loss: 1.9698e-04
Epoch 414/500
1/1 [=====] - 0s 5ms/step - loss: 1.9294e-04
Epoch 415/500
1/1 [=====] - 0s 7ms/step - loss: 1.8897e-04
Epoch 416/500
1/1 [=====] - 0s 8ms/step - loss: 1.8509e-04
Epoch 417/500
1/1 [=====] - 0s 7ms/step - loss: 1.8129e-04
Epoch 418/500
1/1 [=====] - 0s 5ms/step - loss: 1.7757e-04
Epoch 419/500

1/1 [=====] - 0s 7ms/step - loss: 1.7392e-04
Epoch 420/500
1/1 [=====] - 0s 5ms/step - loss: 1.7035e-04
Epoch 421/500
1/1 [=====] - 0s 6ms/step - loss: 1.6685e-04
Epoch 422/500
1/1 [=====] - 0s 5ms/step - loss: 1.6342e-04
Epoch 423/500
1/1 [=====] - 0s 5ms/step - loss: 1.6006e-04
Epoch 424/500
1/1 [=====] - 0s 5ms/step - loss: 1.5677e-04
Epoch 425/500
1/1 [=====] - 0s 5ms/step - loss: 1.5355e-04
Epoch 426/500
1/1 [=====] - 0s 6ms/step - loss: 1.5040e-04
Epoch 427/500
1/1 [=====] - 0s 5ms/step - loss: 1.4731e-04
Epoch 428/500
1/1 [=====] - 0s 5ms/step - loss: 1.4428e-04
Epoch 429/500
1/1 [=====] - 0s 5ms/step - loss: 1.4132e-04
Epoch 430/500
1/1 [=====] - 0s 5ms/step - loss: 1.3842e-04
Epoch 431/500
1/1 [=====] - 0s 5ms/step - loss: 1.3557e-04
Epoch 432/500
1/1 [=====] - 0s 5ms/step - loss: 1.3279e-04
Epoch 433/500
1/1 [=====] - 0s 5ms/step - loss: 1.3006e-04
Epoch 434/500
1/1 [=====] - 0s 5ms/step - loss: 1.2739e-04
Epoch 435/500
1/1 [=====] - 0s 6ms/step - loss: 1.2477e-04
Epoch 436/500
1/1 [=====] - 0s 5ms/step - loss: 1.2221e-04
Epoch 437/500
1/1 [=====] - 0s 5ms/step - loss: 1.1970e-04
Epoch 438/500
1/1 [=====] - 0s 6ms/step - loss: 1.1724e-04
Epoch 439/500
1/1 [=====] - 0s 4ms/step - loss: 1.1483e-04
Epoch 440/500
1/1 [=====] - 0s 6ms/step - loss: 1.1247e-04
Epoch 441/500
1/1 [=====] - 0s 5ms/step - loss: 1.1016e-04
Epoch 442/500
1/1 [=====] - 0s 5ms/step - loss: 1.0790e-04
Epoch 443/500
1/1 [=====] - 0s 6ms/step - loss: 1.0569e-04
Epoch 444/500
1/1 [=====] - 0s 6ms/step - loss: 1.0351e-04
Epoch 445/500
1/1 [=====] - 0s 6ms/step - loss: 1.0139e-04
Epoch 446/500
1/1 [=====] - 0s 6ms/step - loss: 9.9305e-05
Epoch 447/500
1/1 [=====] - 0s 6ms/step - loss: 9.7266e-05
Epoch 448/500
1/1 [=====] - 0s 5ms/step - loss: 9.5268e-05
Epoch 449/500
1/1 [=====] - 0s 5ms/step - loss: 9.3312e-05

```
Epoch 450/500
1/1 [=====] - 0s 6ms/step - loss: 9.1395e-05
Epoch 451/500
1/1 [=====] - 0s 5ms/step - loss: 8.9519e-05
Epoch 452/500
1/1 [=====] - 0s 6ms/step - loss: 8.7679e-05
Epoch 453/500
1/1 [=====] - 0s 5ms/step - loss: 8.5879e-05
Epoch 454/500
1/1 [=====] - 0s 5ms/step - loss: 8.4115e-05
Epoch 455/500
1/1 [=====] - 0s 5ms/step - loss: 8.2388e-05
Epoch 456/500
1/1 [=====] - 0s 5ms/step - loss: 8.0696e-05
Epoch 457/500
1/1 [=====] - 0s 6ms/step - loss: 7.9038e-05
Epoch 458/500
1/1 [=====] - 0s 6ms/step - loss: 7.7414e-05
Epoch 459/500
1/1 [=====] - 0s 7ms/step - loss: 7.5824e-05
Epoch 460/500
1/1 [=====] - 0s 5ms/step - loss: 7.4267e-05
Epoch 461/500
1/1 [=====] - 0s 7ms/step - loss: 7.2741e-05
Epoch 462/500
1/1 [=====] - 0s 6ms/step - loss: 7.1246e-05
Epoch 463/500
1/1 [=====] - 0s 6ms/step - loss: 6.9783e-05
Epoch 464/500
1/1 [=====] - 0s 6ms/step - loss: 6.8349e-05
Epoch 465/500
1/1 [=====] - 0s 8ms/step - loss: 6.6946e-05
Epoch 466/500
1/1 [=====] - 0s 5ms/step - loss: 6.5570e-05
Epoch 467/500
1/1 [=====] - 0s 6ms/step - loss: 6.4224e-05
Epoch 468/500
1/1 [=====] - 0s 6ms/step - loss: 6.2904e-05
Epoch 469/500
1/1 [=====] - 0s 6ms/step - loss: 6.1611e-05
Epoch 470/500
1/1 [=====] - 0s 5ms/step - loss: 6.0347e-05
Epoch 471/500
1/1 [=====] - 0s 7ms/step - loss: 5.9107e-05
Epoch 472/500
1/1 [=====] - 0s 5ms/step - loss: 5.7892e-05
Epoch 473/500
1/1 [=====] - 0s 6ms/step - loss: 5.6703e-05
Epoch 474/500
1/1 [=====] - 0s 6ms/step - loss: 5.5539e-05
Epoch 475/500
1/1 [=====] - 0s 5ms/step - loss: 5.4397e-05
Epoch 476/500
1/1 [=====] - 0s 6ms/step - loss: 5.3279e-05
Epoch 477/500
1/1 [=====] - 0s 6ms/step - loss: 5.2186e-05
Epoch 478/500
1/1 [=====] - 0s 6ms/step - loss: 5.1114e-05
Epoch 479/500
1/1 [=====] - 0s 5ms/step - loss: 5.0063e-05
Epoch 480/500
```

```

1/1 [=====] - 0s 6ms/step - loss: 4.9036e-05
Epoch 481/500
1/1 [=====] - 0s 5ms/step - loss: 4.8028e-05
Epoch 482/500
1/1 [=====] - 0s 6ms/step - loss: 4.7042e-05
Epoch 483/500
1/1 [=====] - 0s 6ms/step - loss: 4.6075e-05
Epoch 484/500
1/1 [=====] - 0s 6ms/step - loss: 4.5130e-05
Epoch 485/500
1/1 [=====] - 0s 5ms/step - loss: 4.4202e-05
Epoch 486/500
1/1 [=====] - 0s 6ms/step - loss: 4.3295e-05
Epoch 487/500
1/1 [=====] - 0s 5ms/step - loss: 4.2406e-05
Epoch 488/500
1/1 [=====] - 0s 6ms/step - loss: 4.1534e-05
Epoch 489/500
1/1 [=====] - 0s 5ms/step - loss: 4.0681e-05
Epoch 490/500
1/1 [=====] - 0s 5ms/step - loss: 3.9845e-05
Epoch 491/500
1/1 [=====] - 0s 6ms/step - loss: 3.9027e-05
Epoch 492/500
1/1 [=====] - 0s 6ms/step - loss: 3.8226e-05
Epoch 493/500
1/1 [=====] - 0s 6ms/step - loss: 3.7440e-05
Epoch 494/500
1/1 [=====] - 0s 5ms/step - loss: 3.6671e-05
Epoch 495/500
1/1 [=====] - 0s 7ms/step - loss: 3.5918e-05
Epoch 496/500
1/1 [=====] - 0s 5ms/step - loss: 3.5180e-05
Epoch 497/500
1/1 [=====] - 0s 8ms/step - loss: 3.4457e-05
Epoch 498/500
1/1 [=====] - 0s 5ms/step - loss: 3.3750e-05
Epoch 499/500
1/1 [=====] - 0s 7ms/step - loss: 3.3056e-05
Epoch 500/500
1/1 [=====] - 0s 6ms/step - loss: 3.2378e-05
Out[ ]: <keras.callbacks.History at 0x7f8f74604c40>

```

Ok, now you have a model that has been trained to learn the relationship between `x` and `y`. You can use the `model.predict()` method to have it figure out the `y` for a previously unknown `x`. So, for example, if `x=10`, what do you think `y` will be? Take a guess before you run this code:

```

In [ ]: # Make a prediction
print(model.predict([10.0]))

for lay in model.layers:
    print(lay.name)
    print(lay.get_weights())

```

```
1/1 [=====] - 0s 76ms/step
[[18.983398]]
dense_3
[array([[1.9975939]], dtype=float32), array([-0.99254024], dtype=float32)]
```

You might have thought **19**, right? But it ended up being a little under. Why do you think that is?

Remember that neural networks deal with probabilities. So given the data that we fed the model with, it calculated that there is a very high probability that the relationship between **x** and **y** is **$y=2x-1$** , but with only 6 data points we can't know for sure. As a result, the result for 10 is very close to 19, but not necessarily 19.

As you work with neural networks, you'll see this pattern recurring. You will almost always deal with probabilities, not certainties, and will do a little bit of coding to figure out what the result is based on the probabilities, particularly when it comes to classification.

Actividad

Para los siguientes datos construya una red neuronal con dos capas ocultas con N unidades y con función de activación sigmoide (i.e., **activation='sigmoid'**). Escoja N de modo que la predicción para una entrada de 2.5 sea lo más próximo a lo esperado (observe la relación cuadrática entre la entrada y salida). La capa de salida debe tener una sola unidad y su función de activación debe ser lineal (i.e., **activation='linear'**). Compile su modelo con el mismo optimizador y función de costo del ejemplo anterior. Entrene su modelo por 2000 épocas. Calcule el error cuadrático medio MSE en el conjunto de entrenamiento

UNA UNIDAD POR CAPA OCULTA

```
In [ ]: import tensorflow as tf
import numpy as np
from tensorflow import keras
# Declare model inputs and outputs for training  $y = x^2$ 
xs = np.array([-4.0, -3.0, -2.0, -1.0, 0.0, 1.0, 2.0, 3.0, 4.0], dtype=float)
ys = np.array([16, 9, 4, 1, 0, 1, 4, 9, 16], dtype=float)

# numero de unidades por capa
n_unidades = 1
# funcion de activacion sigmoid
funcion_activacion = 'sigmoid'

# Build a Sequential model
# 2 capa oculta
# 1 capa de salida con 1 neurona y funcion de activacion lineal
model = tf.keras.Sequential([
    keras.layers.Dense(units=n_unidades, input_shape=(1,)),
    keras.layers.Dense(units=n_unidades, activation=funcion_activacion),
    keras.layers.Dense(units=1, activation='linear')
])

#compile
model.compile(optimizer='sgd', loss='mean_squared_error')
#fit con epochs 2000
model.fit(xs, ys, epochs=2000)

#predict en x=2.5
print('SE PREDICE:', model.predict([2.5]), " CUANDO EN REALIDAD LA RESPUESTA ES 6.25")

# Error cuadratico medio
from sklearn.metrics import mean_squared_error
# calcular error cuadratico medio
print(mean_squared_error(ys, model.predict(xs)), " ERROR CUADRATICO MEDIO")
```

```
Epoch 1/2000
1/1 [=====] - 0s 494ms/step - loss: 68.0936
Epoch 2/2000
1/1 [=====] - 0s 6ms/step - loss: 66.0691
Epoch 3/2000
1/1 [=====] - 0s 8ms/step - loss: 64.1484
Epoch 4/2000
1/1 [=====] - 0s 6ms/step - loss: 62.3278
Epoch 5/2000
1/1 [=====] - 0s 8ms/step - loss: 60.6035
Epoch 6/2000
1/1 [=====] - 0s 10ms/step - loss: 58.9719
Epoch 7/2000
1/1 [=====] - 0s 7ms/step - loss: 57.4293
Epoch 8/2000
1/1 [=====] - 0s 7ms/step - loss: 55.9724
Epoch 9/2000
1/1 [=====] - 0s 6ms/step - loss: 54.5975
Epoch 10/2000
1/1 [=====] - 0s 7ms/step - loss: 53.3013
Epoch 11/2000
1/1 [=====] - 0s 7ms/step - loss: 52.0804
Epoch 12/2000
1/1 [=====] - 0s 7ms/step - loss: 50.9313
```

```
Epoch 13/2000
1/1 [=====] - 0s 7ms/step - loss: 49.8509
Epoch 14/2000
1/1 [=====] - 0s 7ms/step - loss: 48.8357
Epoch 15/2000
1/1 [=====] - 0s 7ms/step - loss: 47.8827
Epoch 16/2000
1/1 [=====] - 0s 14ms/step - loss: 46.9887
Epoch 17/2000
1/1 [=====] - 0s 6ms/step - loss: 46.1506
Epoch 18/2000
1/1 [=====] - 0s 5ms/step - loss: 45.3655
Epoch 19/2000
1/1 [=====] - 0s 31ms/step - loss: 44.6305
Epoch 20/2000
1/1 [=====] - 0s 8ms/step - loss: 43.9429
Epoch 21/2000
1/1 [=====] - 0s 10ms/step - loss: 43.2999
Epoch 22/2000
1/1 [=====] - 0s 9ms/step - loss: 42.6990
Epoch 23/2000
1/1 [=====] - 0s 8ms/step - loss: 42.1377
Epoch 24/2000
1/1 [=====] - 0s 12ms/step - loss: 41.6137
Epoch 25/2000
1/1 [=====] - 0s 9ms/step - loss: 41.1247
Epoch 26/2000
1/1 [=====] - 0s 8ms/step - loss: 40.6685
Epoch 27/2000
1/1 [=====] - 0s 10ms/step - loss: 40.2431
Epoch 28/2000
1/1 [=====] - 0s 10ms/step - loss: 39.8465
Epoch 29/2000
1/1 [=====] - 0s 7ms/step - loss: 39.4770
Epoch 30/2000
1/1 [=====] - 0s 6ms/step - loss: 39.1328
Epoch 31/2000
1/1 [=====] - 0s 9ms/step - loss: 38.8122
Epoch 32/2000
1/1 [=====] - 0s 6ms/step - loss: 38.5137
Epoch 33/2000
1/1 [=====] - 0s 7ms/step - loss: 38.2358
Epoch 34/2000
1/1 [=====] - 0s 10ms/step - loss: 37.9772
Epoch 35/2000
1/1 [=====] - 0s 6ms/step - loss: 37.7365
Epoch 36/2000
1/1 [=====] - 0s 14ms/step - loss: 37.5125
Epoch 37/2000
1/1 [=====] - 0s 10ms/step - loss: 37.3041
Epoch 38/2000
1/1 [=====] - 0s 6ms/step - loss: 37.1103
Epoch 39/2000
1/1 [=====] - 0s 7ms/step - loss: 36.9300
Epoch 40/2000
1/1 [=====] - 0s 5ms/step - loss: 36.7623
Epoch 41/2000
1/1 [=====] - 0s 7ms/step - loss: 36.6062
Epoch 42/2000
1/1 [=====] - 0s 7ms/step - loss: 36.4611
Epoch 43/2000
```

1/1 [=====] - 0s 9ms/step - loss: 36.3261
Epoch 44/2000
1/1 [=====] - 0s 5ms/step - loss: 36.2006
Epoch 45/2000
1/1 [=====] - 0s 7ms/step - loss: 36.0838
Epoch 46/2000
1/1 [=====] - 0s 8ms/step - loss: 35.9751
Epoch 47/2000
1/1 [=====] - 0s 7ms/step - loss: 35.8739
Epoch 48/2000
1/1 [=====] - 0s 8ms/step - loss: 35.7798
Epoch 49/2000
1/1 [=====] - 0s 10ms/step - loss: 35.6922
Epoch 50/2000
1/1 [=====] - 0s 8ms/step - loss: 35.6106
Epoch 51/2000
1/1 [=====] - 0s 8ms/step - loss: 35.5347
Epoch 52/2000
1/1 [=====] - 0s 8ms/step - loss: 35.4639
Epoch 53/2000
1/1 [=====] - 0s 6ms/step - loss: 35.3980
Epoch 54/2000
1/1 [=====] - 0s 9ms/step - loss: 35.3366
Epoch 55/2000
1/1 [=====] - 0s 6ms/step - loss: 35.2793
Epoch 56/2000
1/1 [=====] - 0s 7ms/step - loss: 35.2259
Epoch 57/2000
1/1 [=====] - 0s 8ms/step - loss: 35.1760
Epoch 58/2000
1/1 [=====] - 0s 7ms/step - loss: 35.1295
Epoch 59/2000
1/1 [=====] - 0s 7ms/step - loss: 35.0860
Epoch 60/2000
1/1 [=====] - 0s 5ms/step - loss: 35.0454
Epoch 61/2000
1/1 [=====] - 0s 7ms/step - loss: 35.0075
Epoch 62/2000
1/1 [=====] - 0s 7ms/step - loss: 34.9720
Epoch 63/2000
1/1 [=====] - 0s 8ms/step - loss: 34.9387
Epoch 64/2000
1/1 [=====] - 0s 10ms/step - loss: 34.9076
Epoch 65/2000
1/1 [=====] - 0s 19ms/step - loss: 34.8784
Epoch 66/2000
1/1 [=====] - 0s 11ms/step - loss: 34.8510
Epoch 67/2000
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Epoch 68/2000
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Epoch 69/2000
1/1 [=====] - 0s 17ms/step - loss: 34.7785
Epoch 70/2000
1/1 [=====] - 0s 10ms/step - loss: 34.7571
Epoch 71/2000
1/1 [=====] - 0s 5ms/step - loss: 34.7370
Epoch 72/2000
1/1 [=====] - 0s 7ms/step - loss: 34.7180
Epoch 73/2000
1/1 [=====] - 0s 10ms/step - loss: 34.7001

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Epoch 74/2000
1/1 [=====] - 0s 8ms/step - loss: 34.6832
Epoch 75/2000
1/1 [=====] - 0s 7ms/step - loss: 34.6672
Epoch 76/2000
1/1 [=====] - 0s 8ms/step - loss: 34.6521
Epoch 77/2000
1/1 [=====] - 0s 7ms/step - loss: 34.6378
Epoch 78/2000
1/1 [=====] - 0s 6ms/step - loss: 34.6241
Epoch 79/2000
1/1 [=====] - 0s 6ms/step - loss: 34.6112
Epoch 80/2000
1/1 [=====] - 0s 11ms/step - loss: 34.5989
Epoch 81/2000
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Epoch 82/2000
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Epoch 83/2000
1/1 [=====] - 0s 9ms/step - loss: 34.5654
Epoch 84/2000
1/1 [=====] - 0s 18ms/step - loss: 34.5552
Epoch 85/2000
1/1 [=====] - 0s 10ms/step - loss: 34.5455
Epoch 86/2000
1/1 [=====] - 0s 7ms/step - loss: 34.5362
Epoch 87/2000
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Epoch 88/2000
1/1 [=====] - 0s 7ms/step - loss: 34.5186
Epoch 89/2000
1/1 [=====] - 0s 12ms/step - loss: 34.5104
Epoch 90/2000
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Epoch 91/2000
1/1 [=====] - 0s 8ms/step - loss: 34.4948
Epoch 92/2000
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Epoch 93/2000
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Epoch 94/2000
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Epoch 96/2000
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Epoch 98/2000
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Epoch 100/2000
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Epoch 101/2000
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Epoch 102/2000
1/1 [=====] - 0s 7ms/step - loss: 34.4256
Epoch 103/2000
1/1 [=====] - 0s 11ms/step - loss: 34.4203
Epoch 104/2000
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1/1 [=====] - 0s 8ms/step - loss: 34.4152
Epoch 105/2000
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Epoch 106/2000
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Epoch 107/2000
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Epoch 110/2000
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Epoch 112/2000
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1/1 [=====] - 0s 7ms/step - loss: 34.3704
Epoch 115/2000
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Epoch 116/2000
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Epoch 117/2000
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Epoch 141/2000
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Epoch 142/2000
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Epoch 143/2000
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Epoch 146/2000
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Epoch 147/2000
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Epoch 149/2000
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Epoch 151/2000
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Epoch 152/2000
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Epoch 153/2000
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Epoch 155/2000
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Epoch 168/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2503
Epoch 169/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2494
Epoch 170/2000
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Epoch 173/2000
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Epoch 174/2000
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Epoch 175/2000
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Epoch 186/2000
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Epoch 188/2000
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Epoch 189/2000
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Epoch 190/2000
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Epoch 191/2000
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Epoch 192/2000
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Epoch 193/2000
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Epoch 194/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2336
Epoch 195/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2332

Epoch 196/2000
1/1 [=====] - 0s 16ms/step - loss: 34.2328
Epoch 197/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2324
Epoch 198/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2321
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Epoch 200/2000
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Epoch 206/2000
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Epoch 207/2000
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Epoch 212/2000
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Epoch 213/2000
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Epoch 214/2000
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Epoch 215/2000
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Epoch 216/2000
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Epoch 217/2000
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Epoch 218/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2271
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Epoch 220/2000
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Epoch 221/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2266
Epoch 222/2000
1/1 [=====] - 0s 86ms/step - loss: 34.2264
Epoch 223/2000
1/1 [=====] - 0s 21ms/step - loss: 34.2263
Epoch 224/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2261
Epoch 225/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2260
Epoch 226/2000

1/1 [=====] - 0s 6ms/step - loss: 34.2259
Epoch 227/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2257
Epoch 228/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2256
Epoch 229/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2255
Epoch 230/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2254
Epoch 231/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2253
Epoch 232/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2252
Epoch 233/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2250
Epoch 234/2000
1/1 [=====] - 0s 17ms/step - loss: 34.2249
Epoch 235/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2248
Epoch 236/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2248
Epoch 237/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2247
Epoch 238/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2246
Epoch 239/2000
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Epoch 240/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2244
Epoch 241/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2243
Epoch 242/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2243
Epoch 243/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2242
Epoch 244/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2241
Epoch 245/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2241
Epoch 246/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2240
Epoch 247/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2239
Epoch 248/2000
1/1 [=====] - 0s 12ms/step - loss: 34.2239
Epoch 249/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2238
Epoch 250/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2238
Epoch 251/2000
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Epoch 252/2000
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Epoch 1263/2000
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Epoch 1293/2000
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Epoch 1666/2000
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Epoch 1667/2000
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Epoch 1668/2000
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Epoch 1669/2000
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Epoch 1670/2000
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Epoch 1671/2000
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Epoch 1672/2000
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Epoch 1673/2000
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Epoch 1674/2000
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Epoch 1675/2000
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Epoch 1676/2000
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Epoch 1678/2000
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Epoch 1679/2000
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Epoch 1680/2000
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Epoch 1681/2000
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Epoch 1686/2000
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Epoch 1687/2000
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Epoch 1688/2000
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Epoch 1689/2000
1/1 [=====] - 0s 16ms/step - loss: 34.2222
Epoch 1690/2000
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Epoch 1692/2000
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Epoch 1693/2000
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Epoch 1698/2000
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Epoch 1699/2000
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Epoch 1700/2000
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Epoch 1701/2000
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Epoch 1702/2000
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Epoch 1714/2000
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Epoch 1751/2000

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Epoch 1780/2000
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Epoch 1781/2000
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Epoch 1800/2000
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Epoch 1811/2000
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Epoch 1812/2000
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Epoch 1813/2000
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Epoch 1814/2000
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Epoch 1815/2000
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Epoch 1816/2000
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Epoch 1817/2000
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Epoch 1818/2000
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Epoch 1819/2000
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Epoch 1820/2000
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Epoch 1821/2000
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Epoch 1822/2000
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Epoch 1823/2000
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Epoch 1824/2000
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Epoch 1840/2000
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Epoch 1841/2000
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Epoch 1842/2000
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Epoch 1843/2000
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Epoch 1844/2000
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Epoch 1845/2000
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Epoch 1846/2000
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Epoch 1847/2000
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Epoch 1848/2000
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Epoch 1849/2000
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Epoch 1850/2000
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Epoch 1851/2000
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Epoch 1852/2000
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Epoch 1862/2000
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Epoch 1863/2000
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Epoch 1868/2000
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Epoch 1869/2000
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Epoch 1870/2000
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Epoch 1871/2000
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Epoch 1872/2000
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Epoch 1873/2000
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Epoch 1875/2000
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Epoch 1876/2000
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Epoch 1878/2000
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Epoch 1879/2000
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Epoch 1880/2000
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Epoch 1881/2000
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Epoch 1882/2000
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Epoch 1883/2000
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Epoch 1884/2000
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Epoch 1885/2000
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Epoch 1886/2000
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Epoch 1887/2000
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Epoch 1888/2000
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Epoch 1889/2000
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Epoch 1890/2000
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Epoch 1894/2000
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Epoch 1896/2000
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Epoch 1897/2000
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Epoch 1899/2000
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Epoch 1900/2000
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Epoch 1901/2000
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Epoch 1902/2000
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Epoch 1903/2000
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Epoch 1905/2000
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Epoch 1906/2000
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Epoch 1907/2000
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Epoch 1908/2000
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Epoch 1909/2000
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Epoch 1910/2000
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Epoch 1911/2000
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Epoch 1912/2000
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Epoch 1913/2000
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Epoch 1914/2000
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Epoch 1915/2000
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Epoch 1927/2000
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Epoch 1932/2000
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Epoch 1933/2000
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Epoch 1934/2000
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Epoch 1936/2000
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Epoch 1940/2000
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Epoch 1941/2000
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Epoch 1942/2000
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Epoch 1943/2000
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Epoch 1944/2000
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Epoch 1945/2000
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Epoch 1948/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2222
Epoch 1949/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2222
Epoch 1950/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2222
Epoch 1951/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2222
Epoch 1952/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2222
Epoch 1953/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2222
Epoch 1954/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2222
Epoch 1955/2000
1/1 [=====] - 0s 20ms/step - loss: 34.2222
Epoch 1956/2000
1/1 [=====] - 0s 12ms/step - loss: 34.2222
Epoch 1957/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2222
Epoch 1958/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2222
Epoch 1959/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2222
Epoch 1960/2000
1/1 [=====] - 0s 21ms/step - loss: 34.2222
Epoch 1961/2000
1/1 [=====] - 0s 14ms/step - loss: 34.2222
Epoch 1962/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2222
Epoch 1963/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2222
Epoch 1964/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2222

Epoch 1965/2000
1/1 [=====] - 0s 16ms/step - loss: 34.2222
Epoch 1966/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2222
Epoch 1967/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2222
Epoch 1968/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2222
Epoch 1969/2000
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Epoch 1970/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2222
Epoch 1971/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2222
Epoch 1972/2000
1/1 [=====] - 0s 14ms/step - loss: 34.2222
Epoch 1973/2000
1/1 [=====] - 0s 13ms/step - loss: 34.2222
Epoch 1974/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2222
Epoch 1975/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2222
Epoch 1976/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2222
Epoch 1977/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2222
Epoch 1978/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2222
Epoch 1979/2000
1/1 [=====] - 0s 13ms/step - loss: 34.2222
Epoch 1980/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2222
Epoch 1981/2000
1/1 [=====] - 0s 15ms/step - loss: 34.2222
Epoch 1982/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2222
Epoch 1983/2000
1/1 [=====] - 0s 58ms/step - loss: 34.2222
Epoch 1984/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2222
Epoch 1985/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2222
Epoch 1986/2000
1/1 [=====] - 0s 17ms/step - loss: 34.2222
Epoch 1987/2000
1/1 [=====] - 0s 18ms/step - loss: 34.2222
Epoch 1988/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2222
Epoch 1989/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2222
Epoch 1990/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2222
Epoch 1991/2000
1/1 [=====] - 0s 14ms/step - loss: 34.2222
Epoch 1992/2000
1/1 [=====] - 0s 18ms/step - loss: 34.2222
Epoch 1993/2000
1/1 [=====] - 0s 14ms/step - loss: 34.2222
Epoch 1994/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2222
Epoch 1995/2000

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1/1 [=====] - 0s 11ms/step - loss: 34.2222
Epoch 1996/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2222
Epoch 1997/2000
1/1 [=====] - 0s 20ms/step - loss: 34.2222
Epoch 1998/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2222
Epoch 1999/2000
1/1 [=====] - 0s 16ms/step - loss: 34.2222
Epoch 2000/2000
1/1 [=====] - 0s 16ms/step - loss: 34.2222
1/1 [=====] - 0s 230ms/step
SE PREDICE: [[6.666662]] CUANDO EN REALIDAD LA RESPUESTA ES 6.25
1/1 [=====] - 0s 47ms/step
34.22222222224203 ERROR CUADRATICO MEDIO, DEBERIA SER LO MAS CERCANO A 0
POSIBLE

```

DOS UNIDADES POR CAPA OCULTA

```

In [ ]: import tensorflow as tf
import numpy as np
from tensorflow import keras
# Declare model inputs and outputs for training y = x^2
xs = np.array([-4.0, -3.0, -2.0, -1.0, 0.0, 1.0, 2.0, 3.0, 4.0], dtype=float)
ys = np.array([16, 9, 4, 1, 0, 1, 4, 9, 16], dtype=float)

# numero de unidades por capa
n_unidades = 2
# funcion de activacion sigmoid
funcion_activacion = 'sigmoid'

# Build a Sequential model
# 2 capa oculta
# 1 capa de salida con 1 neurona y funcion de activacion lineal
model = tf.keras.Sequential([
    keras.layers.Dense(units=n_unidades, input_shape=(1,)),
    keras.layers.Dense(units=n_unidades, activation=funcion_activacion),
    keras.layers.Dense(units=1, activation='linear')
])

#compile
model.compile(optimizer='sgd', loss='mean_squared_error')
#fit con epochs 2000
model.fit(xs, ys, epochs=2000)

#predict en x=2.5
print('SE PREDICE:', model.predict([2.5]), " CUANDO EN REALIDAD LA RESPUESTA ES 6.25")

# Error cuadratico medio
from sklearn.metrics import mean_squared_error
# calcular error cuadratico medio
print(mean_squared_error(ys, model.predict(xs)), " ERROR CUADRATICO MEDIO")

Epoch 1/2000
1/1 [=====] - 1s 571ms/step - loss: 68.4774
Epoch 2/2000
1/1 [=====] - 0s 7ms/step - loss: 66.3153

```

```
Epoch 3/2000
1/1 [=====] - 0s 9ms/step - loss: 64.2540
Epoch 4/2000
1/1 [=====] - 0s 10ms/step - loss: 62.2909
Epoch 5/2000
1/1 [=====] - 0s 7ms/step - loss: 60.4241
Epoch 6/2000
1/1 [=====] - 0s 9ms/step - loss: 58.6515
Epoch 7/2000
1/1 [=====] - 0s 13ms/step - loss: 56.9710
Epoch 8/2000
1/1 [=====] - 0s 10ms/step - loss: 55.3806
Epoch 9/2000
1/1 [=====] - 0s 9ms/step - loss: 53.8779
Epoch 10/2000
1/1 [=====] - 0s 7ms/step - loss: 52.4607
Epoch 11/2000
1/1 [=====] - 0s 8ms/step - loss: 51.1265
Epoch 12/2000
1/1 [=====] - 0s 6ms/step - loss: 49.8726
Epoch 13/2000
1/1 [=====] - 0s 7ms/step - loss: 48.6961
Epoch 14/2000
1/1 [=====] - 0s 9ms/step - loss: 47.5942
Epoch 15/2000
1/1 [=====] - 0s 11ms/step - loss: 46.5638
Epoch 16/2000
1/1 [=====] - 0s 12ms/step - loss: 45.6018
Epoch 17/2000
1/1 [=====] - 0s 10ms/step - loss: 44.7050
Epoch 18/2000
1/1 [=====] - 0s 10ms/step - loss: 43.8702
Epoch 19/2000
1/1 [=====] - 0s 8ms/step - loss: 43.0942
Epoch 20/2000
1/1 [=====] - 0s 16ms/step - loss: 42.3738
Epoch 21/2000
1/1 [=====] - 0s 6ms/step - loss: 41.7060
Epoch 22/2000
1/1 [=====] - 0s 22ms/step - loss: 41.0876
Epoch 23/2000
1/1 [=====] - 0s 7ms/step - loss: 40.5157
Epoch 24/2000
1/1 [=====] - 0s 6ms/step - loss: 39.9873
Epoch 25/2000
1/1 [=====] - 0s 8ms/step - loss: 39.4998
Epoch 26/2000
1/1 [=====] - 0s 7ms/step - loss: 39.0503
Epoch 27/2000
1/1 [=====] - 0s 8ms/step - loss: 38.6364
Epoch 28/2000
1/1 [=====] - 0s 5ms/step - loss: 38.2555
Epoch 29/2000
1/1 [=====] - 0s 8ms/step - loss: 37.9054
Epoch 30/2000
1/1 [=====] - 0s 8ms/step - loss: 37.5839
Epoch 31/2000
1/1 [=====] - 0s 41ms/step - loss: 37.2889
Epoch 32/2000
1/1 [=====] - 0s 6ms/step - loss: 37.0184
Epoch 33/2000
```


1/1 [=====] - 0s 14ms/step - loss: 36.7705
Epoch 34/2000
1/1 [=====] - 0s 6ms/step - loss: 36.5436
Epoch 35/2000
1/1 [=====] - 0s 7ms/step - loss: 36.3360
Epoch 36/2000
1/1 [=====] - 0s 7ms/step - loss: 36.1462
Epoch 37/2000
1/1 [=====] - 0s 8ms/step - loss: 35.9728
Epoch 38/2000
1/1 [=====] - 0s 7ms/step - loss: 35.8145
Epoch 39/2000
1/1 [=====] - 0s 7ms/step - loss: 35.6700
Epoch 40/2000
1/1 [=====] - 0s 5ms/step - loss: 35.5382
Epoch 41/2000
1/1 [=====] - 0s 6ms/step - loss: 35.4181
Epoch 42/2000
1/1 [=====] - 0s 8ms/step - loss: 35.3086
Epoch 43/2000
1/1 [=====] - 0s 5ms/step - loss: 35.2089
Epoch 44/2000
1/1 [=====] - 0s 7ms/step - loss: 35.1182
Epoch 45/2000
1/1 [=====] - 0s 7ms/step - loss: 35.0357
Epoch 46/2000
1/1 [=====] - 0s 7ms/step - loss: 34.9606
Epoch 47/2000
1/1 [=====] - 0s 7ms/step - loss: 34.8923
Epoch 48/2000
1/1 [=====] - 0s 6ms/step - loss: 34.8303
Epoch 49/2000
1/1 [=====] - 0s 6ms/step - loss: 34.7740
Epoch 50/2000
1/1 [=====] - 0s 5ms/step - loss: 34.7228
Epoch 51/2000
1/1 [=====] - 0s 7ms/step - loss: 34.6764
Epoch 52/2000
1/1 [=====] - 0s 7ms/step - loss: 34.6342
Epoch 53/2000
1/1 [=====] - 0s 8ms/step - loss: 34.5960
Epoch 54/2000
1/1 [=====] - 0s 6ms/step - loss: 34.5613
Epoch 55/2000
1/1 [=====] - 0s 7ms/step - loss: 34.5298
Epoch 56/2000
1/1 [=====] - 0s 8ms/step - loss: 34.5013
Epoch 57/2000
1/1 [=====] - 0s 7ms/step - loss: 34.4755
Epoch 58/2000
1/1 [=====] - 0s 9ms/step - loss: 34.4520
Epoch 59/2000
1/1 [=====] - 0s 7ms/step - loss: 34.4308
Epoch 60/2000
1/1 [=====] - 0s 5ms/step - loss: 34.4116
Epoch 61/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3941
Epoch 62/2000
1/1 [=====] - 0s 60ms/step - loss: 34.3784
Epoch 63/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3641

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Epoch 64/2000
1/1 [=====] - 0s 8ms/step - loss: 34.3511
Epoch 65/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3394
Epoch 66/2000
1/1 [=====] - 0s 14ms/step - loss: 34.3288
Epoch 67/2000
1/1 [=====] - 0s 8ms/step - loss: 34.3192
Epoch 68/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3106
Epoch 69/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3027
Epoch 70/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2956
Epoch 71/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2891
Epoch 72/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2833
Epoch 73/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2780
Epoch 74/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2733
Epoch 75/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2689
Epoch 76/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2650
Epoch 77/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2615
Epoch 78/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2583
Epoch 79/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2554
Epoch 80/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2527
Epoch 81/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2503
Epoch 82/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2482
Epoch 83/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2462
Epoch 84/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2445
Epoch 85/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2429
Epoch 86/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2414
Epoch 87/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2401
Epoch 88/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2389
Epoch 89/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2378
Epoch 90/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2368
Epoch 91/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2359
Epoch 92/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2351
Epoch 93/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2343
Epoch 94/2000
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1/1 [=====] - 0s 8ms/step - loss: 34.2337
Epoch 95/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2331
Epoch 96/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2325
Epoch 97/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2320
Epoch 98/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2315
Epoch 99/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2311
Epoch 100/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2307
Epoch 101/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2303
Epoch 102/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2300
Epoch 103/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2297
Epoch 104/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2294
Epoch 105/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2292
Epoch 106/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2290
Epoch 107/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2288
Epoch 108/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2286
Epoch 109/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2284
Epoch 110/2000
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Epoch 111/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2281
Epoch 112/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2279
Epoch 113/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2278
Epoch 114/2000
1/1 [=====] - 0s 20ms/step - loss: 34.2277
Epoch 115/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2275
Epoch 116/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2274
Epoch 117/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2273
Epoch 118/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2272
Epoch 119/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2271
Epoch 120/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2271
Epoch 121/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2270
Epoch 122/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2269
Epoch 123/2000
1/1 [=====] - 0s 12ms/step - loss: 34.2268
Epoch 124/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2268

Epoch 125/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2267
Epoch 126/2000
1/1 [=====] - 0s 14ms/step - loss: 34.2267
Epoch 127/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2266
Epoch 128/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2265
Epoch 129/2000
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Epoch 130/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2264
Epoch 131/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2264
Epoch 132/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2263
Epoch 133/2000
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Epoch 134/2000
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Epoch 135/2000
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Epoch 136/2000
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Epoch 137/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2261
Epoch 138/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2261
Epoch 139/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2261
Epoch 140/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2260
Epoch 141/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2260
Epoch 142/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2260
Epoch 143/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2259
Epoch 144/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2259
Epoch 145/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2259
Epoch 146/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2258
Epoch 147/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2258
Epoch 148/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2258
Epoch 149/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2257
Epoch 150/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2257
Epoch 151/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2257
Epoch 152/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2257
Epoch 153/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2256
Epoch 154/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2256
Epoch 155/2000

1/1 [=====] - 0s 8ms/step - loss: 34.2256
Epoch 156/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2256
Epoch 157/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2255
Epoch 158/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2255
Epoch 159/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2255
Epoch 160/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2255
Epoch 161/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2254
Epoch 162/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2254
Epoch 163/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2254
Epoch 164/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2254
Epoch 165/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2253
Epoch 166/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2253
Epoch 167/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2253
Epoch 168/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2253
Epoch 169/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2253
Epoch 170/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2252
Epoch 171/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2252
Epoch 172/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2252
Epoch 173/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2252
Epoch 174/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2252
Epoch 175/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2251
Epoch 176/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2251
Epoch 177/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2251
Epoch 178/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2251
Epoch 179/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2251
Epoch 180/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2250
Epoch 181/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2250
Epoch 182/2000
1/1 [=====] - 0s 16ms/step - loss: 34.2250
Epoch 183/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2250
Epoch 184/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2250
Epoch 185/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2249

```
Epoch 186/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2249
Epoch 187/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2249
Epoch 188/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2249
Epoch 189/2000
1/1 [=====] - 0s 31ms/step - loss: 34.2249
Epoch 190/2000
1/1 [=====] - 0s 15ms/step - loss: 34.2248
Epoch 191/2000
1/1 [=====] - 0s 35ms/step - loss: 34.2248
Epoch 192/2000
1/1 [=====] - 0s 14ms/step - loss: 34.2248
Epoch 193/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2248
Epoch 194/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2248
Epoch 195/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2248
Epoch 196/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2247
Epoch 197/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2247
Epoch 198/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2247
Epoch 199/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2247
Epoch 200/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2247
Epoch 201/2000
1/1 [=====] - 0s 20ms/step - loss: 34.2247
Epoch 202/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2246
Epoch 203/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2246
Epoch 204/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2246
Epoch 205/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2246
Epoch 206/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2246
Epoch 207/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2246
Epoch 208/2000
1/1 [=====] - 0s 13ms/step - loss: 34.2245
Epoch 209/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2245
Epoch 210/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2245
Epoch 211/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2245
Epoch 212/2000
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Epoch 215/2000
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Epoch 216/2000
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Epoch 521/2000

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Epoch 582/2000
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Epoch 612/2000
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Epoch 643/2000

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Epoch 704/2000

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Epoch 734/2000
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Epoch 760/2000
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Epoch 764/2000
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Epoch 765/2000
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Epoch 767/2000
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Epoch 773/2000
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Epoch 776/2000
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Epoch 777/2000
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Epoch 779/2000
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Epoch 780/2000
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Epoch 782/2000
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Epoch 786/2000
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Epoch 787/2000
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Epoch 788/2000
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Epoch 789/2000
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Epoch 791/2000
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Epoch 792/2000
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Epoch 793/2000
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Epoch 794/2000
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Epoch 795/2000
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Epoch 796/2000
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Epoch 797/2000
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Epoch 798/2000
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Epoch 799/2000
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Epoch 800/2000
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Epoch 801/2000
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Epoch 802/2000
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Epoch 807/2000
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Epoch 808/2000
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Epoch 812/2000
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Epoch 814/2000
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Epoch 817/2000
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Epoch 818/2000
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Epoch 819/2000
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Epoch 820/2000
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Epoch 825/2000
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Epoch 826/2000

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Epoch 827/2000
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Epoch 828/2000
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Epoch 829/2000
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Epoch 830/2000
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Epoch 831/2000
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Epoch 832/2000
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Epoch 834/2000
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Epoch 835/2000
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Epoch 836/2000
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Epoch 837/2000
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Epoch 838/2000
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Epoch 839/2000
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Epoch 840/2000
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Epoch 841/2000
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Epoch 842/2000
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Epoch 843/2000
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Epoch 844/2000
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Epoch 845/2000
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Epoch 846/2000
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Epoch 847/2000
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Epoch 848/2000
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Epoch 855/2000
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Epoch 856/2000
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Epoch 861/2000
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Epoch 862/2000
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Epoch 863/2000
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Epoch 864/2000
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Epoch 865/2000
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Epoch 866/2000
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Epoch 867/2000
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Epoch 868/2000
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Epoch 869/2000
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Epoch 871/2000
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Epoch 872/2000
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Epoch 873/2000
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Epoch 874/2000
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Epoch 875/2000
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Epoch 876/2000
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Epoch 877/2000
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Epoch 878/2000
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Epoch 879/2000
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Epoch 881/2000
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Epoch 882/2000
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Epoch 887/2000

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Epoch 895/2000
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Epoch 897/2000
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Epoch 898/2000
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Epoch 899/2000
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Epoch 900/2000
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Epoch 902/2000
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Epoch 904/2000
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Epoch 907/2000
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Epoch 908/2000
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Epoch 911/2000
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Epoch 912/2000
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Epoch 914/2000
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Epoch 915/2000
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Epoch 917/2000
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Epoch 919/2000
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Epoch 921/2000
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Epoch 922/2000
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Epoch 923/2000
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Epoch 924/2000
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Epoch 925/2000
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Epoch 926/2000
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Epoch 927/2000
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Epoch 928/2000
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Epoch 929/2000
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Epoch 930/2000
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Epoch 935/2000
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Epoch 941/2000
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Epoch 944/2000
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Epoch 945/2000
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Epoch 946/2000
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Epoch 947/2000
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Epoch 948/2000

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Epoch 950/2000
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Epoch 952/2000
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Epoch 953/2000
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Epoch 954/2000
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Epoch 955/2000
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Epoch 957/2000
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Epoch 958/2000
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Epoch 959/2000
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Epoch 960/2000
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Epoch 961/2000
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Epoch 962/2000
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Epoch 963/2000
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Epoch 964/2000
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Epoch 965/2000
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Epoch 967/2000
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Epoch 968/2000
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Epoch 971/2000
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Epoch 972/2000
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Epoch 974/2000
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Epoch 975/2000
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Epoch 976/2000
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Epoch 977/2000
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Epoch 978/2000
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Epoch 979/2000
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Epoch 980/2000
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Epoch 981/2000
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Epoch 982/2000
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Epoch 983/2000
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Epoch 984/2000
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Epoch 985/2000
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Epoch 986/2000
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Epoch 987/2000
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Epoch 988/2000
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Epoch 989/2000
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Epoch 990/2000
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Epoch 991/2000
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Epoch 992/2000
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Epoch 993/2000
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Epoch 994/2000
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Epoch 995/2000
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Epoch 996/2000
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Epoch 997/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1635
Epoch 998/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1629
Epoch 999/2000
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Epoch 1000/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1618
Epoch 1001/2000
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Epoch 1002/2000
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Epoch 1003/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1599
Epoch 1004/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1593
Epoch 1005/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1587
Epoch 1006/2000
1/1 [=====] - 0s 16ms/step - loss: 34.1580
Epoch 1007/2000
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Epoch 1008/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1567
Epoch 1009/2000


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Epoch 1011/2000
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Epoch 1012/2000
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Epoch 1013/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1534
Epoch 1014/2000
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Epoch 1015/2000
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Epoch 1016/2000
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Epoch 1017/2000
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Epoch 1018/2000
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Epoch 1019/2000
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Epoch 1020/2000
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Epoch 1021/2000
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Epoch 1022/2000
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Epoch 1023/2000
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Epoch 1024/2000
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Epoch 1025/2000
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Epoch 1026/2000
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Epoch 1027/2000
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Epoch 1028/2000
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Epoch 1029/2000
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Epoch 1030/2000
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Epoch 1031/2000
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Epoch 1032/2000
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Epoch 1033/2000
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Epoch 1034/2000
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Epoch 1035/2000
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Epoch 1036/2000
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Epoch 1037/2000
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Epoch 1038/2000
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Epoch 1039/2000
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```

Epoch 1040/2000
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Epoch 1041/2000
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Epoch 1042/2000
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Epoch 1043/2000
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Epoch 1044/2000
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Epoch 1045/2000
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Epoch 1046/2000
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Epoch 1047/2000
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Epoch 1048/2000
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Epoch 1049/2000
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Epoch 1050/2000
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Epoch 1055/2000
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Epoch 1068/2000
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Epoch 1069/2000
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Epoch 1070/2000

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Epoch 1072/2000
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Epoch 1073/2000
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Epoch 1074/2000
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Epoch 1075/2000
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Epoch 1079/2000
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Epoch 1098/2000
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Epoch 1099/2000
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Epoch 1104/2000
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Epoch 1105/2000
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Epoch 1127/2000
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Epoch 1129/2000
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Epoch 1130/2000
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Epoch 1131/2000
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Epoch 1133/2000
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Epoch 1135/2000
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Epoch 1142/2000
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Epoch 1146/2000
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Epoch 1147/2000
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Epoch 1173/2000
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Epoch 1192/2000

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Epoch 1253/2000

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Epoch 1313/2000
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Epoch 1314/2000

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Epoch 1315/2000
1/1 [=====] - 0s 5ms/step - loss: 32.7192
Epoch 1316/2000
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Epoch 1317/2000
1/1 [=====] - 0s 10ms/step - loss: 32.6837
Epoch 1318/2000
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Epoch 1319/2000
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Epoch 1320/2000
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Epoch 1321/2000
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Epoch 1322/2000
1/1 [=====] - 0s 5ms/step - loss: 32.5908
Epoch 1323/2000
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Epoch 1324/2000
1/1 [=====] - 0s 6ms/step - loss: 32.5519
Epoch 1325/2000
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Epoch 1326/2000
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Epoch 1327/2000
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Epoch 1328/2000
1/1 [=====] - 0s 10ms/step - loss: 32.4711
Epoch 1329/2000
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Epoch 1330/2000
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Epoch 1331/2000
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Epoch 1332/2000
1/1 [=====] - 0s 12ms/step - loss: 32.3861
Epoch 1333/2000
1/1 [=====] - 0s 6ms/step - loss: 32.3641
Epoch 1334/2000
1/1 [=====] - 0s 7ms/step - loss: 32.3419
Epoch 1335/2000
1/1 [=====] - 0s 18ms/step - loss: 32.3194
Epoch 1336/2000
1/1 [=====] - 0s 4ms/step - loss: 32.2967
Epoch 1337/2000
1/1 [=====] - 0s 6ms/step - loss: 32.2736
Epoch 1338/2000
1/1 [=====] - 0s 5ms/step - loss: 32.2502
Epoch 1339/2000
1/1 [=====] - 0s 6ms/step - loss: 32.2266
Epoch 1340/2000
1/1 [=====] - 0s 6ms/step - loss: 32.2026
Epoch 1341/2000
1/1 [=====] - 0s 5ms/step - loss: 32.1784
Epoch 1342/2000
1/1 [=====] - 0s 5ms/step - loss: 32.1538
Epoch 1343/2000
1/1 [=====] - 0s 9ms/step - loss: 32.1290
Epoch 1344/2000
1/1 [=====] - 0s 6ms/step - loss: 32.1038

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Epoch 1345/2000
1/1 [=====] - 0s 7ms/step - loss: 32.0783
Epoch 1346/2000
1/1 [=====] - 0s 6ms/step - loss: 32.0525
Epoch 1347/2000
1/1 [=====] - 0s 9ms/step - loss: 32.0264
Epoch 1348/2000
1/1 [=====] - 0s 7ms/step - loss: 32.0000
Epoch 1349/2000
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Epoch 1350/2000
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Epoch 1351/2000
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Epoch 1352/2000
1/1 [=====] - 0s 13ms/step - loss: 31.8910
Epoch 1353/2000
1/1 [=====] - 0s 11ms/step - loss: 31.8629
Epoch 1354/2000
1/1 [=====] - 0s 8ms/step - loss: 31.8345
Epoch 1355/2000
1/1 [=====] - 0s 8ms/step - loss: 31.8058
Epoch 1356/2000
1/1 [=====] - 0s 8ms/step - loss: 31.7767
Epoch 1357/2000
1/1 [=====] - 0s 7ms/step - loss: 31.7472
Epoch 1358/2000
1/1 [=====] - 0s 12ms/step - loss: 31.7174
Epoch 1359/2000
1/1 [=====] - 0s 12ms/step - loss: 31.6873
Epoch 1360/2000
1/1 [=====] - 0s 8ms/step - loss: 31.6568
Epoch 1361/2000
1/1 [=====] - 0s 10ms/step - loss: 31.6259
Epoch 1362/2000
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Epoch 1363/2000
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Epoch 1364/2000
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Epoch 1365/2000
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Epoch 1366/2000
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Epoch 1367/2000
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Epoch 1368/2000
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Epoch 1369/2000
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Epoch 1370/2000
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Epoch 1371/2000
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Epoch 1372/2000
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Epoch 1374/2000
1/1 [=====] - 0s 6ms/step - loss: 31.1909
Epoch 1375/2000
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Epoch 1376/2000
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Epoch 1377/2000
1/1 [=====] - 0s 5ms/step - loss: 31.0813
Epoch 1378/2000
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Epoch 1379/2000
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Epoch 1380/2000
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Epoch 1381/2000
1/1 [=====] - 0s 6ms/step - loss: 30.9295
Epoch 1382/2000
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Epoch 1383/2000
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Epoch 1384/2000
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Epoch 1385/2000
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Epoch 1386/2000
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Epoch 1387/2000
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Epoch 1388/2000
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Epoch 1389/2000
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Epoch 1393/2000
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Epoch 1394/2000
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Epoch 1395/2000
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Epoch 1397/2000
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Epoch 1398/2000
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Epoch 1399/2000
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Epoch 1402/2000
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Epoch 1403/2000
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Epoch 1404/2000
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Epoch 1405/2000
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Epoch 1407/2000
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Epoch 1408/2000
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Epoch 1409/2000
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Epoch 1417/2000
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Epoch 1418/2000
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Epoch 1419/2000
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Epoch 1420/2000
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Epoch 1423/2000
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Epoch 1424/2000
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Epoch 1426/2000
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Epoch 1427/2000
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Epoch 1435/2000
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Epoch 1436/2000

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Epoch 1438/2000
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Epoch 1440/2000
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Epoch 1441/2000
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Epoch 1442/2000
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Epoch 1443/2000
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Epoch 1444/2000
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Epoch 1445/2000
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Epoch 1446/2000
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Epoch 1448/2000
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Epoch 1449/2000
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Epoch 1450/2000
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Epoch 1451/2000
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Epoch 1452/2000
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Epoch 1453/2000
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Epoch 1462/2000
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Epoch 1476/2000
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Epoch 1477/2000
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Epoch 1479/2000
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Epoch 1480/2000
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Epoch 1481/2000
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Epoch 1482/2000
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Epoch 1486/2000
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Epoch 1491/2000
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Epoch 1494/2000
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Epoch 1495/2000
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Epoch 1497/2000

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Epoch 1529/2000
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Epoch 1558/2000

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Epoch 1562/2000
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Epoch 1565/2000
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Epoch 1566/2000
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Epoch 1567/2000
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Epoch 1568/2000
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Epoch 1575/2000
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Epoch 1576/2000
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Epoch 1578/2000
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Epoch 1579/2000
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Epoch 1582/2000
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Epoch 1583/2000
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Epoch 1584/2000
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Epoch 1585/2000
1/1 [=====] - 0s 8ms/step - loss: 16.2061
Epoch 1586/2000
1/1 [=====] - 0s 6ms/step - loss: 16.1255
Epoch 1587/2000
1/1 [=====] - 0s 7ms/step - loss: 16.0452
Epoch 1588/2000
1/1 [=====] - 0s 8ms/step - loss: 15.9651

Epoch 1589/2000
1/1 [=====] - 0s 6ms/step - loss: 15.8852
Epoch 1590/2000
1/1 [=====] - 0s 6ms/step - loss: 15.8055
Epoch 1591/2000
1/1 [=====] - 0s 7ms/step - loss: 15.7260
Epoch 1592/2000
1/1 [=====] - 0s 6ms/step - loss: 15.6467
Epoch 1593/2000
1/1 [=====] - 0s 6ms/step - loss: 15.5677
Epoch 1594/2000
1/1 [=====] - 0s 6ms/step - loss: 15.4889
Epoch 1595/2000
1/1 [=====] - 0s 7ms/step - loss: 15.4103
Epoch 1596/2000
1/1 [=====] - 0s 7ms/step - loss: 15.3320
Epoch 1597/2000
1/1 [=====] - 0s 6ms/step - loss: 15.2539
Epoch 1598/2000
1/1 [=====] - 0s 7ms/step - loss: 15.1760
Epoch 1599/2000
1/1 [=====] - 0s 6ms/step - loss: 15.0984
Epoch 1600/2000
1/1 [=====] - 0s 8ms/step - loss: 15.0210
Epoch 1601/2000
1/1 [=====] - 0s 10ms/step - loss: 14.9439
Epoch 1602/2000
1/1 [=====] - 0s 8ms/step - loss: 14.8670
Epoch 1603/2000
1/1 [=====] - 0s 28ms/step - loss: 14.7903
Epoch 1604/2000
1/1 [=====] - 0s 10ms/step - loss: 14.7139
Epoch 1605/2000
1/1 [=====] - 0s 6ms/step - loss: 14.6378
Epoch 1606/2000
1/1 [=====] - 0s 11ms/step - loss: 14.5619
Epoch 1607/2000
1/1 [=====] - 0s 6ms/step - loss: 14.4863
Epoch 1608/2000
1/1 [=====] - 0s 5ms/step - loss: 14.4109
Epoch 1609/2000
1/1 [=====] - 0s 7ms/step - loss: 14.3358
Epoch 1610/2000
1/1 [=====] - 0s 7ms/step - loss: 14.2609
Epoch 1611/2000
1/1 [=====] - 0s 17ms/step - loss: 14.1863
Epoch 1612/2000
1/1 [=====] - 0s 7ms/step - loss: 14.1120
Epoch 1613/2000
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Epoch 1614/2000
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Epoch 1615/2000
1/1 [=====] - 0s 8ms/step - loss: 13.8907
Epoch 1616/2000
1/1 [=====] - 0s 5ms/step - loss: 13.8174
Epoch 1617/2000
1/1 [=====] - 0s 5ms/step - loss: 13.7445
Epoch 1618/2000
1/1 [=====] - 0s 5ms/step - loss: 13.6718
Epoch 1619/2000

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1/1 [=====] - 0s 7ms/step - loss: 13.5994
Epoch 1620/2000
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Epoch 1621/2000
1/1 [=====] - 0s 6ms/step - loss: 13.4554
Epoch 1622/2000
1/1 [=====] - 0s 6ms/step - loss: 13.3838
Epoch 1623/2000
1/1 [=====] - 0s 5ms/step - loss: 13.3125
Epoch 1624/2000
1/1 [=====] - 0s 6ms/step - loss: 13.2415
Epoch 1625/2000
1/1 [=====] - 0s 6ms/step - loss: 13.1708
Epoch 1626/2000
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Epoch 1627/2000
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Epoch 1628/2000
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Epoch 1629/2000
1/1 [=====] - 0s 7ms/step - loss: 12.8908
Epoch 1630/2000
1/1 [=====] - 0s 40ms/step - loss: 12.8215
Epoch 1631/2000
1/1 [=====] - 0s 8ms/step - loss: 12.7525
Epoch 1632/2000
1/1 [=====] - 0s 10ms/step - loss: 12.6838
Epoch 1633/2000
1/1 [=====] - 0s 5ms/step - loss: 12.6154
Epoch 1634/2000
1/1 [=====] - 0s 6ms/step - loss: 12.5473
Epoch 1635/2000
1/1 [=====] - 0s 5ms/step - loss: 12.4794
Epoch 1636/2000
1/1 [=====] - 0s 7ms/step - loss: 12.4119
Epoch 1637/2000
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Epoch 1638/2000
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Epoch 1639/2000
1/1 [=====] - 0s 7ms/step - loss: 12.2111
Epoch 1640/2000
1/1 [=====] - 0s 4ms/step - loss: 12.1448
Epoch 1641/2000
1/1 [=====] - 0s 7ms/step - loss: 12.0787
Epoch 1642/2000
1/1 [=====] - 0s 14ms/step - loss: 12.0130
Epoch 1643/2000
1/1 [=====] - 0s 5ms/step - loss: 11.9475
Epoch 1644/2000
1/1 [=====] - 0s 8ms/step - loss: 11.8824
Epoch 1645/2000
1/1 [=====] - 0s 6ms/step - loss: 11.8175
Epoch 1646/2000
1/1 [=====] - 0s 6ms/step - loss: 11.7530
Epoch 1647/2000
1/1 [=====] - 0s 5ms/step - loss: 11.6887
Epoch 1648/2000
1/1 [=====] - 0s 6ms/step - loss: 11.6248
Epoch 1649/2000
1/1 [=====] - 0s 6ms/step - loss: 11.5612
```

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Epoch 1650/2000
1/1 [=====] - 0s 5ms/step - loss: 11.4978
Epoch 1651/2000
1/1 [=====] - 0s 8ms/step - loss: 11.4348
Epoch 1652/2000
1/1 [=====] - 0s 7ms/step - loss: 11.3720
Epoch 1653/2000
1/1 [=====] - 0s 19ms/step - loss: 11.3096
Epoch 1654/2000
1/1 [=====] - 0s 6ms/step - loss: 11.2474
Epoch 1655/2000
1/1 [=====] - 0s 6ms/step - loss: 11.1856
Epoch 1656/2000
1/1 [=====] - 0s 8ms/step - loss: 11.1241
Epoch 1657/2000
1/1 [=====] - 0s 5ms/step - loss: 11.0628
Epoch 1658/2000
1/1 [=====] - 0s 9ms/step - loss: 11.0019
Epoch 1659/2000
1/1 [=====] - 0s 9ms/step - loss: 10.9412
Epoch 1660/2000
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Epoch 1661/2000
1/1 [=====] - 0s 6ms/step - loss: 10.8209
Epoch 1662/2000
1/1 [=====] - 0s 5ms/step - loss: 10.7611
Epoch 1663/2000
1/1 [=====] - 0s 6ms/step - loss: 10.7017
Epoch 1664/2000
1/1 [=====] - 0s 6ms/step - loss: 10.6426
Epoch 1665/2000
1/1 [=====] - 0s 5ms/step - loss: 10.5837
Epoch 1666/2000
1/1 [=====] - 0s 7ms/step - loss: 10.5252
Epoch 1667/2000
1/1 [=====] - 0s 7ms/step - loss: 10.4670
Epoch 1668/2000
1/1 [=====] - 0s 6ms/step - loss: 10.4090
Epoch 1669/2000
1/1 [=====] - 0s 11ms/step - loss: 10.3514
Epoch 1670/2000
1/1 [=====] - 0s 6ms/step - loss: 10.2941
Epoch 1671/2000
1/1 [=====] - 0s 6ms/step - loss: 10.2370
Epoch 1672/2000
1/1 [=====] - 0s 9ms/step - loss: 10.1803
Epoch 1673/2000
1/1 [=====] - 0s 20ms/step - loss: 10.1238
Epoch 1674/2000
1/1 [=====] - 0s 6ms/step - loss: 10.0677
Epoch 1675/2000
1/1 [=====] - 0s 11ms/step - loss: 10.0118
Epoch 1676/2000
1/1 [=====] - 0s 29ms/step - loss: 9.9563
Epoch 1677/2000
1/1 [=====] - 0s 5ms/step - loss: 9.9010
Epoch 1678/2000
1/1 [=====] - 0s 7ms/step - loss: 9.8461
Epoch 1679/2000
1/1 [=====] - 0s 7ms/step - loss: 9.7914
Epoch 1680/2000
```

```
1/1 [=====] - 0s 7ms/step - loss: 9.7370
Epoch 1681/2000
1/1 [=====] - 0s 12ms/step - loss: 9.6829
Epoch 1682/2000
1/1 [=====] - 0s 6ms/step - loss: 9.6291
Epoch 1683/2000
1/1 [=====] - 0s 36ms/step - loss: 9.5756
Epoch 1684/2000
1/1 [=====] - 0s 5ms/step - loss: 9.5224
Epoch 1685/2000
1/1 [=====] - 0s 9ms/step - loss: 9.4695
Epoch 1686/2000
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Epoch 1687/2000
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Epoch 1688/2000
1/1 [=====] - 0s 6ms/step - loss: 9.3124
Epoch 1689/2000
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Epoch 1690/2000
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Epoch 1691/2000
1/1 [=====] - 0s 6ms/step - loss: 9.1579
Epoch 1692/2000
1/1 [=====] - 0s 5ms/step - loss: 9.1070
Epoch 1693/2000
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Epoch 1694/2000
1/1 [=====] - 0s 5ms/step - loss: 9.0060
Epoch 1695/2000
1/1 [=====] - 0s 6ms/step - loss: 8.9559
Epoch 1696/2000
1/1 [=====] - 0s 9ms/step - loss: 8.9061
Epoch 1697/2000
1/1 [=====] - 0s 7ms/step - loss: 8.8566
Epoch 1698/2000
1/1 [=====] - 0s 16ms/step - loss: 8.8074
Epoch 1699/2000
1/1 [=====] - 0s 5ms/step - loss: 8.7584
Epoch 1700/2000
1/1 [=====] - 0s 6ms/step - loss: 8.7097
Epoch 1701/2000
1/1 [=====] - 0s 7ms/step - loss: 8.6613
Epoch 1702/2000
1/1 [=====] - 0s 5ms/step - loss: 8.6132
Epoch 1703/2000
1/1 [=====] - 0s 8ms/step - loss: 8.5653
Epoch 1704/2000
1/1 [=====] - 0s 7ms/step - loss: 8.5177
Epoch 1705/2000
1/1 [=====] - 0s 6ms/step - loss: 8.4704
Epoch 1706/2000
1/1 [=====] - 0s 24ms/step - loss: 8.4234
Epoch 1707/2000
1/1 [=====] - 0s 6ms/step - loss: 8.3766
Epoch 1708/2000
1/1 [=====] - 0s 6ms/step - loss: 8.3301
Epoch 1709/2000
1/1 [=====] - 0s 5ms/step - loss: 8.2839
Epoch 1710/2000
1/1 [=====] - 0s 5ms/step - loss: 8.2379
```

```
Epoch 1711/2000
1/1 [=====] - 0s 6ms/step - loss: 8.1922
Epoch 1712/2000
1/1 [=====] - 0s 9ms/step - loss: 8.1467
Epoch 1713/2000
1/1 [=====] - 0s 8ms/step - loss: 8.1015
Epoch 1714/2000
1/1 [=====] - 0s 96ms/step - loss: 8.0566
Epoch 1715/2000
1/1 [=====] - 0s 7ms/step - loss: 8.0120
Epoch 1716/2000
1/1 [=====] - 0s 8ms/step - loss: 7.9676
Epoch 1717/2000
1/1 [=====] - 0s 20ms/step - loss: 7.9234
Epoch 1718/2000
1/1 [=====] - 0s 7ms/step - loss: 7.8795
Epoch 1719/2000
1/1 [=====] - 0s 6ms/step - loss: 7.8359
Epoch 1720/2000
1/1 [=====] - 0s 5ms/step - loss: 7.7925
Epoch 1721/2000
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Epoch 1722/2000
1/1 [=====] - 0s 5ms/step - loss: 7.7065
Epoch 1723/2000
1/1 [=====] - 0s 13ms/step - loss: 7.6639
Epoch 1724/2000
1/1 [=====] - 0s 5ms/step - loss: 7.6216
Epoch 1725/2000
1/1 [=====] - 0s 7ms/step - loss: 7.5794
Epoch 1726/2000
1/1 [=====] - 0s 19ms/step - loss: 7.5376
Epoch 1727/2000
1/1 [=====] - 0s 7ms/step - loss: 7.4960
Epoch 1728/2000
1/1 [=====] - 0s 8ms/step - loss: 7.4546
Epoch 1729/2000
1/1 [=====] - 0s 6ms/step - loss: 7.4134
Epoch 1730/2000
1/1 [=====] - 0s 11ms/step - loss: 7.3726
Epoch 1731/2000
1/1 [=====] - 0s 5ms/step - loss: 7.3319
Epoch 1732/2000
1/1 [=====] - 0s 7ms/step - loss: 7.2915
Epoch 1733/2000
1/1 [=====] - 0s 6ms/step - loss: 7.2513
Epoch 1734/2000
1/1 [=====] - 0s 4ms/step - loss: 7.2114
Epoch 1735/2000
1/1 [=====] - 0s 7ms/step - loss: 7.1717
Epoch 1736/2000
1/1 [=====] - 0s 5ms/step - loss: 7.1323
Epoch 1737/2000
1/1 [=====] - 0s 5ms/step - loss: 7.0930
Epoch 1738/2000
1/1 [=====] - 0s 12ms/step - loss: 7.0541
Epoch 1739/2000
1/1 [=====] - 0s 8ms/step - loss: 7.0153
Epoch 1740/2000
1/1 [=====] - 0s 25ms/step - loss: 6.9768
Epoch 1741/2000
```


1/1 [=====] - 0s 19ms/step - loss: 6.9385
Epoch 1742/2000
1/1 [=====] - 0s 6ms/step - loss: 6.9004
Epoch 1743/2000
1/1 [=====] - 0s 7ms/step - loss: 6.8626
Epoch 1744/2000
1/1 [=====] - 0s 6ms/step - loss: 6.8250
Epoch 1745/2000
1/1 [=====] - 0s 7ms/step - loss: 6.7876
Epoch 1746/2000
1/1 [=====] - 0s 7ms/step - loss: 6.7504
Epoch 1747/2000
1/1 [=====] - 0s 7ms/step - loss: 6.7135
Epoch 1748/2000
1/1 [=====] - 0s 6ms/step - loss: 6.6767
Epoch 1749/2000
1/1 [=====] - 0s 6ms/step - loss: 6.6402
Epoch 1750/2000
1/1 [=====] - 0s 6ms/step - loss: 6.6040
Epoch 1751/2000
1/1 [=====] - 0s 5ms/step - loss: 6.5679
Epoch 1752/2000
1/1 [=====] - 0s 5ms/step - loss: 6.5321
Epoch 1753/2000
1/1 [=====] - 0s 5ms/step - loss: 6.4964
Epoch 1754/2000
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Epoch 1755/2000
1/1 [=====] - 0s 7ms/step - loss: 6.4258
Epoch 1756/2000
1/1 [=====] - 0s 8ms/step - loss: 6.3908
Epoch 1757/2000
1/1 [=====] - 0s 5ms/step - loss: 6.3560
Epoch 1758/2000
1/1 [=====] - 0s 30ms/step - loss: 6.3214
Epoch 1759/2000
1/1 [=====] - 0s 6ms/step - loss: 6.2871
Epoch 1760/2000
1/1 [=====] - 0s 6ms/step - loss: 6.2529
Epoch 1761/2000
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Epoch 1762/2000
1/1 [=====] - 0s 4ms/step - loss: 6.1852
Epoch 1763/2000
1/1 [=====] - 0s 7ms/step - loss: 6.1517
Epoch 1764/2000
1/1 [=====] - 0s 5ms/step - loss: 6.1183
Epoch 1765/2000
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Epoch 1766/2000
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Epoch 1767/2000
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Epoch 1768/2000
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Epoch 1769/2000
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Epoch 1770/2000
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Epoch 1771/2000
1/1 [=====] - 0s 6ms/step - loss: 5.8904

Epoch 1772/2000
1/1 [=====] - 0s 8ms/step - loss: 5.8587
Epoch 1773/2000
1/1 [=====] - 0s 5ms/step - loss: 5.8271
Epoch 1774/2000
1/1 [=====] - 0s 16ms/step - loss: 5.7957
Epoch 1775/2000
1/1 [=====] - 0s 6ms/step - loss: 5.7645
Epoch 1776/2000
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Epoch 1777/2000
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Epoch 1778/2000
1/1 [=====] - 0s 7ms/step - loss: 5.6720
Epoch 1779/2000
1/1 [=====] - 0s 5ms/step - loss: 5.6416
Epoch 1780/2000
1/1 [=====] - 0s 5ms/step - loss: 5.6113
Epoch 1781/2000
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Epoch 1782/2000
1/1 [=====] - 0s 4ms/step - loss: 5.5513
Epoch 1783/2000
1/1 [=====] - 0s 6ms/step - loss: 5.5216
Epoch 1784/2000
1/1 [=====] - 0s 6ms/step - loss: 5.4920
Epoch 1785/2000
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Epoch 1786/2000
1/1 [=====] - 0s 4ms/step - loss: 5.4335
Epoch 1787/2000
1/1 [=====] - 0s 7ms/step - loss: 5.4044
Epoch 1788/2000
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Epoch 1789/2000
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Epoch 1790/2000
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Epoch 1791/2000
1/1 [=====] - 0s 8ms/step - loss: 5.2901
Epoch 1792/2000
1/1 [=====] - 0s 6ms/step - loss: 5.2620
Epoch 1793/2000
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Epoch 1794/2000
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Epoch 1795/2000
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Epoch 1796/2000
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Epoch 1797/2000
1/1 [=====] - 0s 9ms/step - loss: 5.1237
Epoch 1798/2000
1/1 [=====] - 0s 8ms/step - loss: 5.0966
Epoch 1799/2000
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Epoch 1800/2000
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Epoch 1801/2000
1/1 [=====] - 0s 6ms/step - loss: 5.0161
Epoch 1802/2000

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1/1 [=====] - 0s 7ms/step - loss: 4.9896
Epoch 1803/2000
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Epoch 1804/2000
1/1 [=====] - 0s 4ms/step - loss: 4.9371
Epoch 1805/2000
1/1 [=====] - 0s 6ms/step - loss: 4.9111
Epoch 1806/2000
1/1 [=====] - 0s 7ms/step - loss: 4.8852
Epoch 1807/2000
1/1 [=====] - 0s 9ms/step - loss: 4.8595
Epoch 1808/2000
1/1 [=====] - 0s 6ms/step - loss: 4.8339
Epoch 1809/2000
1/1 [=====] - 0s 6ms/step - loss: 4.8085
Epoch 1810/2000
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Epoch 1811/2000
1/1 [=====] - 0s 7ms/step - loss: 4.7582
Epoch 1812/2000
1/1 [=====] - 0s 5ms/step - loss: 4.7332
Epoch 1813/2000
1/1 [=====] - 0s 5ms/step - loss: 4.7084
Epoch 1814/2000
1/1 [=====] - 0s 4ms/step - loss: 4.6838
Epoch 1815/2000
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Epoch 1816/2000
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Epoch 1817/2000
1/1 [=====] - 0s 5ms/step - loss: 4.6107
Epoch 1818/2000
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Epoch 1819/2000
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Epoch 1820/2000
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Epoch 1821/2000
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Epoch 1822/2000
1/1 [=====] - 0s 9ms/step - loss: 4.4919
Epoch 1823/2000
1/1 [=====] - 0s 23ms/step - loss: 4.4685
Epoch 1824/2000
1/1 [=====] - 0s 5ms/step - loss: 4.4453
Epoch 1825/2000
1/1 [=====] - 0s 9ms/step - loss: 4.4223
Epoch 1826/2000
1/1 [=====] - 0s 6ms/step - loss: 4.3994
Epoch 1827/2000
1/1 [=====] - 0s 4ms/step - loss: 4.3766
Epoch 1828/2000
1/1 [=====] - 0s 10ms/step - loss: 4.3539
Epoch 1829/2000
1/1 [=====] - 0s 13ms/step - loss: 4.3314
Epoch 1830/2000
1/1 [=====] - 0s 12ms/step - loss: 4.3090
Epoch 1831/2000
1/1 [=====] - 0s 8ms/step - loss: 4.2868
Epoch 1832/2000
1/1 [=====] - 0s 8ms/step - loss: 4.2647
```

Epoch 1833/2000
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Epoch 1834/2000
1/1 [=====] - 0s 11ms/step - loss: 4.2209
Epoch 1835/2000
1/1 [=====] - 0s 5ms/step - loss: 4.1992
Epoch 1836/2000
1/1 [=====] - 0s 5ms/step - loss: 4.1776
Epoch 1837/2000
1/1 [=====] - 0s 7ms/step - loss: 4.1561
Epoch 1838/2000
1/1 [=====] - 0s 6ms/step - loss: 4.1348
Epoch 1839/2000
1/1 [=====] - 0s 7ms/step - loss: 4.1136
Epoch 1840/2000
1/1 [=====] - 0s 6ms/step - loss: 4.0926
Epoch 1841/2000
1/1 [=====] - 0s 14ms/step - loss: 4.0716
Epoch 1842/2000
1/1 [=====] - 0s 12ms/step - loss: 4.0508
Epoch 1843/2000
1/1 [=====] - 0s 7ms/step - loss: 4.0301
Epoch 1844/2000
1/1 [=====] - 0s 6ms/step - loss: 4.0096
Epoch 1845/2000
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Epoch 1846/2000
1/1 [=====] - 0s 5ms/step - loss: 3.9688
Epoch 1847/2000
1/1 [=====] - 0s 6ms/step - loss: 3.9486
Epoch 1848/2000
1/1 [=====] - 0s 5ms/step - loss: 3.9286
Epoch 1849/2000
1/1 [=====] - 0s 9ms/step - loss: 3.9086
Epoch 1850/2000
1/1 [=====] - 0s 7ms/step - loss: 3.8888
Epoch 1851/2000
1/1 [=====] - 0s 4ms/step - loss: 3.8691
Epoch 1852/2000
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Epoch 1853/2000
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Epoch 1854/2000
1/1 [=====] - 0s 8ms/step - loss: 3.8107
Epoch 1855/2000
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Epoch 1856/2000
1/1 [=====] - 0s 7ms/step - loss: 3.7723
Epoch 1857/2000
1/1 [=====] - 0s 5ms/step - loss: 3.7533
Epoch 1858/2000
1/1 [=====] - 0s 4ms/step - loss: 3.7345
Epoch 1859/2000
1/1 [=====] - 0s 5ms/step - loss: 3.7157
Epoch 1860/2000
1/1 [=====] - 0s 6ms/step - loss: 3.6970
Epoch 1861/2000
1/1 [=====] - 0s 6ms/step - loss: 3.6785
Epoch 1862/2000
1/1 [=====] - 0s 6ms/step - loss: 3.6600
Epoch 1863/2000

1/1 [=====] - 0s 5ms/step - loss: 3.6417
Epoch 1864/2000
1/1 [=====] - 0s 6ms/step - loss: 3.6235
Epoch 1865/2000
1/1 [=====] - 0s 9ms/step - loss: 3.6054
Epoch 1866/2000
1/1 [=====] - 0s 6ms/step - loss: 3.5874
Epoch 1867/2000
1/1 [=====] - 0s 6ms/step - loss: 3.5695
Epoch 1868/2000
1/1 [=====] - 0s 8ms/step - loss: 3.5518
Epoch 1869/2000
1/1 [=====] - 0s 5ms/step - loss: 3.5341
Epoch 1870/2000
1/1 [=====] - 0s 8ms/step - loss: 3.5165
Epoch 1871/2000
1/1 [=====] - 0s 6ms/step - loss: 3.4991
Epoch 1872/2000
1/1 [=====] - 0s 14ms/step - loss: 3.4817
Epoch 1873/2000
1/1 [=====] - 0s 5ms/step - loss: 3.4645
Epoch 1874/2000
1/1 [=====] - 0s 7ms/step - loss: 3.4474
Epoch 1875/2000
1/1 [=====] - 0s 8ms/step - loss: 3.4303
Epoch 1876/2000
1/1 [=====] - 0s 7ms/step - loss: 3.4134
Epoch 1877/2000
1/1 [=====] - 0s 6ms/step - loss: 3.3966
Epoch 1878/2000
1/1 [=====] - 0s 5ms/step - loss: 3.3799
Epoch 1879/2000
1/1 [=====] - 0s 7ms/step - loss: 3.3632
Epoch 1880/2000
1/1 [=====] - 0s 4ms/step - loss: 3.3467
Epoch 1881/2000
1/1 [=====] - 0s 7ms/step - loss: 3.3303
Epoch 1882/2000
1/1 [=====] - 0s 5ms/step - loss: 3.3140
Epoch 1883/2000
1/1 [=====] - 0s 7ms/step - loss: 3.2978
Epoch 1884/2000
1/1 [=====] - 0s 5ms/step - loss: 3.2816
Epoch 1885/2000
1/1 [=====] - 0s 6ms/step - loss: 3.2656
Epoch 1886/2000
1/1 [=====] - 0s 6ms/step - loss: 3.2497
Epoch 1887/2000
1/1 [=====] - 0s 7ms/step - loss: 3.2339
Epoch 1888/2000
1/1 [=====] - 0s 5ms/step - loss: 3.2181
Epoch 1889/2000
1/1 [=====] - 0s 6ms/step - loss: 3.2025
Epoch 1890/2000
1/1 [=====] - 0s 5ms/step - loss: 3.1869
Epoch 1891/2000
1/1 [=====] - 0s 4ms/step - loss: 3.1715
Epoch 1892/2000
1/1 [=====] - 0s 6ms/step - loss: 3.1562
Epoch 1893/2000
1/1 [=====] - 0s 5ms/step - loss: 3.1409

```
Epoch 1894/2000
1/1 [=====] - 0s 7ms/step - loss: 3.1257
Epoch 1895/2000
1/1 [=====] - 0s 5ms/step - loss: 3.1107
Epoch 1896/2000
1/1 [=====] - 0s 4ms/step - loss: 3.0957
Epoch 1897/2000
1/1 [=====] - 0s 5ms/step - loss: 3.0808
Epoch 1898/2000
1/1 [=====] - 0s 6ms/step - loss: 3.0660
Epoch 1899/2000
1/1 [=====] - 0s 5ms/step - loss: 3.0513
Epoch 1900/2000
1/1 [=====] - 0s 8ms/step - loss: 3.0367
Epoch 1901/2000
1/1 [=====] - 0s 7ms/step - loss: 3.0222
Epoch 1902/2000
1/1 [=====] - 0s 9ms/step - loss: 3.0077
Epoch 1903/2000
1/1 [=====] - 0s 7ms/step - loss: 2.9934
Epoch 1904/2000
1/1 [=====] - 0s 8ms/step - loss: 2.9791
Epoch 1905/2000
1/1 [=====] - 0s 7ms/step - loss: 2.9650
Epoch 1906/2000
1/1 [=====] - 0s 9ms/step - loss: 2.9509
Epoch 1907/2000
1/1 [=====] - 0s 7ms/step - loss: 2.9369
Epoch 1908/2000
1/1 [=====] - 0s 4ms/step - loss: 2.9230
Epoch 1909/2000
1/1 [=====] - 0s 6ms/step - loss: 2.9091
Epoch 1910/2000
1/1 [=====] - 0s 4ms/step - loss: 2.8954
Epoch 1911/2000
1/1 [=====] - 0s 7ms/step - loss: 2.8818
Epoch 1912/2000
1/1 [=====] - 0s 4ms/step - loss: 2.8682
Epoch 1913/2000
1/1 [=====] - 0s 8ms/step - loss: 2.8547
Epoch 1914/2000
1/1 [=====] - 0s 6ms/step - loss: 2.8413
Epoch 1915/2000
1/1 [=====] - 0s 6ms/step - loss: 2.8280
Epoch 1916/2000
1/1 [=====] - 0s 5ms/step - loss: 2.8147
Epoch 1917/2000
1/1 [=====] - 0s 6ms/step - loss: 2.8016
Epoch 1918/2000
1/1 [=====] - 0s 21ms/step - loss: 2.7885
Epoch 1919/2000
1/1 [=====] - 0s 7ms/step - loss: 2.7755
Epoch 1920/2000
1/1 [=====] - 0s 5ms/step - loss: 2.7626
Epoch 1921/2000
1/1 [=====] - 0s 5ms/step - loss: 2.7498
Epoch 1922/2000
1/1 [=====] - 0s 5ms/step - loss: 2.7370
Epoch 1923/2000
1/1 [=====] - 0s 4ms/step - loss: 2.7243
Epoch 1924/2000
```

```
1/1 [=====] - 0s 4ms/step - loss: 2.7117
Epoch 1925/2000
1/1 [=====] - 0s 6ms/step - loss: 2.6992
Epoch 1926/2000
1/1 [=====] - 0s 7ms/step - loss: 2.6868
Epoch 1927/2000
1/1 [=====] - 0s 5ms/step - loss: 2.6744
Epoch 1928/2000
1/1 [=====] - 0s 4ms/step - loss: 2.6621
Epoch 1929/2000
1/1 [=====] - 0s 5ms/step - loss: 2.6499
Epoch 1930/2000
1/1 [=====] - 0s 5ms/step - loss: 2.6378
Epoch 1931/2000
1/1 [=====] - 0s 6ms/step - loss: 2.6257
Epoch 1932/2000
1/1 [=====] - 0s 15ms/step - loss: 2.6138
Epoch 1933/2000
1/1 [=====] - 0s 11ms/step - loss: 2.6019
Epoch 1934/2000
1/1 [=====] - 0s 16ms/step - loss: 2.5900
Epoch 1935/2000
1/1 [=====] - 0s 10ms/step - loss: 2.5783
Epoch 1936/2000
1/1 [=====] - 0s 5ms/step - loss: 2.5666
Epoch 1937/2000
1/1 [=====] - 0s 4ms/step - loss: 2.5550
Epoch 1938/2000
1/1 [=====] - 0s 6ms/step - loss: 2.5434
Epoch 1939/2000
1/1 [=====] - 0s 5ms/step - loss: 2.5320
Epoch 1940/2000
1/1 [=====] - 0s 6ms/step - loss: 2.5206
Epoch 1941/2000
1/1 [=====] - 0s 4ms/step - loss: 2.5092
Epoch 1942/2000
1/1 [=====] - 0s 4ms/step - loss: 2.4980
Epoch 1943/2000
1/1 [=====] - 0s 6ms/step - loss: 2.4868
Epoch 1944/2000
1/1 [=====] - 0s 9ms/step - loss: 2.4757
Epoch 1945/2000
1/1 [=====] - 0s 12ms/step - loss: 2.4647
Epoch 1946/2000
1/1 [=====] - 0s 6ms/step - loss: 2.4537
Epoch 1947/2000
1/1 [=====] - 0s 5ms/step - loss: 2.4428
Epoch 1948/2000
1/1 [=====] - 0s 10ms/step - loss: 2.4319
Epoch 1949/2000
1/1 [=====] - 0s 9ms/step - loss: 2.4212
Epoch 1950/2000
1/1 [=====] - 0s 8ms/step - loss: 2.4105
Epoch 1951/2000
1/1 [=====] - 0s 7ms/step - loss: 2.3998
Epoch 1952/2000
1/1 [=====] - 0s 8ms/step - loss: 2.3893
Epoch 1953/2000
1/1 [=====] - 0s 6ms/step - loss: 2.3788
Epoch 1954/2000
1/1 [=====] - 0s 74ms/step - loss: 2.3683
```

```
Epoch 1955/2000
1/1 [=====] - 0s 8ms/step - loss: 2.3580
Epoch 1956/2000
1/1 [=====] - 0s 5ms/step - loss: 2.3477
Epoch 1957/2000
1/1 [=====] - 0s 7ms/step - loss: 2.3374
Epoch 1958/2000
1/1 [=====] - 0s 7ms/step - loss: 2.3273
Epoch 1959/2000
1/1 [=====] - 0s 6ms/step - loss: 2.3172
Epoch 1960/2000
1/1 [=====] - 0s 8ms/step - loss: 2.3071
Epoch 1961/2000
1/1 [=====] - 0s 5ms/step - loss: 2.2971
Epoch 1962/2000
1/1 [=====] - 0s 5ms/step - loss: 2.2872
Epoch 1963/2000
1/1 [=====] - 0s 5ms/step - loss: 2.2774
Epoch 1964/2000
1/1 [=====] - 0s 5ms/step - loss: 2.2676
Epoch 1965/2000
1/1 [=====] - 0s 17ms/step - loss: 2.2578
Epoch 1966/2000
1/1 [=====] - 0s 8ms/step - loss: 2.2482
Epoch 1967/2000
1/1 [=====] - 0s 7ms/step - loss: 2.2386
Epoch 1968/2000
1/1 [=====] - 0s 8ms/step - loss: 2.2290
Epoch 1969/2000
1/1 [=====] - 0s 6ms/step - loss: 2.2195
Epoch 1970/2000
1/1 [=====] - 0s 11ms/step - loss: 2.2101
Epoch 1971/2000
1/1 [=====] - 0s 6ms/step - loss: 2.2008
Epoch 1972/2000
1/1 [=====] - 0s 7ms/step - loss: 2.1914
Epoch 1973/2000
1/1 [=====] - 0s 6ms/step - loss: 2.1822
Epoch 1974/2000
1/1 [=====] - 0s 6ms/step - loss: 2.1730
Epoch 1975/2000
1/1 [=====] - 0s 9ms/step - loss: 2.1639
Epoch 1976/2000
1/1 [=====] - 0s 8ms/step - loss: 2.1548
Epoch 1977/2000
1/1 [=====] - 0s 8ms/step - loss: 2.1458
Epoch 1978/2000
1/1 [=====] - 0s 6ms/step - loss: 2.1369
Epoch 1979/2000
1/1 [=====] - 0s 6ms/step - loss: 2.1280
Epoch 1980/2000
1/1 [=====] - 0s 6ms/step - loss: 2.1191
Epoch 1981/2000
1/1 [=====] - 0s 13ms/step - loss: 2.1103
Epoch 1982/2000
1/1 [=====] - 0s 14ms/step - loss: 2.1016
Epoch 1983/2000
1/1 [=====] - 0s 38ms/step - loss: 2.0929
Epoch 1984/2000
1/1 [=====] - 0s 7ms/step - loss: 2.0843
Epoch 1985/2000
```



```

1/1 [=====] - 0s 6ms/step - loss: 2.0758
Epoch 1986/2000
1/1 [=====] - 0s 5ms/step - loss: 2.0673
Epoch 1987/2000
1/1 [=====] - 0s 4ms/step - loss: 2.0588
Epoch 1988/2000
1/1 [=====] - 0s 7ms/step - loss: 2.0504
Epoch 1989/2000
1/1 [=====] - 0s 4ms/step - loss: 2.0421
Epoch 1990/2000
1/1 [=====] - 0s 4ms/step - loss: 2.0338
Epoch 1991/2000
1/1 [=====] - 0s 7ms/step - loss: 2.0255
Epoch 1992/2000
1/1 [=====] - 0s 4ms/step - loss: 2.0174
Epoch 1993/2000
1/1 [=====] - 0s 6ms/step - loss: 2.0092
Epoch 1994/2000
1/1 [=====] - 0s 21ms/step - loss: 2.0012
Epoch 1995/2000
1/1 [=====] - 0s 6ms/step - loss: 1.9931
Epoch 1996/2000
1/1 [=====] - 0s 4ms/step - loss: 1.9852
Epoch 1997/2000
1/1 [=====] - 0s 4ms/step - loss: 1.9772
Epoch 1998/2000
1/1 [=====] - 0s 6ms/step - loss: 1.9694
Epoch 1999/2000
1/1 [=====] - 0s 4ms/step - loss: 1.9615
Epoch 2000/2000
1/1 [=====] - 0s 5ms/step - loss: 1.9538
WARNING:tensorflow:5 out of the last 8 calls to <function Model.make_predict_function.<locals>.predict_function at 0x7f8f60ff0ee0> triggered tf.function retracing. Tracing is expensive and the excessive number of tracings could be due to (1) creating @tf.function repeatedly in a loop, (2) passing tensors with different shapes, (3) passing Python objects instead of tensors. For (1), please define your @tf.function outside of the loop. For (2), @tf.function has reduce_retracing=True option that can avoid unnecessary retracing. For (3), please refer to https://www.tensorflow.org/guide/function#controlling_retracing and https://www.tensorflow.org/api_docs/python/tf/function for more details.
1/1 [=====] - 0s 172ms/step
SE PREDICE: [[5.6600885]] CUANDO EN REALIDAD LA RESPUESTA ES 6.25
1/1 [=====] - 0s 28ms/step
1.9460540072891932 ERROR CUADRATICO MEDIO, DEBERIA SER LO MAS CERCANO A 0 POSIBLE

```

TRES UNIDADES POR CAPA OCULTA

```
In [ ]: import tensorflow as tf
import numpy as np
from tensorflow import keras
# Declare model inputs and outputs for training  $y = x^2$ 
xs = np.array([-4.0, -3.0, -2.0, -1.0, 0.0, 1.0, 2.0, 3.0, 4.0], dtype=float)
ys = np.array([16, 9, 4, 1, 0, 1, 4, 9, 16], dtype=float)

# numero de unidades por capa
n_unidades = 3
# funcion de activacion sigmoid
funcion_activacion = 'sigmoid'

# Build a Sequential model
# 2 capa oculta
# 1 capa de salida con 1 neurona y funcion de activacion lineal
model = tf.keras.Sequential([
    keras.layers.Dense(units=n_unidades, input_shape=(xs.shape[1],)),
    keras.layers.Dense(units=n_unidades, activation=funcion_activacion),
    keras.layers.Dense(units=1, activation='linear')
])

#compile
model.compile(optimizer='sgd', loss='mean_squared_error')
#fit con epochs 2000
model.fit(xs, ys, epochs=2000)

#predict en x=2.5
print('SE PREDICE:', model.predict([2.5]), " CUANDO EN REALIDAD LA RESPUESTA ES 6.25")

# Error cuadratico medio
from sklearn.metrics import mean_squared_error
# calcular error cuadratico medio
print(mean_squared_error(ys, model.predict(xs)), " ERROR CUADRATICO MEDIO")
```

```
Epoch 1/2000
1/1 [=====] - 0s 477ms/step - loss: 74.5256
Epoch 2/2000
1/1 [=====] - 0s 6ms/step - loss: 71.2033
Epoch 3/2000
1/1 [=====] - 0s 6ms/step - loss: 68.1316
Epoch 4/2000
1/1 [=====] - 0s 7ms/step - loss: 65.2888
Epoch 5/2000
1/1 [=====] - 0s 6ms/step - loss: 62.6567
Epoch 6/2000
1/1 [=====] - 0s 8ms/step - loss: 60.2195
Epoch 7/2000
1/1 [=====] - 0s 7ms/step - loss: 57.9636
Epoch 8/2000
1/1 [=====] - 0s 8ms/step - loss: 55.8768
Epoch 9/2000
1/1 [=====] - 0s 9ms/step - loss: 53.9485
Epoch 10/2000
1/1 [=====] - 0s 8ms/step - loss: 52.1688
Epoch 11/2000
1/1 [=====] - 0s 9ms/step - loss: 50.5284
Epoch 12/2000
1/1 [=====] - 0s 10ms/step - loss: 49.0189
```

```
Epoch 13/2000
1/1 [=====] - 0s 11ms/step - loss: 47.6322
Epoch 14/2000
1/1 [=====] - 0s 87ms/step - loss: 46.3603
Epoch 15/2000
1/1 [=====] - 0s 9ms/step - loss: 45.1960
Epoch 16/2000
1/1 [=====] - 0s 21ms/step - loss: 44.1321
Epoch 17/2000
1/1 [=====] - 0s 6ms/step - loss: 43.1616
Epoch 18/2000
1/1 [=====] - 0s 6ms/step - loss: 42.2779
Epoch 19/2000
1/1 [=====] - 0s 6ms/step - loss: 41.4747
Epoch 20/2000
1/1 [=====] - 0s 6ms/step - loss: 40.7458
Epoch 21/2000
1/1 [=====] - 0s 7ms/step - loss: 40.0855
Epoch 22/2000
1/1 [=====] - 0s 6ms/step - loss: 39.4881
Epoch 23/2000
1/1 [=====] - 0s 6ms/step - loss: 38.9486
Epoch 24/2000
1/1 [=====] - 0s 5ms/step - loss: 38.4620
Epoch 25/2000
1/1 [=====] - 0s 7ms/step - loss: 38.0236
Epoch 26/2000
1/1 [=====] - 0s 6ms/step - loss: 37.6291
Epoch 27/2000
1/1 [=====] - 0s 8ms/step - loss: 37.2746
Epoch 28/2000
1/1 [=====] - 0s 8ms/step - loss: 36.9563
Epoch 29/2000
1/1 [=====] - 0s 6ms/step - loss: 36.6708
Epoch 30/2000
1/1 [=====] - 0s 6ms/step - loss: 36.4149
Epoch 31/2000
1/1 [=====] - 0s 7ms/step - loss: 36.1858
Epoch 32/2000
1/1 [=====] - 0s 5ms/step - loss: 35.9806
Epoch 33/2000
1/1 [=====] - 0s 6ms/step - loss: 35.7971
Epoch 34/2000
1/1 [=====] - 0s 6ms/step - loss: 35.6330
Epoch 35/2000
1/1 [=====] - 0s 7ms/step - loss: 35.4863
Epoch 36/2000
1/1 [=====] - 0s 11ms/step - loss: 35.3552
Epoch 37/2000
1/1 [=====] - 0s 8ms/step - loss: 35.2380
Epoch 38/2000
1/1 [=====] - 0s 6ms/step - loss: 35.1333
Epoch 39/2000
1/1 [=====] - 0s 6ms/step - loss: 35.0397
Epoch 40/2000
1/1 [=====] - 0s 6ms/step - loss: 34.9560
Epoch 41/2000
1/1 [=====] - 0s 7ms/step - loss: 34.8812
Epoch 42/2000
1/1 [=====] - 0s 5ms/step - loss: 34.8142
Epoch 43/2000
```

1/1 [=====] - 0s 6ms/step - loss: 34.7542
Epoch 44/2000
1/1 [=====] - 0s 6ms/step - loss: 34.7004
Epoch 45/2000
1/1 [=====] - 0s 6ms/step - loss: 34.6522
Epoch 46/2000
1/1 [=====] - 0s 8ms/step - loss: 34.6089
Epoch 47/2000
1/1 [=====] - 0s 8ms/step - loss: 34.5699
Epoch 48/2000
1/1 [=====] - 0s 7ms/step - loss: 34.5348
Epoch 49/2000
1/1 [=====] - 0s 7ms/step - loss: 34.5032
Epoch 50/2000
1/1 [=====] - 0s 5ms/step - loss: 34.4746
Epoch 51/2000
1/1 [=====] - 0s 8ms/step - loss: 34.4487
Epoch 52/2000
1/1 [=====] - 0s 5ms/step - loss: 34.4251
Epoch 53/2000
1/1 [=====] - 0s 7ms/step - loss: 34.4037
Epoch 54/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3842
Epoch 55/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3664
Epoch 56/2000
1/1 [=====] - 0s 8ms/step - loss: 34.3500
Epoch 57/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3349
Epoch 58/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3210
Epoch 59/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3081
Epoch 60/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2961
Epoch 61/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2849
Epoch 62/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2745
Epoch 63/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2646
Epoch 64/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2554
Epoch 65/2000
1/1 [=====] - 0s 65ms/step - loss: 34.2466
Epoch 66/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2382
Epoch 67/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2303
Epoch 68/2000
1/1 [=====] - 0s 18ms/step - loss: 34.2227
Epoch 69/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2154
Epoch 70/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2084
Epoch 71/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2016
Epoch 72/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1950
Epoch 73/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1886

```
Epoch 74/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1824
Epoch 75/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1764
Epoch 76/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1704
Epoch 77/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1646
Epoch 78/2000
1/1 [=====] - 0s 19ms/step - loss: 34.1589
Epoch 79/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1533
Epoch 80/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1478
Epoch 81/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1423
Epoch 82/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1369
Epoch 83/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1316
Epoch 84/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1263
Epoch 85/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1211
Epoch 86/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1159
Epoch 87/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1107
Epoch 88/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1056
Epoch 89/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1005
Epoch 90/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0954
Epoch 91/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0903
Epoch 92/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0852
Epoch 93/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0802
Epoch 94/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0752
Epoch 95/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0701
Epoch 96/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0651
Epoch 97/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0601
Epoch 98/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0551
Epoch 99/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0500
Epoch 100/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0450
Epoch 101/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0400
Epoch 102/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0350
Epoch 103/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0299
Epoch 104/2000
```

1/1 [=====] - 0s 7ms/step - loss: 34.0249
Epoch 105/2000
1/1 [=====] - 0s 79ms/step - loss: 34.0199
Epoch 106/2000
1/1 [=====] - 0s 15ms/step - loss: 34.0148
Epoch 107/2000
1/1 [=====] - 0s 10ms/step - loss: 34.0097
Epoch 108/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0047
Epoch 109/2000
1/1 [=====] - 0s 9ms/step - loss: 33.9996
Epoch 110/2000
1/1 [=====] - 0s 9ms/step - loss: 33.9945
Epoch 111/2000
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Epoch 114/2000
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Epoch 115/2000
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Epoch 116/2000
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Epoch 117/2000
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Epoch 118/2000
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Epoch 120/2000
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Epoch 121/2000
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Epoch 126/2000
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Epoch 127/2000
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Epoch 128/2000
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Epoch 131/2000
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Epoch 133/2000
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Epoch 134/2000
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Epoch 136/2000
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Epoch 137/2000
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Epoch 145/2000
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Epoch 146/2000
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Epoch 147/2000
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Epoch 148/2000
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Epoch 165/2000

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Epoch 169/2000
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Epoch 195/2000
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Epoch 208/2000
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Epoch 216/2000
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Epoch 217/2000
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Epoch 222/2000
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Epoch 226/2000
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Epoch 230/2000
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Epoch 248/2000
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Epoch 256/2000
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Epoch 262/2000
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Epoch 263/2000
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Epoch 278/2000
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Epoch 282/2000
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Epoch 283/2000
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Epoch 284/2000
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Epoch 285/2000
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Epoch 286/2000
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Epoch 287/2000
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Epoch 348/2000

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Epoch 378/2000
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Epoch 390/2000
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Epoch 391/2000
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Epoch 392/2000
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Epoch 393/2000
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Epoch 394/2000
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Epoch 395/2000
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Epoch 396/2000
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Epoch 397/2000
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Epoch 398/2000
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Epoch 399/2000
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Epoch 400/2000
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Epoch 401/2000
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Epoch 402/2000
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Epoch 403/2000
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Epoch 404/2000
1/1 [=====] - 0s 6ms/step - loss: 29.3103
Epoch 405/2000
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Epoch 406/2000
1/1 [=====] - 0s 8ms/step - loss: 29.2289
Epoch 407/2000
1/1 [=====] - 0s 13ms/step - loss: 29.1878
Epoch 408/2000
1/1 [=====] - 0s 7ms/step - loss: 29.1464
Epoch 409/2000
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1/1 [=====] - 0s 9ms/step - loss: 29.1046
Epoch 410/2000
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Epoch 411/2000
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Epoch 412/2000
1/1 [=====] - 0s 7ms/step - loss: 28.9773
Epoch 413/2000
1/1 [=====] - 0s 9ms/step - loss: 28.9342
Epoch 414/2000
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Epoch 415/2000
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Epoch 416/2000
1/1 [=====] - 0s 7ms/step - loss: 28.8029
Epoch 417/2000
1/1 [=====] - 0s 7ms/step - loss: 28.7585
Epoch 418/2000
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Epoch 419/2000
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Epoch 420/2000
1/1 [=====] - 0s 11ms/step - loss: 28.6231
Epoch 421/2000
1/1 [=====] - 0s 7ms/step - loss: 28.5773
Epoch 422/2000
1/1 [=====] - 0s 13ms/step - loss: 28.5312
Epoch 423/2000
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Epoch 424/2000
1/1 [=====] - 0s 10ms/step - loss: 28.4378
Epoch 425/2000
1/1 [=====] - 0s 9ms/step - loss: 28.3905
Epoch 426/2000
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Epoch 427/2000
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Epoch 428/2000
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Epoch 429/2000
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Epoch 430/2000
1/1 [=====] - 0s 7ms/step - loss: 28.1489
Epoch 431/2000
1/1 [=====] - 0s 8ms/step - loss: 28.0995
Epoch 432/2000
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Epoch 433/2000
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Epoch 434/2000
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Epoch 435/2000
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Epoch 436/2000
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Epoch 437/2000
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Epoch 438/2000
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Epoch 439/2000
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Epoch 440/2000
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Epoch 441/2000
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Epoch 442/2000
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Epoch 443/2000
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Epoch 444/2000
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Epoch 445/2000
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Epoch 446/2000
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Epoch 447/2000
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Epoch 448/2000
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Epoch 449/2000
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Epoch 450/2000
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Epoch 451/2000
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Epoch 452/2000
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Epoch 453/2000
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Epoch 454/2000
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Epoch 455/2000
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Epoch 456/2000
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Epoch 457/2000
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Epoch 458/2000
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Epoch 459/2000
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Epoch 460/2000
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Epoch 463/2000
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Epoch 465/2000
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Epoch 466/2000
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Epoch 467/2000
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Epoch 468/2000
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Epoch 469/2000
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Epoch 470/2000

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Epoch 471/2000
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Epoch 472/2000
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Epoch 473/2000
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Epoch 474/2000
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Epoch 475/2000
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Epoch 476/2000
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Epoch 477/2000
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Epoch 478/2000
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Epoch 479/2000
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Epoch 480/2000
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Epoch 481/2000
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Epoch 486/2000
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Epoch 487/2000
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Epoch 488/2000
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Epoch 489/2000
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Epoch 490/2000
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Epoch 492/2000
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Epoch 495/2000
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Epoch 496/2000
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Epoch 498/2000
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1/1 [=====] - 0s 8ms/step - loss: 23.8033
Epoch 500/2000
1/1 [=====] - 0s 8ms/step - loss: 23.7262

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Epoch 501/2000
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Epoch 504/2000
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Epoch 507/2000
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Epoch 508/2000
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Epoch 509/2000
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Epoch 522/2000
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Epoch 523/2000
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Epoch 524/2000
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Epoch 525/2000
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Epoch 526/2000
1/1 [=====] - 0s 10ms/step - loss: 21.6010
Epoch 527/2000
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Epoch 528/2000
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Epoch 529/2000
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Epoch 530/2000
1/1 [=====] - 0s 8ms/step - loss: 21.2560
Epoch 531/2000
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Epoch 532/2000
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Epoch 533/2000
1/1 [=====] - 0s 7ms/step - loss: 20.9947
Epoch 534/2000
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Epoch 535/2000
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Epoch 536/2000
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Epoch 537/2000
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Epoch 538/2000
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Epoch 539/2000
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Epoch 540/2000
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Epoch 541/2000
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Epoch 542/2000
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Epoch 543/2000
1/1 [=====] - 0s 6ms/step - loss: 20.1097
Epoch 544/2000
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Epoch 545/2000
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Epoch 550/2000
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Epoch 551/2000
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Epoch 552/2000
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Epoch 553/2000
1/1 [=====] - 0s 6ms/step - loss: 19.2082
Epoch 554/2000
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Epoch 555/2000
1/1 [=====] - 0s 6ms/step - loss: 19.0264
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Epoch 557/2000
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Epoch 558/2000
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Epoch 559/2000
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Epoch 561/2000
1/1 [=====] - 0s 6ms/step - loss: 18.4794

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Epoch 562/2000
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Epoch 563/2000
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Epoch 564/2000
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Epoch 565/2000
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Epoch 566/2000
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Epoch 569/2000
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Epoch 570/2000
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Epoch 574/2000
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Epoch 575/2000
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Epoch 576/2000
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Epoch 577/2000
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Epoch 578/2000
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Epoch 579/2000
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Epoch 581/2000
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Epoch 582/2000
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Epoch 583/2000
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Epoch 584/2000
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Epoch 585/2000
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Epoch 586/2000
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Epoch 587/2000
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Epoch 588/2000
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Epoch 589/2000
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Epoch 590/2000
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Epoch 591/2000
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Epoch 592/2000
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Epoch 594/2000
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Epoch 595/2000
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Epoch 596/2000
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Epoch 598/2000
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Epoch 599/2000
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Epoch 600/2000
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Epoch 601/2000
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Epoch 602/2000
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Epoch 603/2000
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Epoch 605/2000
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Epoch 606/2000
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Epoch 607/2000
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Epoch 608/2000
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Epoch 615/2000
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Epoch 616/2000
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Epoch 617/2000
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Epoch 618/2000
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Epoch 622/2000
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Epoch 623/2000
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Epoch 624/2000
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Epoch 625/2000
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Epoch 632/2000
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Epoch 633/2000
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Epoch 634/2000
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Epoch 638/2000
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Epoch 639/2000
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Epoch 640/2000
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Epoch 643/2000
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Epoch 644/2000
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Epoch 645/2000
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Epoch 646/2000
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Epoch 652/2000
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Epoch 653/2000

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Epoch 654/2000
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Epoch 655/2000
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Epoch 658/2000
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Epoch 659/2000
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Epoch 660/2000
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Epoch 661/2000
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Epoch 662/2000
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Epoch 663/2000
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Epoch 665/2000
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Epoch 666/2000
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Epoch 667/2000
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Epoch 668/2000
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Epoch 669/2000
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Epoch 670/2000
1/1 [=====] - 0s 7ms/step - loss: 9.4759
Epoch 671/2000
1/1 [=====] - 0s 6ms/step - loss: 9.4102
Epoch 672/2000
1/1 [=====] - 0s 6ms/step - loss: 9.3449
Epoch 673/2000
1/1 [=====] - 0s 7ms/step - loss: 9.2799
Epoch 674/2000
1/1 [=====] - 0s 5ms/step - loss: 9.2153
Epoch 675/2000
1/1 [=====] - 0s 61ms/step - loss: 9.1511
Epoch 676/2000
1/1 [=====] - 0s 7ms/step - loss: 9.0873
Epoch 677/2000
1/1 [=====] - 0s 6ms/step - loss: 9.0239
Epoch 678/2000
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Epoch 679/2000
1/1 [=====] - 0s 6ms/step - loss: 8.8982
Epoch 680/2000
1/1 [=====] - 0s 7ms/step - loss: 8.8359
Epoch 681/2000
1/1 [=====] - 0s 9ms/step - loss: 8.7740
Epoch 682/2000
1/1 [=====] - 0s 7ms/step - loss: 8.7125
Epoch 683/2000
1/1 [=====] - 0s 6ms/step - loss: 8.6513

Epoch 684/2000
1/1 [=====] - 0s 6ms/step - loss: 8.5906
Epoch 685/2000
1/1 [=====] - 0s 7ms/step - loss: 8.5302
Epoch 686/2000
1/1 [=====] - 0s 7ms/step - loss: 8.4702
Epoch 687/2000
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Epoch 688/2000
1/1 [=====] - 0s 17ms/step - loss: 8.3513
Epoch 689/2000
1/1 [=====] - 0s 6ms/step - loss: 8.2925
Epoch 690/2000
1/1 [=====] - 0s 7ms/step - loss: 8.2340
Epoch 691/2000
1/1 [=====] - 0s 8ms/step - loss: 8.1759
Epoch 692/2000
1/1 [=====] - 0s 5ms/step - loss: 8.1181
Epoch 693/2000
1/1 [=====] - 0s 6ms/step - loss: 8.0608
Epoch 694/2000
1/1 [=====] - 0s 5ms/step - loss: 8.0038
Epoch 695/2000
1/1 [=====] - 0s 8ms/step - loss: 7.9472
Epoch 696/2000
1/1 [=====] - 0s 8ms/step - loss: 7.8910
Epoch 697/2000
1/1 [=====] - 0s 7ms/step - loss: 7.8351
Epoch 698/2000
1/1 [=====] - 0s 7ms/step - loss: 7.7796
Epoch 699/2000
1/1 [=====] - 0s 9ms/step - loss: 7.7245
Epoch 700/2000
1/1 [=====] - 0s 7ms/step - loss: 7.6697
Epoch 701/2000
1/1 [=====] - 0s 6ms/step - loss: 7.6153
Epoch 702/2000
1/1 [=====] - 0s 7ms/step - loss: 7.5613
Epoch 703/2000
1/1 [=====] - 0s 6ms/step - loss: 7.5077
Epoch 704/2000
1/1 [=====] - 0s 7ms/step - loss: 7.4544
Epoch 705/2000
1/1 [=====] - 0s 7ms/step - loss: 7.4015
Epoch 706/2000
1/1 [=====] - 0s 5ms/step - loss: 7.3489
Epoch 707/2000
1/1 [=====] - 0s 8ms/step - loss: 7.2967
Epoch 708/2000
1/1 [=====] - 0s 7ms/step - loss: 7.2449
Epoch 709/2000
1/1 [=====] - 0s 6ms/step - loss: 7.1934
Epoch 710/2000
1/1 [=====] - 0s 7ms/step - loss: 7.1423
Epoch 711/2000
1/1 [=====] - 0s 11ms/step - loss: 7.0915
Epoch 712/2000
1/1 [=====] - 0s 10ms/step - loss: 7.0411
Epoch 713/2000
1/1 [=====] - 0s 6ms/step - loss: 6.9911
Epoch 714/2000

1/1 [=====] - 0s 7ms/step - loss: 6.9414
Epoch 715/2000
1/1 [=====] - 0s 6ms/step - loss: 6.8920
Epoch 716/2000
1/1 [=====] - 0s 6ms/step - loss: 6.8430
Epoch 717/2000
1/1 [=====] - 0s 8ms/step - loss: 6.7944
Epoch 718/2000
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Epoch 719/2000
1/1 [=====] - 0s 7ms/step - loss: 6.6981
Epoch 720/2000
1/1 [=====] - 0s 14ms/step - loss: 6.6505
Epoch 721/2000
1/1 [=====] - 0s 6ms/step - loss: 6.6033
Epoch 722/2000
1/1 [=====] - 0s 17ms/step - loss: 6.5564
Epoch 723/2000
1/1 [=====] - 0s 7ms/step - loss: 6.5098
Epoch 724/2000
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Epoch 725/2000
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Epoch 726/2000
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Epoch 727/2000
1/1 [=====] - 0s 9ms/step - loss: 6.3268
Epoch 728/2000
1/1 [=====] - 0s 68ms/step - loss: 6.2819
Epoch 729/2000
1/1 [=====] - 0s 7ms/step - loss: 6.2373
Epoch 730/2000
1/1 [=====] - 0s 7ms/step - loss: 6.1931
Epoch 731/2000
1/1 [=====] - 0s 8ms/step - loss: 6.1492
Epoch 732/2000
1/1 [=====] - 0s 6ms/step - loss: 6.1056
Epoch 733/2000
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Epoch 734/2000
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Epoch 735/2000
1/1 [=====] - 0s 7ms/step - loss: 5.9767
Epoch 736/2000
1/1 [=====] - 0s 7ms/step - loss: 5.9344
Epoch 737/2000
1/1 [=====] - 0s 6ms/step - loss: 5.8925
Epoch 738/2000
1/1 [=====] - 0s 5ms/step - loss: 5.8508
Epoch 739/2000
1/1 [=====] - 0s 10ms/step - loss: 5.8094
Epoch 740/2000
1/1 [=====] - 0s 5ms/step - loss: 5.7684
Epoch 741/2000
1/1 [=====] - 0s 7ms/step - loss: 5.7277
Epoch 742/2000
1/1 [=====] - 0s 6ms/step - loss: 5.6872
Epoch 743/2000
1/1 [=====] - 0s 6ms/step - loss: 5.6471
Epoch 744/2000
1/1 [=====] - 0s 5ms/step - loss: 5.6073

Epoch 745/2000
1/1 [=====] - 0s 6ms/step - loss: 5.5678
Epoch 746/2000
1/1 [=====] - 0s 8ms/step - loss: 5.5286
Epoch 747/2000
1/1 [=====] - 0s 7ms/step - loss: 5.4897
Epoch 748/2000
1/1 [=====] - 0s 6ms/step - loss: 5.4511
Epoch 749/2000
1/1 [=====] - 0s 7ms/step - loss: 5.4128
Epoch 750/2000
1/1 [=====] - 0s 8ms/step - loss: 5.3748
Epoch 751/2000
1/1 [=====] - 0s 61ms/step - loss: 5.3371
Epoch 752/2000
1/1 [=====] - 0s 9ms/step - loss: 5.2997
Epoch 753/2000
1/1 [=====] - 0s 5ms/step - loss: 5.2625
Epoch 754/2000
1/1 [=====] - 0s 6ms/step - loss: 5.2257
Epoch 755/2000
1/1 [=====] - 0s 17ms/step - loss: 5.1891
Epoch 756/2000
1/1 [=====] - 0s 6ms/step - loss: 5.1528
Epoch 757/2000
1/1 [=====] - 0s 8ms/step - loss: 5.1169
Epoch 758/2000
1/1 [=====] - 0s 7ms/step - loss: 5.0811
Epoch 759/2000
1/1 [=====] - 0s 6ms/step - loss: 5.0457
Epoch 760/2000
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Epoch 761/2000
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Epoch 762/2000
1/1 [=====] - 0s 8ms/step - loss: 4.9411
Epoch 763/2000
1/1 [=====] - 0s 6ms/step - loss: 4.9068
Epoch 764/2000
1/1 [=====] - 0s 10ms/step - loss: 4.8727
Epoch 765/2000
1/1 [=====] - 0s 6ms/step - loss: 4.8389
Epoch 766/2000
1/1 [=====] - 0s 6ms/step - loss: 4.8054
Epoch 767/2000
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Epoch 768/2000
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Epoch 770/2000
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Epoch 771/2000
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Epoch 772/2000
1/1 [=====] - 0s 7ms/step - loss: 4.6098
Epoch 773/2000
1/1 [=====] - 0s 7ms/step - loss: 4.5781
Epoch 774/2000
1/1 [=====] - 0s 10ms/step - loss: 4.5466
Epoch 775/2000

1/1 [=====] - 0s 6ms/step - loss: 4.5154
Epoch 776/2000
1/1 [=====] - 0s 19ms/step - loss: 4.4845
Epoch 777/2000
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Epoch 778/2000
1/1 [=====] - 0s 6ms/step - loss: 4.4233
Epoch 779/2000
1/1 [=====] - 0s 5ms/step - loss: 4.3931
Epoch 780/2000
1/1 [=====] - 0s 5ms/step - loss: 4.3632
Epoch 781/2000
1/1 [=====] - 0s 6ms/step - loss: 4.3334
Epoch 782/2000
1/1 [=====] - 0s 9ms/step - loss: 4.3039
Epoch 783/2000
1/1 [=====] - 0s 6ms/step - loss: 4.2747
Epoch 784/2000
1/1 [=====] - 0s 62ms/step - loss: 4.2457
Epoch 785/2000
1/1 [=====] - 0s 7ms/step - loss: 4.2169
Epoch 786/2000
1/1 [=====] - 0s 7ms/step - loss: 4.1884
Epoch 787/2000
1/1 [=====] - 0s 8ms/step - loss: 4.1601
Epoch 788/2000
1/1 [=====] - 0s 7ms/step - loss: 4.1320
Epoch 789/2000
1/1 [=====] - 0s 6ms/step - loss: 4.1041
Epoch 790/2000
1/1 [=====] - 0s 6ms/step - loss: 4.0765
Epoch 791/2000
1/1 [=====] - 0s 6ms/step - loss: 4.0491
Epoch 792/2000
1/1 [=====] - 0s 10ms/step - loss: 4.0219
Epoch 793/2000
1/1 [=====] - 0s 5ms/step - loss: 3.9949
Epoch 794/2000
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Epoch 795/2000
1/1 [=====] - 0s 7ms/step - loss: 3.9417
Epoch 796/2000
1/1 [=====] - 0s 7ms/step - loss: 3.9154
Epoch 797/2000
1/1 [=====] - 0s 7ms/step - loss: 3.8893
Epoch 798/2000
1/1 [=====] - 0s 6ms/step - loss: 3.8634
Epoch 799/2000
1/1 [=====] - 0s 6ms/step - loss: 3.8377
Epoch 800/2000
1/1 [=====] - 0s 6ms/step - loss: 3.8123
Epoch 801/2000
1/1 [=====] - 0s 5ms/step - loss: 3.7870
Epoch 802/2000
1/1 [=====] - 0s 7ms/step - loss: 3.7620
Epoch 803/2000
1/1 [=====] - 0s 5ms/step - loss: 3.7371
Epoch 804/2000
1/1 [=====] - 0s 6ms/step - loss: 3.7125
Epoch 805/2000
1/1 [=====] - 0s 6ms/step - loss: 3.6881

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Epoch 806/2000
1/1 [=====] - 0s 4ms/step - loss: 3.6638
Epoch 807/2000
1/1 [=====] - 0s 6ms/step - loss: 3.6398
Epoch 808/2000
1/1 [=====] - 0s 9ms/step - loss: 3.6160
Epoch 809/2000
1/1 [=====] - 0s 5ms/step - loss: 3.5923
Epoch 810/2000
1/1 [=====] - 0s 5ms/step - loss: 3.5689
Epoch 811/2000
1/1 [=====] - 0s 7ms/step - loss: 3.5456
Epoch 812/2000
1/1 [=====] - 0s 5ms/step - loss: 3.5226
Epoch 813/2000
1/1 [=====] - 0s 7ms/step - loss: 3.4997
Epoch 814/2000
1/1 [=====] - 0s 8ms/step - loss: 3.4770
Epoch 815/2000
1/1 [=====] - 0s 8ms/step - loss: 3.4545
Epoch 816/2000
1/1 [=====] - 0s 69ms/step - loss: 3.4322
Epoch 817/2000
1/1 [=====] - 0s 15ms/step - loss: 3.4101
Epoch 818/2000
1/1 [=====] - 0s 6ms/step - loss: 3.3881
Epoch 819/2000
1/1 [=====] - 0s 5ms/step - loss: 3.3663
Epoch 820/2000
1/1 [=====] - 0s 6ms/step - loss: 3.3448
Epoch 821/2000
1/1 [=====] - 0s 5ms/step - loss: 3.3233
Epoch 822/2000
1/1 [=====] - 0s 8ms/step - loss: 3.3021
Epoch 823/2000
1/1 [=====] - 0s 6ms/step - loss: 3.2811
Epoch 824/2000
1/1 [=====] - 0s 5ms/step - loss: 3.2602
Epoch 825/2000
1/1 [=====] - 0s 18ms/step - loss: 3.2395
Epoch 826/2000
1/1 [=====] - 0s 6ms/step - loss: 3.2189
Epoch 827/2000
1/1 [=====] - 0s 11ms/step - loss: 3.1986
Epoch 828/2000
1/1 [=====] - 0s 5ms/step - loss: 3.1784
Epoch 829/2000
1/1 [=====] - 0s 5ms/step - loss: 3.1583
Epoch 830/2000
1/1 [=====] - 0s 7ms/step - loss: 3.1385
Epoch 831/2000
1/1 [=====] - 0s 7ms/step - loss: 3.1188
Epoch 832/2000
1/1 [=====] - 0s 6ms/step - loss: 3.0992
Epoch 833/2000
1/1 [=====] - 0s 8ms/step - loss: 3.0798
Epoch 834/2000
1/1 [=====] - 0s 7ms/step - loss: 3.0606
Epoch 835/2000
1/1 [=====] - 0s 6ms/step - loss: 3.0416
Epoch 836/2000
```

```
1/1 [=====] - 0s 5ms/step - loss: 3.0227
Epoch 837/2000
1/1 [=====] - 0s 5ms/step - loss: 3.0039
Epoch 838/2000
1/1 [=====] - 0s 5ms/step - loss: 2.9853
Epoch 839/2000
1/1 [=====] - 0s 8ms/step - loss: 2.9669
Epoch 840/2000
1/1 [=====] - 0s 6ms/step - loss: 2.9486
Epoch 841/2000
1/1 [=====] - 0s 7ms/step - loss: 2.9305
Epoch 842/2000
1/1 [=====] - 0s 7ms/step - loss: 2.9125
Epoch 843/2000
1/1 [=====] - 0s 18ms/step - loss: 2.8947
Epoch 844/2000
1/1 [=====] - 0s 6ms/step - loss: 2.8770
Epoch 845/2000
1/1 [=====] - 0s 76ms/step - loss: 2.8595
Epoch 846/2000
1/1 [=====] - 0s 11ms/step - loss: 2.8421
Epoch 847/2000
1/1 [=====] - 0s 8ms/step - loss: 2.8248
Epoch 848/2000
1/1 [=====] - 0s 8ms/step - loss: 2.8077
Epoch 849/2000
1/1 [=====] - 0s 21ms/step - loss: 2.7908
Epoch 850/2000
1/1 [=====] - 0s 6ms/step - loss: 2.7740
Epoch 851/2000
1/1 [=====] - 0s 7ms/step - loss: 2.7573
Epoch 852/2000
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Epoch 853/2000
1/1 [=====] - 0s 6ms/step - loss: 2.7243
Epoch 854/2000
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Epoch 855/2000
1/1 [=====] - 0s 7ms/step - loss: 2.6919
Epoch 856/2000
1/1 [=====] - 0s 7ms/step - loss: 2.6759
Epoch 857/2000
1/1 [=====] - 0s 8ms/step - loss: 2.6601
Epoch 858/2000
1/1 [=====] - 0s 6ms/step - loss: 2.6443
Epoch 859/2000
1/1 [=====] - 0s 8ms/step - loss: 2.6287
Epoch 860/2000
1/1 [=====] - 0s 5ms/step - loss: 2.6133
Epoch 861/2000
1/1 [=====] - 0s 7ms/step - loss: 2.5979
Epoch 862/2000
1/1 [=====] - 0s 5ms/step - loss: 2.5827
Epoch 863/2000
1/1 [=====] - 0s 6ms/step - loss: 2.5676
Epoch 864/2000
1/1 [=====] - 0s 6ms/step - loss: 2.5526
Epoch 865/2000
1/1 [=====] - 0s 6ms/step - loss: 2.5378
Epoch 866/2000
1/1 [=====] - 0s 5ms/step - loss: 2.5231
```

Epoch 867/2000
1/1 [=====] - 0s 6ms/step - loss: 2.5085
Epoch 868/2000
1/1 [=====] - 0s 6ms/step - loss: 2.4940
Epoch 869/2000
1/1 [=====] - 0s 6ms/step - loss: 2.4796
Epoch 870/2000
1/1 [=====] - 0s 9ms/step - loss: 2.4654
Epoch 871/2000
1/1 [=====] - 0s 8ms/step - loss: 2.4513
Epoch 872/2000
1/1 [=====] - 0s 8ms/step - loss: 2.4373
Epoch 873/2000
1/1 [=====] - 0s 5ms/step - loss: 2.4234
Epoch 874/2000
1/1 [=====] - 0s 5ms/step - loss: 2.4096
Epoch 875/2000
1/1 [=====] - 0s 7ms/step - loss: 2.3960
Epoch 876/2000
1/1 [=====] - 0s 5ms/step - loss: 2.3824
Epoch 877/2000
1/1 [=====] - 0s 5ms/step - loss: 2.3690
Epoch 878/2000
1/1 [=====] - 0s 6ms/step - loss: 2.3557
Epoch 879/2000
1/1 [=====] - 0s 7ms/step - loss: 2.3425
Epoch 880/2000
1/1 [=====] - 0s 5ms/step - loss: 2.3294
Epoch 881/2000
1/1 [=====] - 0s 7ms/step - loss: 2.3164
Epoch 882/2000
1/1 [=====] - 0s 5ms/step - loss: 2.3035
Epoch 883/2000
1/1 [=====] - 0s 7ms/step - loss: 2.2907
Epoch 884/2000
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Epoch 885/2000
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Epoch 886/2000
1/1 [=====] - 0s 6ms/step - loss: 2.2530
Epoch 887/2000
1/1 [=====] - 0s 7ms/step - loss: 2.2406
Epoch 888/2000
1/1 [=====] - 0s 8ms/step - loss: 2.2284
Epoch 889/2000
1/1 [=====] - 0s 9ms/step - loss: 2.2162
Epoch 890/2000
1/1 [=====] - 0s 6ms/step - loss: 2.2042
Epoch 891/2000
1/1 [=====] - 0s 7ms/step - loss: 2.1922
Epoch 892/2000
1/1 [=====] - 0s 6ms/step - loss: 2.1803
Epoch 893/2000
1/1 [=====] - 0s 5ms/step - loss: 2.1686
Epoch 894/2000
1/1 [=====] - 0s 12ms/step - loss: 2.1569
Epoch 895/2000
1/1 [=====] - 0s 7ms/step - loss: 2.1454
Epoch 896/2000
1/1 [=====] - 0s 6ms/step - loss: 2.1339
Epoch 897/2000

1/1 [=====] - 0s 8ms/step - loss: 2.1225
Epoch 898/2000
1/1 [=====] - 0s 59ms/step - loss: 2.1112
Epoch 899/2000
1/1 [=====] - 0s 5ms/step - loss: 2.1000
Epoch 900/2000
1/1 [=====] - 0s 7ms/step - loss: 2.0889
Epoch 901/2000
1/1 [=====] - 0s 7ms/step - loss: 2.0779
Epoch 902/2000
1/1 [=====] - 0s 7ms/step - loss: 2.0670
Epoch 903/2000
1/1 [=====] - 0s 20ms/step - loss: 2.0562
Epoch 904/2000
1/1 [=====] - 0s 6ms/step - loss: 2.0455
Epoch 905/2000
1/1 [=====] - 0s 7ms/step - loss: 2.0348
Epoch 906/2000
1/1 [=====] - 0s 5ms/step - loss: 2.0243
Epoch 907/2000
1/1 [=====] - 0s 5ms/step - loss: 2.0138
Epoch 908/2000
1/1 [=====] - 0s 7ms/step - loss: 2.0034
Epoch 909/2000
1/1 [=====] - 0s 5ms/step - loss: 1.9931
Epoch 910/2000
1/1 [=====] - 0s 6ms/step - loss: 1.9829
Epoch 911/2000
1/1 [=====] - 0s 6ms/step - loss: 1.9727
Epoch 912/2000
1/1 [=====] - 0s 7ms/step - loss: 1.9627
Epoch 913/2000
1/1 [=====] - 0s 6ms/step - loss: 1.9527
Epoch 914/2000
1/1 [=====] - 0s 7ms/step - loss: 1.9428
Epoch 915/2000
1/1 [=====] - 0s 5ms/step - loss: 1.9330
Epoch 916/2000
1/1 [=====] - 0s 8ms/step - loss: 1.9233
Epoch 917/2000
1/1 [=====] - 0s 5ms/step - loss: 1.9137
Epoch 918/2000
1/1 [=====] - 0s 8ms/step - loss: 1.9041
Epoch 919/2000
1/1 [=====] - 0s 6ms/step - loss: 1.8946
Epoch 920/2000
1/1 [=====] - 0s 6ms/step - loss: 1.8852
Epoch 921/2000
1/1 [=====] - 0s 6ms/step - loss: 1.8759
Epoch 922/2000
1/1 [=====] - 0s 8ms/step - loss: 1.8666
Epoch 923/2000
1/1 [=====] - 0s 5ms/step - loss: 1.8574
Epoch 924/2000
1/1 [=====] - 0s 7ms/step - loss: 1.8483
Epoch 925/2000
1/1 [=====] - 0s 8ms/step - loss: 1.8393
Epoch 926/2000
1/1 [=====] - 0s 5ms/step - loss: 1.8303
Epoch 927/2000
1/1 [=====] - 0s 5ms/step - loss: 1.8215


```
Epoch 928/2000
1/1 [=====] - 0s 8ms/step - loss: 1.8127
Epoch 929/2000
1/1 [=====] - 0s 7ms/step - loss: 1.8039
Epoch 930/2000
1/1 [=====] - 0s 7ms/step - loss: 1.7952
Epoch 931/2000
1/1 [=====] - 0s 6ms/step - loss: 1.7867
Epoch 932/2000
1/1 [=====] - 0s 9ms/step - loss: 1.7781
Epoch 933/2000
1/1 [=====] - 0s 5ms/step - loss: 1.7697
Epoch 934/2000
1/1 [=====] - 0s 6ms/step - loss: 1.7613
Epoch 935/2000
1/1 [=====] - 0s 9ms/step - loss: 1.7530
Epoch 936/2000
1/1 [=====] - 0s 16ms/step - loss: 1.7447
Epoch 937/2000
1/1 [=====] - 0s 8ms/step - loss: 1.7365
Epoch 938/2000
1/1 [=====] - 0s 7ms/step - loss: 1.7284
Epoch 939/2000
1/1 [=====] - 0s 15ms/step - loss: 1.7204
Epoch 940/2000
1/1 [=====] - 0s 10ms/step - loss: 1.7124
Epoch 941/2000
1/1 [=====] - 0s 89ms/step - loss: 1.7044
Epoch 942/2000
1/1 [=====] - 0s 6ms/step - loss: 1.6966
Epoch 943/2000
1/1 [=====] - 0s 20ms/step - loss: 1.6888
Epoch 944/2000
1/1 [=====] - 0s 6ms/step - loss: 1.6811
Epoch 945/2000
1/1 [=====] - 0s 8ms/step - loss: 1.6734
Epoch 946/2000
1/1 [=====] - 0s 9ms/step - loss: 1.6658
Epoch 947/2000
1/1 [=====] - 0s 5ms/step - loss: 1.6582
Epoch 948/2000
1/1 [=====] - 0s 7ms/step - loss: 1.6508
Epoch 949/2000
1/1 [=====] - 0s 6ms/step - loss: 1.6433
Epoch 950/2000
1/1 [=====] - 0s 6ms/step - loss: 1.6360
Epoch 951/2000
1/1 [=====] - 0s 6ms/step - loss: 1.6287
Epoch 952/2000
1/1 [=====] - 0s 7ms/step - loss: 1.6214
Epoch 953/2000
1/1 [=====] - 0s 6ms/step - loss: 1.6142
Epoch 954/2000
1/1 [=====] - 0s 6ms/step - loss: 1.6071
Epoch 955/2000
1/1 [=====] - 0s 5ms/step - loss: 1.6000
Epoch 956/2000
1/1 [=====] - 0s 15ms/step - loss: 1.5930
Epoch 957/2000
1/1 [=====] - 0s 6ms/step - loss: 1.5861
Epoch 958/2000
```

```
1/1 [=====] - 0s 12ms/step - loss: 1.5792
Epoch 959/2000
1/1 [=====] - 0s 5ms/step - loss: 1.5723
Epoch 960/2000
1/1 [=====] - 0s 5ms/step - loss: 1.5655
Epoch 961/2000
1/1 [=====] - 0s 8ms/step - loss: 1.5588
Epoch 962/2000
1/1 [=====] - 0s 6ms/step - loss: 1.5521
Epoch 963/2000
1/1 [=====] - 0s 7ms/step - loss: 1.5455
Epoch 964/2000
1/1 [=====] - 0s 7ms/step - loss: 1.5389
Epoch 965/2000
1/1 [=====] - 0s 7ms/step - loss: 1.5324
Epoch 966/2000
1/1 [=====] - 0s 64ms/step - loss: 1.5259
Epoch 967/2000
1/1 [=====] - 0s 7ms/step - loss: 1.5195
Epoch 968/2000
1/1 [=====] - 0s 8ms/step - loss: 1.5131
Epoch 969/2000
1/1 [=====] - 0s 5ms/step - loss: 1.5068
Epoch 970/2000
1/1 [=====] - 0s 6ms/step - loss: 1.5005
Epoch 971/2000
1/1 [=====] - 0s 8ms/step - loss: 1.4943
Epoch 972/2000
1/1 [=====] - 0s 5ms/step - loss: 1.4882
Epoch 973/2000
1/1 [=====] - 0s 5ms/step - loss: 1.4820
Epoch 974/2000
1/1 [=====] - 0s 5ms/step - loss: 1.4760
Epoch 975/2000
1/1 [=====] - 0s 6ms/step - loss: 1.4700
Epoch 976/2000
1/1 [=====] - 0s 4ms/step - loss: 1.4640
Epoch 977/2000
1/1 [=====] - 0s 8ms/step - loss: 1.4581
Epoch 978/2000
1/1 [=====] - 0s 8ms/step - loss: 1.4522
Epoch 979/2000
1/1 [=====] - 0s 8ms/step - loss: 1.4464
Epoch 980/2000
1/1 [=====] - 0s 6ms/step - loss: 1.4406
Epoch 981/2000
1/1 [=====] - 0s 7ms/step - loss: 1.4348
Epoch 982/2000
1/1 [=====] - 0s 5ms/step - loss: 1.4291
Epoch 983/2000
1/1 [=====] - 0s 6ms/step - loss: 1.4235
Epoch 984/2000
1/1 [=====] - 0s 9ms/step - loss: 1.4179
Epoch 985/2000
1/1 [=====] - 0s 7ms/step - loss: 1.4123
Epoch 986/2000
1/1 [=====] - 0s 5ms/step - loss: 1.4068
Epoch 987/2000
1/1 [=====] - 0s 4ms/step - loss: 1.4013
Epoch 988/2000
1/1 [=====] - 0s 7ms/step - loss: 1.3959
```

Epoch 989/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3905
Epoch 990/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3852
Epoch 991/2000
1/1 [=====] - 0s 56ms/step - loss: 1.3799
Epoch 992/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3746
Epoch 993/2000
1/1 [=====] - 0s 7ms/step - loss: 1.3694
Epoch 994/2000
1/1 [=====] - 0s 8ms/step - loss: 1.3642
Epoch 995/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3591
Epoch 996/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3540
Epoch 997/2000
1/1 [=====] - 0s 5ms/step - loss: 1.3489
Epoch 998/2000
1/1 [=====] - 0s 5ms/step - loss: 1.3439
Epoch 999/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3390
Epoch 1000/2000
1/1 [=====] - 0s 5ms/step - loss: 1.3340
Epoch 1001/2000
1/1 [=====] - 0s 7ms/step - loss: 1.3291
Epoch 1002/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3243
Epoch 1003/2000
1/1 [=====] - 0s 8ms/step - loss: 1.3194
Epoch 1004/2000
1/1 [=====] - 0s 9ms/step - loss: 1.3146
Epoch 1005/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3099
Epoch 1006/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3052
Epoch 1007/2000
1/1 [=====] - 0s 7ms/step - loss: 1.3005
Epoch 1008/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2959
Epoch 1009/2000
1/1 [=====] - 0s 5ms/step - loss: 1.2913
Epoch 1010/2000
1/1 [=====] - 0s 25ms/step - loss: 1.2867
Epoch 1011/2000
1/1 [=====] - 0s 24ms/step - loss: 1.2822
Epoch 1012/2000
1/1 [=====] - 0s 9ms/step - loss: 1.2777
Epoch 1013/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2732
Epoch 1014/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2688
Epoch 1015/2000
1/1 [=====] - 0s 5ms/step - loss: 1.2644
Epoch 1016/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2600
Epoch 1017/2000
1/1 [=====] - 0s 10ms/step - loss: 1.2557
Epoch 1018/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2514
Epoch 1019/2000

1/1 [=====] - 0s 6ms/step - loss: 1.2472
Epoch 1020/2000
1/1 [=====] - 0s 5ms/step - loss: 1.2429
Epoch 1021/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2387
Epoch 1022/2000
1/1 [=====] - 0s 4ms/step - loss: 1.2346
Epoch 1023/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2305
Epoch 1024/2000
1/1 [=====] - 0s 28ms/step - loss: 1.2264
Epoch 1025/2000
1/1 [=====] - 0s 13ms/step - loss: 1.2223
Epoch 1026/2000
1/1 [=====] - 0s 8ms/step - loss: 1.2183
Epoch 1027/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2142
Epoch 1028/2000
1/1 [=====] - 0s 10ms/step - loss: 1.2103
Epoch 1029/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2063
Epoch 1030/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2024
Epoch 1031/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1985
Epoch 1032/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1947
Epoch 1033/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1909
Epoch 1034/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1871
Epoch 1035/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1833
Epoch 1036/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1795
Epoch 1037/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1758
Epoch 1038/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1722
Epoch 1039/2000
1/1 [=====] - 0s 4ms/step - loss: 1.1685
Epoch 1040/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1649
Epoch 1041/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1613
Epoch 1042/2000
1/1 [=====] - 0s 8ms/step - loss: 1.1577
Epoch 1043/2000
1/1 [=====] - 0s 8ms/step - loss: 1.1542
Epoch 1044/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1506
Epoch 1045/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1471
Epoch 1046/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1437
Epoch 1047/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1402
Epoch 1048/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1368
Epoch 1049/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1334

Epoch 1050/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1301
Epoch 1051/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1267
Epoch 1052/2000
1/1 [=====] - 0s 75ms/step - loss: 1.1234
Epoch 1053/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1201
Epoch 1054/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1168
Epoch 1055/2000
1/1 [=====] - 0s 10ms/step - loss: 1.1136
Epoch 1056/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1104
Epoch 1057/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1072
Epoch 1058/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1040
Epoch 1059/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1009
Epoch 1060/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0978
Epoch 1061/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0947
Epoch 1062/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0916
Epoch 1063/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0885
Epoch 1064/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0855
Epoch 1065/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0825
Epoch 1066/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0795
Epoch 1067/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0765
Epoch 1068/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0736
Epoch 1069/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0706
Epoch 1070/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0677
Epoch 1071/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0649
Epoch 1072/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0620
Epoch 1073/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0592
Epoch 1074/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0563
Epoch 1075/2000
1/1 [=====] - 0s 4ms/step - loss: 1.0535
Epoch 1076/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0508
Epoch 1077/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0480
Epoch 1078/2000
1/1 [=====] - 0s 8ms/step - loss: 1.0453
Epoch 1079/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0425
Epoch 1080/2000

1/1 [=====] - 0s 6ms/step - loss: 1.0398
Epoch 1081/2000
1/1 [=====] - 0s 16ms/step - loss: 1.0372
Epoch 1082/2000
1/1 [=====] - 0s 13ms/step - loss: 1.0345
Epoch 1083/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0319
Epoch 1084/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0292
Epoch 1085/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0266
Epoch 1086/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0240
Epoch 1087/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0215
Epoch 1088/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0189
Epoch 1089/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0164
Epoch 1090/2000
1/1 [=====] - 0s 4ms/step - loss: 1.0139
Epoch 1091/2000
1/1 [=====] - 0s 14ms/step - loss: 1.0114
Epoch 1092/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0089
Epoch 1093/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0064
Epoch 1094/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0040
Epoch 1095/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0016
Epoch 1096/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9992
Epoch 1097/2000
1/1 [=====] - 0s 8ms/step - loss: 0.9968
Epoch 1098/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9944
Epoch 1099/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9920
Epoch 1100/2000
1/1 [=====] - 0s 15ms/step - loss: 0.9897
Epoch 1101/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9874
Epoch 1102/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9850
Epoch 1103/2000
1/1 [=====] - 0s 10ms/step - loss: 0.9827
Epoch 1104/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9805
Epoch 1105/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9782
Epoch 1106/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9760
Epoch 1107/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9737
Epoch 1108/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9715
Epoch 1109/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9693
Epoch 1110/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9671

```
Epoch 1111/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9649
Epoch 1112/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9628
Epoch 1113/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9606
Epoch 1114/2000
1/1 [=====] - 0s 8ms/step - loss: 0.9585
Epoch 1115/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9564
Epoch 1116/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9543
Epoch 1117/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9522
Epoch 1118/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9501
Epoch 1119/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9481
Epoch 1120/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9460
Epoch 1121/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9440
Epoch 1122/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9420
Epoch 1123/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9400
Epoch 1124/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9380
Epoch 1125/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9360
Epoch 1126/2000
1/1 [=====] - 0s 10ms/step - loss: 0.9341
Epoch 1127/2000
1/1 [=====] - 0s 16ms/step - loss: 0.9321
Epoch 1128/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9302
Epoch 1129/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9283
Epoch 1130/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9263
Epoch 1131/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9244
Epoch 1132/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9226
Epoch 1133/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9207
Epoch 1134/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9188
Epoch 1135/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9170
Epoch 1136/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9151
Epoch 1137/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9133
Epoch 1138/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9115
Epoch 1139/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9097
Epoch 1140/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9079
Epoch 1141/2000
```

1/1 [=====] - 0s 6ms/step - loss: 0.9061
Epoch 1142/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9044
Epoch 1143/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9026
Epoch 1144/2000
1/1 [=====] - 0s 4ms/step - loss: 0.9009
Epoch 1145/2000
1/1 [=====] - 0s 4ms/step - loss: 0.8991
Epoch 1146/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8974
Epoch 1147/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8957
Epoch 1148/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8940
Epoch 1149/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8923
Epoch 1150/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8906
Epoch 1151/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8889
Epoch 1152/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8873
Epoch 1153/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8856
Epoch 1154/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8840
Epoch 1155/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8824
Epoch 1156/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8808
Epoch 1157/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8792
Epoch 1158/2000
1/1 [=====] - 0s 24ms/step - loss: 0.8776
Epoch 1159/2000
1/1 [=====] - 0s 10ms/step - loss: 0.8760
Epoch 1160/2000
1/1 [=====] - 0s 37ms/step - loss: 0.8744
Epoch 1161/2000
1/1 [=====] - 0s 8ms/step - loss: 0.8728
Epoch 1162/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8713
Epoch 1163/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8697
Epoch 1164/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8682
Epoch 1165/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8667
Epoch 1166/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8651
Epoch 1167/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8636
Epoch 1168/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8621
Epoch 1169/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8606
Epoch 1170/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8592
Epoch 1171/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8577


```
Epoch 1172/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8562
Epoch 1173/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8548
Epoch 1174/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8533
Epoch 1175/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8519
Epoch 1176/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8504
Epoch 1177/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8490
Epoch 1178/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8476
Epoch 1179/2000
1/1 [=====] - 0s 10ms/step - loss: 0.8462
Epoch 1180/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8448
Epoch 1181/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8434
Epoch 1182/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8420
Epoch 1183/2000
1/1 [=====] - 0s 8ms/step - loss: 0.8407
Epoch 1184/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8393
Epoch 1185/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8379
Epoch 1186/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8366
Epoch 1187/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8353
Epoch 1188/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8339
Epoch 1189/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8326
Epoch 1190/2000
1/1 [=====] - 0s 10ms/step - loss: 0.8313
Epoch 1191/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8300
Epoch 1192/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8287
Epoch 1193/2000
1/1 [=====] - 0s 22ms/step - loss: 0.8274
Epoch 1194/2000
1/1 [=====] - 0s 39ms/step - loss: 0.8261
Epoch 1195/2000
1/1 [=====] - 0s 8ms/step - loss: 0.8248
Epoch 1196/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8235
Epoch 1197/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8223
Epoch 1198/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8210
Epoch 1199/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8198
Epoch 1200/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8185
Epoch 1201/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8173
Epoch 1202/2000
```

```
1/1 [=====] - 0s 5ms/step - loss: 0.8161
Epoch 1203/2000
1/1 [=====] - 0s 14ms/step - loss: 0.8148
Epoch 1204/2000
1/1 [=====] - 0s 8ms/step - loss: 0.8136
Epoch 1205/2000
1/1 [=====] - 0s 9ms/step - loss: 0.8124
Epoch 1206/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8112
Epoch 1207/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8100
Epoch 1208/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8088
Epoch 1209/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8076
Epoch 1210/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8065
Epoch 1211/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8053
Epoch 1212/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8041
Epoch 1213/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8030
Epoch 1214/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8018
Epoch 1215/2000
1/1 [=====] - 0s 4ms/step - loss: 0.8007
Epoch 1216/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7995
Epoch 1217/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7984
Epoch 1218/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7973
Epoch 1219/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7962
Epoch 1220/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7950
Epoch 1221/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7939
Epoch 1222/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7928
Epoch 1223/2000
1/1 [=====] - 0s 12ms/step - loss: 0.7917
Epoch 1224/2000
1/1 [=====] - 0s 10ms/step - loss: 0.7906
Epoch 1225/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7896
Epoch 1226/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7885
Epoch 1227/2000
1/1 [=====] - 0s 77ms/step - loss: 0.7874
Epoch 1228/2000
1/1 [=====] - 0s 24ms/step - loss: 0.7863
Epoch 1229/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7853
Epoch 1230/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7842
Epoch 1231/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7832
Epoch 1232/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7821
```

```
Epoch 1233/2000
1/1 [=====] - 0s 4ms/step - loss: 0.7811
Epoch 1234/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7800
Epoch 1235/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7790
Epoch 1236/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7780
Epoch 1237/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7770
Epoch 1238/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7760
Epoch 1239/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7749
Epoch 1240/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7739
Epoch 1241/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7729
Epoch 1242/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7719
Epoch 1243/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7710
Epoch 1244/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7700
Epoch 1245/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7690
Epoch 1246/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7680
Epoch 1247/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7670
Epoch 1248/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7661
Epoch 1249/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7651
Epoch 1250/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7642
Epoch 1251/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7632
Epoch 1252/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7623
Epoch 1253/2000
1/1 [=====] - 0s 19ms/step - loss: 0.7613
Epoch 1254/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7604
Epoch 1255/2000
1/1 [=====] - 0s 12ms/step - loss: 0.7594
Epoch 1256/2000
1/1 [=====] - 0s 9ms/step - loss: 0.7585
Epoch 1257/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7576
Epoch 1258/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7567
Epoch 1259/2000
1/1 [=====] - 0s 13ms/step - loss: 0.7558
Epoch 1260/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7548
Epoch 1261/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7539
Epoch 1262/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7530
Epoch 1263/2000
```

1/1 [=====] - 0s 21ms/step - loss: 0.7521
Epoch 1264/2000
1/1 [=====] - 0s 4ms/step - loss: 0.7512
Epoch 1265/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7504
Epoch 1266/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7495
Epoch 1267/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7486
Epoch 1268/2000
1/1 [=====] - 0s 4ms/step - loss: 0.7477
Epoch 1269/2000
1/1 [=====] - 0s 10ms/step - loss: 0.7468
Epoch 1270/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7460
Epoch 1271/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7451
Epoch 1272/2000
1/1 [=====] - 0s 10ms/step - loss: 0.7442
Epoch 1273/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7434
Epoch 1274/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7425
Epoch 1275/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7417
Epoch 1276/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7408
Epoch 1277/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7400
Epoch 1278/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7391
Epoch 1279/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7383
Epoch 1280/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7375
Epoch 1281/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7366
Epoch 1282/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7358
Epoch 1283/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7350
Epoch 1284/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7342
Epoch 1285/2000
1/1 [=====] - 0s 9ms/step - loss: 0.7334
Epoch 1286/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7326
Epoch 1287/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7318
Epoch 1288/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7309
Epoch 1289/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7301
Epoch 1290/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7294
Epoch 1291/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7286
Epoch 1292/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7278
Epoch 1293/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7270

Epoch 1294/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7262
Epoch 1295/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7254
Epoch 1296/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7246
Epoch 1297/2000
1/1 [=====] - 0s 9ms/step - loss: 0.7239
Epoch 1298/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7231
Epoch 1299/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7223
Epoch 1300/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7216
Epoch 1301/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7208
Epoch 1302/2000
1/1 [=====] - 0s 10ms/step - loss: 0.7200
Epoch 1303/2000
1/1 [=====] - 0s 4ms/step - loss: 0.7193
Epoch 1304/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7185
Epoch 1305/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7178
Epoch 1306/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7170
Epoch 1307/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7163
Epoch 1308/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7156
Epoch 1309/2000
1/1 [=====] - 0s 4ms/step - loss: 0.7148
Epoch 1310/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7141
Epoch 1311/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7134
Epoch 1312/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7126
Epoch 1313/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7119
Epoch 1314/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7112
Epoch 1315/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7105
Epoch 1316/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7097
Epoch 1317/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7090
Epoch 1318/2000
1/1 [=====] - 0s 11ms/step - loss: 0.7083
Epoch 1319/2000
1/1 [=====] - 0s 65ms/step - loss: 0.7076
Epoch 1320/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7069
Epoch 1321/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7062
Epoch 1322/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7055
Epoch 1323/2000
1/1 [=====] - 0s 21ms/step - loss: 0.7048
Epoch 1324/2000

1/1 [=====] - 0s 7ms/step - loss: 0.7041
Epoch 1325/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7034
Epoch 1326/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7027
Epoch 1327/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7020
Epoch 1328/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7014
Epoch 1329/2000
1/1 [=====] - 0s 9ms/step - loss: 0.7007
Epoch 1330/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7000
Epoch 1331/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6993
Epoch 1332/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6986
Epoch 1333/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6980
Epoch 1334/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6973
Epoch 1335/2000
1/1 [=====] - 0s 93ms/step - loss: 0.6966
Epoch 1336/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6960
Epoch 1337/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6953
Epoch 1338/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6946
Epoch 1339/2000
1/1 [=====] - 0s 18ms/step - loss: 0.6940
Epoch 1340/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6933
Epoch 1341/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6927
Epoch 1342/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6920
Epoch 1343/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6914
Epoch 1344/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6907
Epoch 1345/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6901
Epoch 1346/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6894
Epoch 1347/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6888
Epoch 1348/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6881
Epoch 1349/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6875
Epoch 1350/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6869
Epoch 1351/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6862
Epoch 1352/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6856
Epoch 1353/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6850
Epoch 1354/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6844

```
Epoch 1355/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6837
Epoch 1356/2000
1/1 [=====] - 0s 64ms/step - loss: 0.6831
Epoch 1357/2000
1/1 [=====] - 0s 12ms/step - loss: 0.6825
Epoch 1358/2000
1/1 [=====] - 0s 19ms/step - loss: 0.6819
Epoch 1359/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6813
Epoch 1360/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6806
Epoch 1361/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6800
Epoch 1362/2000
1/1 [=====] - 0s 14ms/step - loss: 0.6794
Epoch 1363/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6788
Epoch 1364/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6782
Epoch 1365/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6776
Epoch 1366/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6770
Epoch 1367/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6764
Epoch 1368/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6758
Epoch 1369/2000
1/1 [=====] - 0s 4ms/step - loss: 0.6752
Epoch 1370/2000
1/1 [=====] - 0s 4ms/step - loss: 0.6746
Epoch 1371/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6740
Epoch 1372/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6734
Epoch 1373/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6728
Epoch 1374/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6723
Epoch 1375/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6717
Epoch 1376/2000
1/1 [=====] - 0s 4ms/step - loss: 0.6711
Epoch 1377/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6705
Epoch 1378/2000
1/1 [=====] - 0s 4ms/step - loss: 0.6699
Epoch 1379/2000
1/1 [=====] - 0s 12ms/step - loss: 0.6693
Epoch 1380/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6688
Epoch 1381/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6682
Epoch 1382/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6676
Epoch 1383/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6670
Epoch 1384/2000
1/1 [=====] - 0s 4ms/step - loss: 0.6665
Epoch 1385/2000
```

1/1 [=====] - 0s 5ms/step - loss: 0.6659
Epoch 1386/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6653
Epoch 1387/2000
1/1 [=====] - 0s 4ms/step - loss: 0.6648
Epoch 1388/2000
1/1 [=====] - 0s 61ms/step - loss: 0.6642
Epoch 1389/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6637
Epoch 1390/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6631
Epoch 1391/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6625
Epoch 1392/2000
1/1 [=====] - 0s 19ms/step - loss: 0.6620
Epoch 1393/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6614
Epoch 1394/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6609
Epoch 1395/2000
1/1 [=====] - 0s 4ms/step - loss: 0.6603
Epoch 1396/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6598
Epoch 1397/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6592
Epoch 1398/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6587
Epoch 1399/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6581
Epoch 1400/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6576
Epoch 1401/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6570
Epoch 1402/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6565
Epoch 1403/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6559
Epoch 1404/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6554
Epoch 1405/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6549
Epoch 1406/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6543
Epoch 1407/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6538
Epoch 1408/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6533
Epoch 1409/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6527
Epoch 1410/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6522
Epoch 1411/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6517
Epoch 1412/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6511
Epoch 1413/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6506
Epoch 1414/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6501
Epoch 1415/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6496

Epoch 1416/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6490
Epoch 1417/2000
1/1 [=====] - 0s 10ms/step - loss: 0.6485
Epoch 1418/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6480
Epoch 1419/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6475
Epoch 1420/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6470
Epoch 1421/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6464
Epoch 1422/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6459
Epoch 1423/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6454
Epoch 1424/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6449
Epoch 1425/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6444
Epoch 1426/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6439
Epoch 1427/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6434
Epoch 1428/2000
1/1 [=====] - 0s 105ms/step - loss: 0.6429
Epoch 1429/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6424
Epoch 1430/2000
1/1 [=====] - 0s 13ms/step - loss: 0.6419
Epoch 1431/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6414
Epoch 1432/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6409
Epoch 1433/2000
1/1 [=====] - 0s 13ms/step - loss: 0.6403
Epoch 1434/2000
1/1 [=====] - 0s 12ms/step - loss: 0.6398
Epoch 1435/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6393
Epoch 1436/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6389
Epoch 1437/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6384
Epoch 1438/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6379
Epoch 1439/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6374
Epoch 1440/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6369
Epoch 1441/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6364
Epoch 1442/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6359
Epoch 1443/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6354
Epoch 1444/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6349
Epoch 1445/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6344
Epoch 1446/2000

1/1 [=====] - 0s 6ms/step - loss: 0.6339
Epoch 1447/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6334
Epoch 1448/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6330
Epoch 1449/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6325
Epoch 1450/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6320
Epoch 1451/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6315
Epoch 1452/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6310
Epoch 1453/2000
1/1 [=====] - 0s 4ms/step - loss: 0.6306
Epoch 1454/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6301
Epoch 1455/2000
1/1 [=====] - 0s 4ms/step - loss: 0.6296
Epoch 1456/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6291
Epoch 1457/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6286
Epoch 1458/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6282
Epoch 1459/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6277
Epoch 1460/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6272
Epoch 1461/2000
1/1 [=====] - 0s 10ms/step - loss: 0.6268
Epoch 1462/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6263
Epoch 1463/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6258
Epoch 1464/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6253
Epoch 1465/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6249
Epoch 1466/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6244
Epoch 1467/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6239
Epoch 1468/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6235
Epoch 1469/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6230
Epoch 1470/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6226
Epoch 1471/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6221
Epoch 1472/2000
1/1 [=====] - 0s 84ms/step - loss: 0.6216
Epoch 1473/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6212
Epoch 1474/2000
1/1 [=====] - 0s 21ms/step - loss: 0.6207
Epoch 1475/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6203
Epoch 1476/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6198

```
Epoch 1477/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6193
Epoch 1478/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6189
Epoch 1479/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6184
Epoch 1480/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6180
Epoch 1481/2000
1/1 [=====] - 0s 15ms/step - loss: 0.6175
Epoch 1482/2000
1/1 [=====] - 0s 10ms/step - loss: 0.6171
Epoch 1483/2000
1/1 [=====] - 0s 19ms/step - loss: 0.6166
Epoch 1484/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6162
Epoch 1485/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6157
Epoch 1486/2000
1/1 [=====] - 0s 25ms/step - loss: 0.6153
Epoch 1487/2000
1/1 [=====] - 0s 15ms/step - loss: 0.6148
Epoch 1488/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6144
Epoch 1489/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6139
Epoch 1490/2000
1/1 [=====] - 0s 11ms/step - loss: 0.6135
Epoch 1491/2000
1/1 [=====] - 0s 10ms/step - loss: 0.6130
Epoch 1492/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6126
Epoch 1493/2000
1/1 [=====] - 0s 10ms/step - loss: 0.6121
Epoch 1494/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6117
Epoch 1495/2000
1/1 [=====] - 0s 11ms/step - loss: 0.6113
Epoch 1496/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6108
Epoch 1497/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6104
Epoch 1498/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6099
Epoch 1499/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6095
Epoch 1500/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6091
Epoch 1501/2000
1/1 [=====] - 0s 67ms/step - loss: 0.6086
Epoch 1502/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6082
Epoch 1503/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6078
Epoch 1504/2000
1/1 [=====] - 0s 12ms/step - loss: 0.6073
Epoch 1505/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6069
Epoch 1506/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6064
Epoch 1507/2000
```

```
1/1 [=====] - 0s 9ms/step - loss: 0.6060
Epoch 1508/2000
1/1 [=====] - 0s 10ms/step - loss: 0.6056
Epoch 1509/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6052
Epoch 1510/2000
1/1 [=====] - 0s 14ms/step - loss: 0.6047
Epoch 1511/2000
1/1 [=====] - 0s 11ms/step - loss: 0.6043
Epoch 1512/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6039
Epoch 1513/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6034
Epoch 1514/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6030
Epoch 1515/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6026
Epoch 1516/2000
1/1 [=====] - 0s 25ms/step - loss: 0.6022
Epoch 1517/2000
1/1 [=====] - 0s 10ms/step - loss: 0.6017
Epoch 1518/2000
1/1 [=====] - 0s 11ms/step - loss: 0.6013
Epoch 1519/2000
1/1 [=====] - 0s 12ms/step - loss: 0.6009
Epoch 1520/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6005
Epoch 1521/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6000
Epoch 1522/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5996
Epoch 1523/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5992
Epoch 1524/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5988
Epoch 1525/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5983
Epoch 1526/2000
1/1 [=====] - 0s 15ms/step - loss: 0.5979
Epoch 1527/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5975
Epoch 1528/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5971
Epoch 1529/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5967
Epoch 1530/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5963
Epoch 1531/2000
1/1 [=====] - 0s 62ms/step - loss: 0.5958
Epoch 1532/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5954
Epoch 1533/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5950
Epoch 1534/2000
1/1 [=====] - 0s 21ms/step - loss: 0.5946
Epoch 1535/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5942
Epoch 1536/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5938
Epoch 1537/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5934
```

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Epoch 1538/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5929
Epoch 1539/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5925
Epoch 1540/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5921
Epoch 1541/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5917
Epoch 1542/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5913
Epoch 1543/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5909
Epoch 1544/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5905
Epoch 1545/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5901
Epoch 1546/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5897
Epoch 1547/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5893
Epoch 1548/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5889
Epoch 1549/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5884
Epoch 1550/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5880
Epoch 1551/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5876
Epoch 1552/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5872
Epoch 1553/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5868
Epoch 1554/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5864
Epoch 1555/2000
1/1 [=====] - 0s 12ms/step - loss: 0.5860
Epoch 1556/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5856
Epoch 1557/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5852
Epoch 1558/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5848
Epoch 1559/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5844
Epoch 1560/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5840
Epoch 1561/2000
1/1 [=====] - 0s 61ms/step - loss: 0.5836
Epoch 1562/2000
1/1 [=====] - 0s 12ms/step - loss: 0.5832
Epoch 1563/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5828
Epoch 1564/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5824
Epoch 1565/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5820
Epoch 1566/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5816
Epoch 1567/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5812
Epoch 1568/2000
```

1/1 [=====] - 0s 7ms/step - loss: 0.5808
Epoch 1569/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5805
Epoch 1570/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5801
Epoch 1571/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5797
Epoch 1572/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5793
Epoch 1573/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5789
Epoch 1574/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5785
Epoch 1575/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5781
Epoch 1576/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5777
Epoch 1577/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5773
Epoch 1578/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5769
Epoch 1579/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5765
Epoch 1580/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5761
Epoch 1581/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5758
Epoch 1582/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5754
Epoch 1583/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5750
Epoch 1584/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5746
Epoch 1585/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5742
Epoch 1586/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5738
Epoch 1587/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5734
Epoch 1588/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5731
Epoch 1589/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5727
Epoch 1590/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5723
Epoch 1591/2000
1/1 [=====] - 0s 27ms/step - loss: 0.5719
Epoch 1592/2000
1/1 [=====] - 0s 33ms/step - loss: 0.5715
Epoch 1593/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5711
Epoch 1594/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5708
Epoch 1595/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5704
Epoch 1596/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5700
Epoch 1597/2000
1/1 [=====] - 0s 17ms/step - loss: 0.5696
Epoch 1598/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5692

```
Epoch 1599/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5688
Epoch 1600/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5685
Epoch 1601/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5681
Epoch 1602/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5677
Epoch 1603/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5673
Epoch 1604/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5670
Epoch 1605/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5666
Epoch 1606/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5662
Epoch 1607/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5658
Epoch 1608/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5654
Epoch 1609/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5651
Epoch 1610/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5647
Epoch 1611/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5643
Epoch 1612/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5639
Epoch 1613/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5636
Epoch 1614/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5632
Epoch 1615/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5628
Epoch 1616/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5624
Epoch 1617/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5621
Epoch 1618/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5617
Epoch 1619/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5613
Epoch 1620/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5610
Epoch 1621/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5606
Epoch 1622/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5602
Epoch 1623/2000
1/1 [=====] - 0s 23ms/step - loss: 0.5599
Epoch 1624/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5595
Epoch 1625/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5591
Epoch 1626/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5587
Epoch 1627/2000
1/1 [=====] - 0s 31ms/step - loss: 0.5584
Epoch 1628/2000
1/1 [=====] - 0s 14ms/step - loss: 0.5580
Epoch 1629/2000
```

1/1 [=====] - 0s 6ms/step - loss: 0.5576
Epoch 1630/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5573
Epoch 1631/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5569
Epoch 1632/2000
1/1 [=====] - 0s 65ms/step - loss: 0.5565
Epoch 1633/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5562
Epoch 1634/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5558
Epoch 1635/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5554
Epoch 1636/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5551
Epoch 1637/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5547
Epoch 1638/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5543
Epoch 1639/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5540
Epoch 1640/2000
1/1 [=====] - 0s 15ms/step - loss: 0.5536
Epoch 1641/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5533
Epoch 1642/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5529
Epoch 1643/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5525
Epoch 1644/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5522
Epoch 1645/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5518
Epoch 1646/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5515
Epoch 1647/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5511
Epoch 1648/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5507
Epoch 1649/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5504
Epoch 1650/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5500
Epoch 1651/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5497
Epoch 1652/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5493
Epoch 1653/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5489
Epoch 1654/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5486
Epoch 1655/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5482
Epoch 1656/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5479
Epoch 1657/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5475
Epoch 1658/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5471
Epoch 1659/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5468


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Epoch 1660/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5464
Epoch 1661/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5461
Epoch 1662/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5457
Epoch 1663/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5454
Epoch 1664/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5450
Epoch 1665/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5447
Epoch 1666/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5443
Epoch 1667/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5440
Epoch 1668/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5436
Epoch 1669/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5432
Epoch 1670/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5429
Epoch 1671/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5425
Epoch 1672/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5422
Epoch 1673/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5418
Epoch 1674/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5415
Epoch 1675/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5411
Epoch 1676/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5408
Epoch 1677/2000
1/1 [=====] - 0s 88ms/step - loss: 0.5404
Epoch 1678/2000
1/1 [=====] - 0s 12ms/step - loss: 0.5401
Epoch 1679/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5397
Epoch 1680/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5394
Epoch 1681/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5390
Epoch 1682/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5387
Epoch 1683/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5383
Epoch 1684/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5380
Epoch 1685/2000
1/1 [=====] - 0s 31ms/step - loss: 0.5376
Epoch 1686/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5373
Epoch 1687/2000
1/1 [=====] - 0s 13ms/step - loss: 0.5369
Epoch 1688/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5366
Epoch 1689/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5363
Epoch 1690/2000
```

```
1/1 [=====] - 0s 6ms/step - loss: 0.5359
Epoch 1691/2000
1/1 [=====] - 0s 14ms/step - loss: 0.5356
Epoch 1692/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5352
Epoch 1693/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5349
Epoch 1694/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5345
Epoch 1695/2000
1/1 [=====] - 0s 12ms/step - loss: 0.5342
Epoch 1696/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5338
Epoch 1697/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5335
Epoch 1698/2000
1/1 [=====] - 0s 70ms/step - loss: 0.5332
Epoch 1699/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5328
Epoch 1700/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5325
Epoch 1701/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5321
Epoch 1702/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5318
Epoch 1703/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5314
Epoch 1704/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5311
Epoch 1705/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5308
Epoch 1706/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5304
Epoch 1707/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5301
Epoch 1708/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5297
Epoch 1709/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5294
Epoch 1710/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5291
Epoch 1711/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5287
Epoch 1712/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5284
Epoch 1713/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5280
Epoch 1714/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5277
Epoch 1715/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5274
Epoch 1716/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5270
Epoch 1717/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5267
Epoch 1718/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5263
Epoch 1719/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5260
Epoch 1720/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5257
```

```
Epoch 1721/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5253
Epoch 1722/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5250
Epoch 1723/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5247
Epoch 1724/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5243
Epoch 1725/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5240
Epoch 1726/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5237
Epoch 1727/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5233
Epoch 1728/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5230
Epoch 1729/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5227
Epoch 1730/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5223
Epoch 1731/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5220
Epoch 1732/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5217
Epoch 1733/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5213
Epoch 1734/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5210
Epoch 1735/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5207
Epoch 1736/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5203
Epoch 1737/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5200
Epoch 1738/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5197
Epoch 1739/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5193
Epoch 1740/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5190
Epoch 1741/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5187
Epoch 1742/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5183
Epoch 1743/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5180
Epoch 1744/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5177
Epoch 1745/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5173
Epoch 1746/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5170
Epoch 1747/2000
1/1 [=====] - 0s 14ms/step - loss: 0.5167
Epoch 1748/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5164
Epoch 1749/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5160
Epoch 1750/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5157
Epoch 1751/2000
```

1/1 [=====] - 0s 12ms/step - loss: 0.5154
Epoch 1752/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5150
Epoch 1753/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5147
Epoch 1754/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5144
Epoch 1755/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5141
Epoch 1756/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5137
Epoch 1757/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5134
Epoch 1758/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5131
Epoch 1759/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5127
Epoch 1760/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5124
Epoch 1761/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5121
Epoch 1762/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5118
Epoch 1763/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5114
Epoch 1764/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5111
Epoch 1765/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5108
Epoch 1766/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5105
Epoch 1767/2000
1/1 [=====] - 0s 16ms/step - loss: 0.5101
Epoch 1768/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5098
Epoch 1769/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5095
Epoch 1770/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5092
Epoch 1771/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5089
Epoch 1772/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5085
Epoch 1773/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5082
Epoch 1774/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5079
Epoch 1775/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5076
Epoch 1776/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5072
Epoch 1777/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5069
Epoch 1778/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5066
Epoch 1779/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5063
Epoch 1780/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5060
Epoch 1781/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5056

```
Epoch 1782/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5053
Epoch 1783/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5050
Epoch 1784/2000
1/1 [=====] - 0s 12ms/step - loss: 0.5047
Epoch 1785/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5044
Epoch 1786/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5040
Epoch 1787/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5037
Epoch 1788/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5034
Epoch 1789/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5031
Epoch 1790/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5028
Epoch 1791/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5024
Epoch 1792/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5021
Epoch 1793/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5018
Epoch 1794/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5015
Epoch 1795/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5012
Epoch 1796/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5009
Epoch 1797/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5005
Epoch 1798/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5002
Epoch 1799/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4999
Epoch 1800/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4996
Epoch 1801/2000
1/1 [=====] - 0s 14ms/step - loss: 0.4993
Epoch 1802/2000
1/1 [=====] - 0s 10ms/step - loss: 0.4990
Epoch 1803/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4986
Epoch 1804/2000
1/1 [=====] - 0s 12ms/step - loss: 0.4983
Epoch 1805/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4980
Epoch 1806/2000
1/1 [=====] - 0s 23ms/step - loss: 0.4977
Epoch 1807/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4974
Epoch 1808/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4971
Epoch 1809/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4968
Epoch 1810/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4964
Epoch 1811/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4961
Epoch 1812/2000
```

```
1/1 [=====] - 0s 4ms/step - loss: 0.4958
Epoch 1813/2000
1/1 [=====] - 0s 13ms/step - loss: 0.4955
Epoch 1814/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4952
Epoch 1815/2000
1/1 [=====] - 0s 13ms/step - loss: 0.4949
Epoch 1816/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4946
Epoch 1817/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4943
Epoch 1818/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4939
Epoch 1819/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4936
Epoch 1820/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4933
Epoch 1821/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4930
Epoch 1822/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4927
Epoch 1823/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4924
Epoch 1824/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4921
Epoch 1825/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4918
Epoch 1826/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4915
Epoch 1827/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4912
Epoch 1828/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4908
Epoch 1829/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4905
Epoch 1830/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4902
Epoch 1831/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4899
Epoch 1832/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4896
Epoch 1833/2000
1/1 [=====] - 0s 10ms/step - loss: 0.4893
Epoch 1834/2000
1/1 [=====] - 0s 10ms/step - loss: 0.4890
Epoch 1835/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4887
Epoch 1836/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4884
Epoch 1837/2000
1/1 [=====] - 0s 17ms/step - loss: 0.4881
Epoch 1838/2000
1/1 [=====] - 0s 39ms/step - loss: 0.4878
Epoch 1839/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4875
Epoch 1840/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4871
Epoch 1841/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4868
Epoch 1842/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4865
```

Epoch 1843/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4862
Epoch 1844/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4859
Epoch 1845/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4856
Epoch 1846/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4853
Epoch 1847/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4850
Epoch 1848/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4847
Epoch 1849/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4844
Epoch 1850/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4841
Epoch 1851/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4838
Epoch 1852/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4835
Epoch 1853/2000
1/1 [=====] - 0s 14ms/step - loss: 0.4832
Epoch 1854/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4829
Epoch 1855/2000
1/1 [=====] - 0s 21ms/step - loss: 0.4826
Epoch 1856/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4823
Epoch 1857/2000
1/1 [=====] - 0s 17ms/step - loss: 0.4820
Epoch 1858/2000
1/1 [=====] - 0s 10ms/step - loss: 0.4817
Epoch 1859/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4814
Epoch 1860/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4811
Epoch 1861/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4808
Epoch 1862/2000
1/1 [=====] - 0s 13ms/step - loss: 0.4805
Epoch 1863/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4802
Epoch 1864/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4799
Epoch 1865/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4796
Epoch 1866/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4793
Epoch 1867/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4790
Epoch 1868/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4787
Epoch 1869/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4784
Epoch 1870/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4781
Epoch 1871/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4778
Epoch 1872/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4775
Epoch 1873/2000

1/1 [=====] - 0s 6ms/step - loss: 0.4772
Epoch 1874/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4769
Epoch 1875/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4766
Epoch 1876/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4763
Epoch 1877/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4760
Epoch 1878/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4757
Epoch 1879/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4754
Epoch 1880/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4751
Epoch 1881/2000
1/1 [=====] - 0s 60ms/step - loss: 0.4748
Epoch 1882/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4745
Epoch 1883/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4742
Epoch 1884/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4739
Epoch 1885/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4736
Epoch 1886/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4733
Epoch 1887/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4730
Epoch 1888/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4727
Epoch 1889/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4724
Epoch 1890/2000
1/1 [=====] - 0s 10ms/step - loss: 0.4721
Epoch 1891/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4718
Epoch 1892/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4715
Epoch 1893/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4712
Epoch 1894/2000
1/1 [=====] - 0s 11ms/step - loss: 0.4709
Epoch 1895/2000
1/1 [=====] - 0s 32ms/step - loss: 0.4706
Epoch 1896/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4703
Epoch 1897/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4700
Epoch 1898/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4697
Epoch 1899/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4694
Epoch 1900/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4691
Epoch 1901/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4689
Epoch 1902/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4686
Epoch 1903/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4683


```
Epoch 1904/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4680
Epoch 1905/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4677
Epoch 1906/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4674
Epoch 1907/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4671
Epoch 1908/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4668
Epoch 1909/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4665
Epoch 1910/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4662
Epoch 1911/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4659
Epoch 1912/2000
1/1 [=====] - 0s 60ms/step - loss: 0.4656
Epoch 1913/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4653
Epoch 1914/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4651
Epoch 1915/2000
1/1 [=====] - 0s 15ms/step - loss: 0.4648
Epoch 1916/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4645
Epoch 1917/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4642
Epoch 1918/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4639
Epoch 1919/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4636
Epoch 1920/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4633
Epoch 1921/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4630
Epoch 1922/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4627
Epoch 1923/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4624
Epoch 1924/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4622
Epoch 1925/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4619
Epoch 1926/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4616
Epoch 1927/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4613
Epoch 1928/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4610
Epoch 1929/2000
1/1 [=====] - 0s 10ms/step - loss: 0.4607
Epoch 1930/2000
1/1 [=====] - 0s 19ms/step - loss: 0.4604
Epoch 1931/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4601
Epoch 1932/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4599
Epoch 1933/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4596
Epoch 1934/2000
```

1/1 [=====] - 0s 12ms/step - loss: 0.4593
Epoch 1935/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4590
Epoch 1936/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4587
Epoch 1937/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4584
Epoch 1938/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4581
Epoch 1939/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4578
Epoch 1940/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4576
Epoch 1941/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4573
Epoch 1942/2000
1/1 [=====] - 0s 11ms/step - loss: 0.4570
Epoch 1943/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4567
Epoch 1944/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4564
Epoch 1945/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4561
Epoch 1946/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4559
Epoch 1947/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4556
Epoch 1948/2000
1/1 [=====] - 0s 39ms/step - loss: 0.4553
Epoch 1949/2000
1/1 [=====] - 0s 25ms/step - loss: 0.4550
Epoch 1950/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4547
Epoch 1951/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4544
Epoch 1952/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4541
Epoch 1953/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4539
Epoch 1954/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4536
Epoch 1955/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4533
Epoch 1956/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4530
Epoch 1957/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4527
Epoch 1958/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4525
Epoch 1959/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4522
Epoch 1960/2000
1/1 [=====] - 0s 11ms/step - loss: 0.4519
Epoch 1961/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4516
Epoch 1962/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4513
Epoch 1963/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4510
Epoch 1964/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4508

```
Epoch 1965/2000
1/1 [=====] - 0s 15ms/step - loss: 0.4505
Epoch 1966/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4502
Epoch 1967/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4499
Epoch 1968/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4496
Epoch 1969/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4494
Epoch 1970/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4491
Epoch 1971/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4488
Epoch 1972/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4485
Epoch 1973/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4482
Epoch 1974/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4480
Epoch 1975/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4477
Epoch 1976/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4474
Epoch 1977/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4471
Epoch 1978/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4468
Epoch 1979/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4466
Epoch 1980/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4463
Epoch 1981/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4460
Epoch 1982/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4457
Epoch 1983/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4455
Epoch 1984/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4452
Epoch 1985/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4449
Epoch 1986/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4446
Epoch 1987/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4443
Epoch 1988/2000
1/1 [=====] - 0s 12ms/step - loss: 0.4441
Epoch 1989/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4438
Epoch 1990/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4435
Epoch 1991/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4432
Epoch 1992/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4430
Epoch 1993/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4427
Epoch 1994/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4424
Epoch 1995/2000
```

```

1/1 [=====] - 0s 7ms/step - loss: 0.4421
Epoch 1996/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4419
Epoch 1997/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4416
Epoch 1998/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4413
Epoch 1999/2000
1/1 [=====] - 0s 22ms/step - loss: 0.4410
Epoch 2000/2000
1/1 [=====] - 0s 15ms/step - loss: 0.4408
1/1 [=====] - 0s 90ms/step
SE PREDICE: [[5.7145705]] CUANDO EN REALIDAD LA RESPUESTA ES 6.25
1/1 [=====] - 0s 28ms/step
0.4404937075211958 ERROR CUADRATICO MEDIO, DEBERIA SER LO MAS CERCANO A
0 POSIBLE

```

CUATRO UNIDADES POR CAPA OCULTA

```

In [ ]: import tensorflow as tf
import numpy as np
from tensorflow import keras
# Declare model inputs and outputs for training y = x^2
xs = np.array([-4.0, -3.0, -2.0, -1.0, 0.0, 1.0, 2.0, 3.0, 4.0], dtype=float)
ys = np.array([16, 9, 4, 1, 0, 1, 4, 9, 16], dtype=float)

# numero de unidades por capa
n_unidades = 4
# funcion de activacion sigmoid
funcion_activacion = 'sigmoid'

# Build a Sequential model
# 2 capa oculta
# 1 capa de salida con 1 neurona y funcion de activacion lineal
model = tf.keras.Sequential([
    keras.layers.Dense(units=n_unidades, input_shape=(1,)),
    keras.layers.Dense(units=n_unidades, activation=funcion_activacion),
    keras.layers.Dense(units=1, activation='linear')
])

#compile
model.compile(optimizer='sgd', loss='mean_squared_error')
#fit con epochs 2000
model.fit(xs, ys, epochs=2000)

#predict en x=2.5
print('SE PREDICE:', model.predict([2.5]), " CUANDO EN REALIDAD LA RESPUESTA ES 6.25")

# Error cuadratico medio
from sklearn.metrics import mean_squared_error
# calcular error cuadratico medio
print(mean_squared_error(ys, model.predict(xs)), " ERROR CUADRATICO MEDIO")

Epoch 1/2000
1/1 [=====] - 1s 530ms/step - loss: 69.5172
Epoch 2/2000
1/1 [=====] - 0s 5ms/step - loss: 66.9836

```

```
Epoch 3/2000
1/1 [=====] - 0s 7ms/step - loss: 64.5774
Epoch 4/2000
1/1 [=====] - 0s 9ms/step - loss: 62.2930
Epoch 5/2000
1/1 [=====] - 0s 9ms/step - loss: 60.1259
Epoch 6/2000
1/1 [=====] - 0s 10ms/step - loss: 58.0729
Epoch 7/2000
1/1 [=====] - 0s 11ms/step - loss: 56.1314
Epoch 8/2000
1/1 [=====] - 0s 11ms/step - loss: 54.2992
Epoch 9/2000
1/1 [=====] - 0s 8ms/step - loss: 52.5747
Epoch 10/2000
1/1 [=====] - 0s 11ms/step - loss: 50.9559
Epoch 11/2000
1/1 [=====] - 0s 5ms/step - loss: 49.4413
Epoch 12/2000
1/1 [=====] - 0s 15ms/step - loss: 48.0286
Epoch 13/2000
1/1 [=====] - 0s 83ms/step - loss: 46.7157
Epoch 14/2000
1/1 [=====] - 0s 8ms/step - loss: 45.4997
Epoch 15/2000
1/1 [=====] - 0s 7ms/step - loss: 44.3775
Epoch 16/2000
1/1 [=====] - 0s 7ms/step - loss: 43.3457
Epoch 17/2000
1/1 [=====] - 0s 7ms/step - loss: 42.4002
Epoch 18/2000
1/1 [=====] - 0s 8ms/step - loss: 41.5369
Epoch 19/2000
1/1 [=====] - 0s 7ms/step - loss: 40.7514
Epoch 20/2000
1/1 [=====] - 0s 6ms/step - loss: 40.0388
Epoch 21/2000
1/1 [=====] - 0s 9ms/step - loss: 39.3946
Epoch 22/2000
1/1 [=====] - 0s 6ms/step - loss: 38.8139
Epoch 23/2000
1/1 [=====] - 0s 7ms/step - loss: 38.2919
Epoch 24/2000
1/1 [=====] - 0s 55ms/step - loss: 37.8239
Epoch 25/2000
1/1 [=====] - 0s 18ms/step - loss: 37.4055
Epoch 26/2000
1/1 [=====] - 0s 25ms/step - loss: 37.0324
Epoch 27/2000
1/1 [=====] - 0s 10ms/step - loss: 36.7002
Epoch 28/2000
1/1 [=====] - 0s 7ms/step - loss: 36.4053
Epoch 29/2000
1/1 [=====] - 0s 6ms/step - loss: 36.1439
Epoch 30/2000
1/1 [=====] - 0s 8ms/step - loss: 35.9126
Epoch 31/2000
1/1 [=====] - 0s 7ms/step - loss: 35.7084
Epoch 32/2000
1/1 [=====] - 0s 6ms/step - loss: 35.5284
Epoch 33/2000
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1/1 [=====] - 0s 8ms/step - loss: 35.3698
Epoch 34/2000
1/1 [=====] - 0s 6ms/step - loss: 35.2304
Epoch 35/2000
1/1 [=====] - 0s 8ms/step - loss: 35.1080
Epoch 36/2000
1/1 [=====] - 0s 6ms/step - loss: 35.0007
Epoch 37/2000
1/1 [=====] - 0s 6ms/step - loss: 34.9066
Epoch 38/2000
1/1 [=====] - 0s 7ms/step - loss: 34.8243
Epoch 39/2000
1/1 [=====] - 0s 5ms/step - loss: 34.7523
Epoch 40/2000
1/1 [=====] - 0s 6ms/step - loss: 34.6894
Epoch 41/2000
1/1 [=====] - 0s 7ms/step - loss: 34.6344
Epoch 42/2000
1/1 [=====] - 0s 5ms/step - loss: 34.5864
Epoch 43/2000
1/1 [=====] - 0s 6ms/step - loss: 34.5446
Epoch 44/2000
1/1 [=====] - 0s 6ms/step - loss: 34.5081
Epoch 45/2000
1/1 [=====] - 0s 19ms/step - loss: 34.4763
Epoch 46/2000
1/1 [=====] - 0s 10ms/step - loss: 34.4485
Epoch 47/2000
1/1 [=====] - 0s 5ms/step - loss: 34.4244
Epoch 48/2000
1/1 [=====] - 0s 6ms/step - loss: 34.4033
Epoch 49/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3849
Epoch 50/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3689
Epoch 51/2000
1/1 [=====] - 0s 5ms/step - loss: 34.3550
Epoch 52/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3428
Epoch 53/2000
1/1 [=====] - 0s 5ms/step - loss: 34.3321
Epoch 54/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3228
Epoch 55/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3147
Epoch 56/2000
1/1 [=====] - 0s 8ms/step - loss: 34.3076
Epoch 57/2000
1/1 [=====] - 0s 5ms/step - loss: 34.3014
Epoch 58/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2959
Epoch 59/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2911
Epoch 60/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2868
Epoch 61/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2831
Epoch 62/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2797
Epoch 63/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2768

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Epoch 64/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2742
Epoch 65/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2718
Epoch 66/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2697
Epoch 67/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2678
Epoch 68/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2661
Epoch 69/2000
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Epoch 70/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2632
Epoch 71/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2619
Epoch 72/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2607
Epoch 73/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2596
Epoch 74/2000
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Epoch 75/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2576
Epoch 76/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2567
Epoch 77/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2559
Epoch 78/2000
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Epoch 79/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2543
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Epoch 81/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2529
Epoch 82/2000
1/1 [=====] - 0s 4ms/step - loss: 34.2523
Epoch 83/2000
1/1 [=====] - 0s 35ms/step - loss: 34.2516
Epoch 84/2000
1/1 [=====] - 0s 16ms/step - loss: 34.2510
Epoch 85/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2504
Epoch 86/2000
1/1 [=====] - 0s 16ms/step - loss: 34.2499
Epoch 87/2000
1/1 [=====] - 0s 12ms/step - loss: 34.2493
Epoch 88/2000
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Epoch 89/2000
1/1 [=====] - 0s 12ms/step - loss: 34.2482
Epoch 90/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2477
Epoch 91/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2472
Epoch 92/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2467
Epoch 93/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2462
Epoch 94/2000
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Epoch 95/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2452
Epoch 96/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2447
Epoch 97/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2442
Epoch 98/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2438
Epoch 99/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2433
Epoch 100/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2429
Epoch 101/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2424
Epoch 102/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2420
Epoch 103/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2415
Epoch 104/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2411
Epoch 105/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2406
Epoch 106/2000
1/1 [=====] - 0s 12ms/step - loss: 34.2402
Epoch 107/2000
1/1 [=====] - 0s 22ms/step - loss: 34.2398
Epoch 108/2000
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Epoch 109/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2389
Epoch 110/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2385
Epoch 111/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2381
Epoch 112/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2377
Epoch 113/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2373
Epoch 114/2000
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Epoch 115/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2365
Epoch 116/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2361
Epoch 117/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2357
Epoch 118/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2353
Epoch 119/2000
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Epoch 120/2000
1/1 [=====] - 0s 15ms/step - loss: 34.2345
Epoch 121/2000
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Epoch 122/2000
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Epoch 124/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2329


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Epoch 127/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2318
Epoch 128/2000
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Epoch 129/2000
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Epoch 134/2000
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Epoch 135/2000
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Epoch 136/2000
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Epoch 137/2000
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Epoch 139/2000
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Epoch 140/2000
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Epoch 141/2000
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Epoch 142/2000
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Epoch 143/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2259
Epoch 144/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2255
Epoch 145/2000
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Epoch 146/2000
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Epoch 147/2000
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Epoch 148/2000
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Epoch 149/2000
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Epoch 150/2000
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Epoch 151/2000
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Epoch 152/2000
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Epoch 153/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2222
Epoch 154/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2219
Epoch 155/2000
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Epoch 156/2000
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Epoch 157/2000
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Epoch 158/2000
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Epoch 159/2000
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Epoch 161/2000
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Epoch 162/2000
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Epoch 163/2000
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Epoch 164/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2183
Epoch 165/2000
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Epoch 166/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2175
Epoch 167/2000
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Epoch 168/2000
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Epoch 169/2000
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Epoch 170/2000
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Epoch 171/2000
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Epoch 172/2000
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Epoch 173/2000
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Epoch 174/2000
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Epoch 175/2000
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Epoch 176/2000
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Epoch 177/2000
1/1 [=====] - 0s 22ms/step - loss: 34.2135
Epoch 178/2000
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Epoch 179/2000
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Epoch 180/2000
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Epoch 182/2000
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Epoch 183/2000
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Epoch 184/2000
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Epoch 185/2000
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Epoch 186/2000
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Epoch 187/2000
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Epoch 188/2000
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Epoch 189/2000
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Epoch 190/2000
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Epoch 191/2000
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Epoch 192/2000
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Epoch 193/2000
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Epoch 195/2000
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Epoch 196/2000
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Epoch 199/2000
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Epoch 201/2000
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Epoch 202/2000
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Epoch 203/2000
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Epoch 204/2000
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Epoch 205/2000
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Epoch 207/2000
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Epoch 208/2000
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Epoch 209/2000
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Epoch 216/2000

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Epoch 222/2000
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Epoch 223/2000
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Epoch 226/2000
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Epoch 227/2000
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Epoch 228/2000
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Epoch 229/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1908
Epoch 230/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1902
Epoch 231/2000
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Epoch 232/2000
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Epoch 233/2000
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Epoch 246/2000
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Epoch 247/2000
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Epoch 252/2000
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Epoch 253/2000
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Epoch 255/2000
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Epoch 257/2000
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Epoch 258/2000
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Epoch 260/2000
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Epoch 263/2000
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Epoch 270/2000
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Epoch 272/2000
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Epoch 273/2000
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Epoch 274/2000
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Epoch 277/2000

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Epoch 283/2000
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Epoch 285/2000
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Epoch 292/2000
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Epoch 293/2000
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Epoch 294/2000
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Epoch 295/2000
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Epoch 297/2000
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Epoch 301/2000
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Epoch 302/2000
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Epoch 303/2000
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Epoch 304/2000
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Epoch 307/2000
1/1 [=====] - 0s 9ms/step - loss: 34.1223

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Epoch 308/2000
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Epoch 309/2000
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Epoch 310/2000
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Epoch 311/2000
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Epoch 313/2000
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Epoch 314/2000
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Epoch 315/2000
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Epoch 316/2000
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Epoch 317/2000
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Epoch 334/2000
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Epoch 336/2000
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Epoch 337/2000
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Epoch 338/2000
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Epoch 577/2000
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Epoch 580/2000
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Epoch 581/2000
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Epoch 582/2000

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Epoch 584/2000
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Epoch 585/2000
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Epoch 586/2000
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Epoch 588/2000
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Epoch 589/2000
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Epoch 593/2000
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Epoch 618/2000
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Epoch 625/2000
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Epoch 642/2000
1/1 [=====] - 0s 7ms/step - loss: 30.7538
Epoch 643/2000

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Epoch 645/2000
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Epoch 648/2000
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Epoch 651/2000
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Epoch 652/2000
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Epoch 653/2000
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Epoch 654/2000
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Epoch 655/2000
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Epoch 658/2000
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Epoch 659/2000
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Epoch 660/2000
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Epoch 662/2000
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Epoch 663/2000
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Epoch 665/2000
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Epoch 673/2000
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Epoch 681/2000
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Epoch 682/2000
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Epoch 704/2000
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Epoch 734/2000
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Epoch 851/2000
1/1 [=====] - 0s 7ms/step - loss: 20.9360
Epoch 852/2000
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Epoch 853/2000
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Epoch 854/2000
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Epoch 855/2000
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Epoch 856/2000
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Epoch 857/2000
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Epoch 858/2000
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Epoch 859/2000
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Epoch 860/2000
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Epoch 861/2000
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Epoch 862/2000
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Epoch 863/2000
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Epoch 864/2000
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Epoch 865/2000
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Epoch 866/2000
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Epoch 867/2000
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Epoch 868/2000
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Epoch 869/2000
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Epoch 870/2000
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Epoch 871/2000
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Epoch 872/2000
1/1 [=====] - 0s 6ms/step - loss: 19.3072
Epoch 873/2000
1/1 [=====] - 0s 8ms/step - loss: 19.2281
Epoch 874/2000
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Epoch 875/2000
1/1 [=====] - 0s 5ms/step - loss: 19.0697
Epoch 876/2000
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Epoch 877/2000
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Epoch 878/2000
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Epoch 879/2000
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Epoch 880/2000
1/1 [=====] - 0s 6ms/step - loss: 18.6720
Epoch 881/2000
1/1 [=====] - 0s 6ms/step - loss: 18.5923
Epoch 882/2000
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Epoch 883/2000
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Epoch 884/2000
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Epoch 885/2000
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Epoch 886/2000
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Epoch 887/2000

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Epoch 888/2000
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Epoch 889/2000
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Epoch 891/2000
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Epoch 892/2000
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Epoch 899/2000
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Epoch 900/2000
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Epoch 903/2000
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Epoch 904/2000
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Epoch 905/2000
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Epoch 906/2000
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Epoch 907/2000
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Epoch 908/2000
1/1 [=====] - 0s 11ms/step - loss: 16.4264
Epoch 909/2000
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Epoch 910/2000
1/1 [=====] - 0s 5ms/step - loss: 16.2662
Epoch 911/2000
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Epoch 912/2000
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Epoch 913/2000
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Epoch 915/2000
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Epoch 916/2000
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Epoch 917/2000
1/1 [=====] - 0s 6ms/step - loss: 15.7072

Epoch 918/2000
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Epoch 919/2000
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Epoch 920/2000
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Epoch 921/2000
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Epoch 922/2000
1/1 [=====] - 0s 5ms/step - loss: 15.3101
Epoch 923/2000
1/1 [=====] - 0s 7ms/step - loss: 15.2309
Epoch 924/2000
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Epoch 925/2000
1/1 [=====] - 0s 6ms/step - loss: 15.0729
Epoch 926/2000
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Epoch 927/2000
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Epoch 928/2000
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Epoch 929/2000
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Epoch 930/2000
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Epoch 931/2000
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Epoch 932/2000
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Epoch 933/2000
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Epoch 934/2000
1/1 [=====] - 0s 5ms/step - loss: 14.3673
Epoch 935/2000
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Epoch 936/2000
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Epoch 937/2000
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Epoch 938/2000
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Epoch 939/2000
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Epoch 940/2000
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Epoch 941/2000
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Epoch 942/2000
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Epoch 943/2000
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Epoch 944/2000
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Epoch 945/2000
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Epoch 946/2000
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Epoch 947/2000
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Epoch 948/2000

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Epoch 949/2000
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Epoch 950/2000
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Epoch 951/2000
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Epoch 952/2000
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Epoch 953/2000
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Epoch 954/2000
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Epoch 955/2000
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Epoch 956/2000
1/1 [=====] - 0s 9ms/step - loss: 12.6931
Epoch 957/2000
1/1 [=====] - 0s 7ms/step - loss: 12.6191
Epoch 958/2000
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Epoch 959/2000
1/1 [=====] - 0s 6ms/step - loss: 12.4717
Epoch 960/2000
1/1 [=====] - 0s 8ms/step - loss: 12.3983
Epoch 961/2000
1/1 [=====] - 0s 5ms/step - loss: 12.3251
Epoch 962/2000
1/1 [=====] - 0s 6ms/step - loss: 12.2521
Epoch 963/2000
1/1 [=====] - 0s 6ms/step - loss: 12.1793
Epoch 964/2000
1/1 [=====] - 0s 8ms/step - loss: 12.1068
Epoch 965/2000
1/1 [=====] - 0s 5ms/step - loss: 12.0345
Epoch 966/2000
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Epoch 967/2000
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Epoch 968/2000
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Epoch 969/2000
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Epoch 970/2000
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Epoch 971/2000
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Epoch 972/2000
1/1 [=====] - 0s 5ms/step - loss: 11.5345
Epoch 973/2000
1/1 [=====] - 0s 6ms/step - loss: 11.4640
Epoch 974/2000
1/1 [=====] - 0s 12ms/step - loss: 11.3938
Epoch 975/2000
1/1 [=====] - 0s 6ms/step - loss: 11.3238
Epoch 976/2000
1/1 [=====] - 0s 7ms/step - loss: 11.2540
Epoch 977/2000
1/1 [=====] - 0s 8ms/step - loss: 11.1845
Epoch 978/2000
1/1 [=====] - 0s 6ms/step - loss: 11.1153

Epoch 979/2000
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Epoch 980/2000
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Epoch 981/2000
1/1 [=====] - 0s 5ms/step - loss: 10.9090
Epoch 982/2000
1/1 [=====] - 0s 5ms/step - loss: 10.8408
Epoch 983/2000
1/1 [=====] - 0s 7ms/step - loss: 10.7728
Epoch 984/2000
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Epoch 985/2000
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Epoch 986/2000
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Epoch 987/2000
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Epoch 988/2000
1/1 [=====] - 0s 6ms/step - loss: 10.4368
Epoch 989/2000
1/1 [=====] - 0s 5ms/step - loss: 10.3703
Epoch 990/2000
1/1 [=====] - 0s 6ms/step - loss: 10.3042
Epoch 991/2000
1/1 [=====] - 0s 6ms/step - loss: 10.2383
Epoch 992/2000
1/1 [=====] - 0s 8ms/step - loss: 10.1727
Epoch 993/2000
1/1 [=====] - 0s 6ms/step - loss: 10.1074
Epoch 994/2000
1/1 [=====] - 0s 7ms/step - loss: 10.0424
Epoch 995/2000
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Epoch 996/2000
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Epoch 997/2000
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Epoch 998/2000
1/1 [=====] - 0s 7ms/step - loss: 9.7849
Epoch 999/2000
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Epoch 1000/2000
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Epoch 1001/2000
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Epoch 1002/2000
1/1 [=====] - 0s 6ms/step - loss: 9.5320
Epoch 1003/2000
1/1 [=====] - 0s 5ms/step - loss: 9.4694
Epoch 1004/2000
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Epoch 1005/2000
1/1 [=====] - 0s 8ms/step - loss: 9.3453
Epoch 1006/2000
1/1 [=====] - 0s 7ms/step - loss: 9.2836
Epoch 1007/2000
1/1 [=====] - 0s 5ms/step - loss: 9.2222
Epoch 1008/2000
1/1 [=====] - 0s 5ms/step - loss: 9.1611
Epoch 1009/2000

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1/1 [=====] - 0s 8ms/step - loss: 9.1003
Epoch 1010/2000
1/1 [=====] - 0s 12ms/step - loss: 9.0398
Epoch 1011/2000
1/1 [=====] - 0s 31ms/step - loss: 8.9796
Epoch 1012/2000
1/1 [=====] - 0s 6ms/step - loss: 8.9197
Epoch 1013/2000
1/1 [=====] - 0s 8ms/step - loss: 8.8600
Epoch 1014/2000
1/1 [=====] - 0s 10ms/step - loss: 8.8007
Epoch 1015/2000
1/1 [=====] - 0s 7ms/step - loss: 8.7417
Epoch 1016/2000
1/1 [=====] - 0s 5ms/step - loss: 8.6829
Epoch 1017/2000
1/1 [=====] - 0s 6ms/step - loss: 8.6245
Epoch 1018/2000
1/1 [=====] - 0s 6ms/step - loss: 8.5663
Epoch 1019/2000
1/1 [=====] - 0s 6ms/step - loss: 8.5084
Epoch 1020/2000
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Epoch 1021/2000
1/1 [=====] - 0s 7ms/step - loss: 8.3936
Epoch 1022/2000
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Epoch 1023/2000
1/1 [=====] - 0s 6ms/step - loss: 8.2800
Epoch 1024/2000
1/1 [=====] - 0s 6ms/step - loss: 8.2236
Epoch 1025/2000
1/1 [=====] - 0s 7ms/step - loss: 8.1675
Epoch 1026/2000
1/1 [=====] - 0s 5ms/step - loss: 8.1118
Epoch 1027/2000
1/1 [=====] - 0s 6ms/step - loss: 8.0563
Epoch 1028/2000
1/1 [=====] - 0s 5ms/step - loss: 8.0011
Epoch 1029/2000
1/1 [=====] - 0s 9ms/step - loss: 7.9462
Epoch 1030/2000
1/1 [=====] - 0s 8ms/step - loss: 7.8916
Epoch 1031/2000
1/1 [=====] - 0s 7ms/step - loss: 7.8374
Epoch 1032/2000
1/1 [=====] - 0s 10ms/step - loss: 7.7834
Epoch 1033/2000
1/1 [=====] - 0s 5ms/step - loss: 7.7297
Epoch 1034/2000
1/1 [=====] - 0s 6ms/step - loss: 7.6763
Epoch 1035/2000
1/1 [=====] - 0s 6ms/step - loss: 7.6233
Epoch 1036/2000
1/1 [=====] - 0s 8ms/step - loss: 7.5705
Epoch 1037/2000
1/1 [=====] - 0s 6ms/step - loss: 7.5180
Epoch 1038/2000
1/1 [=====] - 0s 21ms/step - loss: 7.4658
Epoch 1039/2000
1/1 [=====] - 0s 6ms/step - loss: 7.4139
```

Epoch 1040/2000
1/1 [=====] - 0s 7ms/step - loss: 7.3624
Epoch 1041/2000
1/1 [=====] - 0s 12ms/step - loss: 7.3111
Epoch 1042/2000
1/1 [=====] - 0s 7ms/step - loss: 7.2601
Epoch 1043/2000
1/1 [=====] - 0s 6ms/step - loss: 7.2094
Epoch 1044/2000
1/1 [=====] - 0s 5ms/step - loss: 7.1590
Epoch 1045/2000
1/1 [=====] - 0s 8ms/step - loss: 7.1089
Epoch 1046/2000
1/1 [=====] - 0s 6ms/step - loss: 7.0591
Epoch 1047/2000
1/1 [=====] - 0s 7ms/step - loss: 7.0097
Epoch 1048/2000
1/1 [=====] - 0s 7ms/step - loss: 6.9605
Epoch 1049/2000
1/1 [=====] - 0s 7ms/step - loss: 6.9116
Epoch 1050/2000
1/1 [=====] - 0s 5ms/step - loss: 6.8630
Epoch 1051/2000
1/1 [=====] - 0s 7ms/step - loss: 6.8147
Epoch 1052/2000
1/1 [=====] - 0s 20ms/step - loss: 6.7666
Epoch 1053/2000
1/1 [=====] - 0s 8ms/step - loss: 6.7189
Epoch 1054/2000
1/1 [=====] - 0s 7ms/step - loss: 6.6715
Epoch 1055/2000
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Epoch 1056/2000
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Epoch 1057/2000
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Epoch 1058/2000
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Epoch 1059/2000
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Epoch 1060/2000
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Epoch 1061/2000
1/1 [=====] - 0s 5ms/step - loss: 6.3478
Epoch 1062/2000
1/1 [=====] - 0s 5ms/step - loss: 6.3027
Epoch 1063/2000
1/1 [=====] - 0s 9ms/step - loss: 6.2579
Epoch 1064/2000
1/1 [=====] - 0s 11ms/step - loss: 6.2134
Epoch 1065/2000
1/1 [=====] - 0s 6ms/step - loss: 6.1691
Epoch 1066/2000
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Epoch 1067/2000
1/1 [=====] - 0s 6ms/step - loss: 6.0816
Epoch 1068/2000
1/1 [=====] - 0s 6ms/step - loss: 6.0382
Epoch 1069/2000
1/1 [=====] - 0s 16ms/step - loss: 5.9951
Epoch 1070/2000

```
1/1 [=====] - 0s 15ms/step - loss: 5.9523
Epoch 1071/2000
1/1 [=====] - 0s 8ms/step - loss: 5.9098
Epoch 1072/2000
1/1 [=====] - 0s 9ms/step - loss: 5.8676
Epoch 1073/2000
1/1 [=====] - 0s 10ms/step - loss: 5.8256
Epoch 1074/2000
1/1 [=====] - 0s 6ms/step - loss: 5.7840
Epoch 1075/2000
1/1 [=====] - 0s 8ms/step - loss: 5.7426
Epoch 1076/2000
1/1 [=====] - 0s 6ms/step - loss: 5.7015
Epoch 1077/2000
1/1 [=====] - 0s 8ms/step - loss: 5.6606
Epoch 1078/2000
1/1 [=====] - 0s 6ms/step - loss: 5.6201
Epoch 1079/2000
1/1 [=====] - 0s 8ms/step - loss: 5.5798
Epoch 1080/2000
1/1 [=====] - 0s 6ms/step - loss: 5.5398
Epoch 1081/2000
1/1 [=====] - 0s 5ms/step - loss: 5.5001
Epoch 1082/2000
1/1 [=====] - 0s 8ms/step - loss: 5.4606
Epoch 1083/2000
1/1 [=====] - 0s 7ms/step - loss: 5.4214
Epoch 1084/2000
1/1 [=====] - 0s 6ms/step - loss: 5.3825
Epoch 1085/2000
1/1 [=====] - 0s 7ms/step - loss: 5.3439
Epoch 1086/2000
1/1 [=====] - 0s 7ms/step - loss: 5.3055
Epoch 1087/2000
1/1 [=====] - 0s 54ms/step - loss: 5.2674
Epoch 1088/2000
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Epoch 1089/2000
1/1 [=====] - 0s 6ms/step - loss: 5.1920
Epoch 1090/2000
1/1 [=====] - 0s 6ms/step - loss: 5.1547
Epoch 1091/2000
1/1 [=====] - 0s 10ms/step - loss: 5.1176
Epoch 1092/2000
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Epoch 1093/2000
1/1 [=====] - 0s 5ms/step - loss: 5.0443
Epoch 1094/2000
1/1 [=====] - 0s 10ms/step - loss: 5.0080
Epoch 1095/2000
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Epoch 1096/2000
1/1 [=====] - 0s 5ms/step - loss: 4.9363
Epoch 1097/2000
1/1 [=====] - 0s 6ms/step - loss: 4.9008
Epoch 1098/2000
1/1 [=====] - 0s 6ms/step - loss: 4.8655
Epoch 1099/2000
1/1 [=====] - 0s 12ms/step - loss: 4.8306
Epoch 1100/2000
1/1 [=====] - 0s 8ms/step - loss: 4.7958
```



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Epoch 1101/2000
1/1 [=====] - 0s 7ms/step - loss: 4.7614
Epoch 1102/2000
1/1 [=====] - 0s 5ms/step - loss: 4.7271
Epoch 1103/2000
1/1 [=====] - 0s 5ms/step - loss: 4.6932
Epoch 1104/2000
1/1 [=====] - 0s 7ms/step - loss: 4.6594
Epoch 1105/2000
1/1 [=====] - 0s 7ms/step - loss: 4.6260
Epoch 1106/2000
1/1 [=====] - 0s 7ms/step - loss: 4.5927
Epoch 1107/2000
1/1 [=====] - 0s 8ms/step - loss: 4.5597
Epoch 1108/2000
1/1 [=====] - 0s 13ms/step - loss: 4.5270
Epoch 1109/2000
1/1 [=====] - 0s 6ms/step - loss: 4.4945
Epoch 1110/2000
1/1 [=====] - 0s 7ms/step - loss: 4.4622
Epoch 1111/2000
1/1 [=====] - 0s 6ms/step - loss: 4.4302
Epoch 1112/2000
1/1 [=====] - 0s 6ms/step - loss: 4.3984
Epoch 1113/2000
1/1 [=====] - 0s 7ms/step - loss: 4.3669
Epoch 1114/2000
1/1 [=====] - 0s 6ms/step - loss: 4.3356
Epoch 1115/2000
1/1 [=====] - 0s 5ms/step - loss: 4.3045
Epoch 1116/2000
1/1 [=====] - 0s 5ms/step - loss: 4.2736
Epoch 1117/2000
1/1 [=====] - 0s 7ms/step - loss: 4.2430
Epoch 1118/2000
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Epoch 1119/2000
1/1 [=====] - 0s 5ms/step - loss: 4.1825
Epoch 1120/2000
1/1 [=====] - 0s 4ms/step - loss: 4.1526
Epoch 1121/2000
1/1 [=====] - 0s 6ms/step - loss: 4.1229
Epoch 1122/2000
1/1 [=====] - 0s 7ms/step - loss: 4.0934
Epoch 1123/2000
1/1 [=====] - 0s 7ms/step - loss: 4.0642
Epoch 1124/2000
1/1 [=====] - 0s 7ms/step - loss: 4.0352
Epoch 1125/2000
1/1 [=====] - 0s 9ms/step - loss: 4.0064
Epoch 1126/2000
1/1 [=====] - 0s 43ms/step - loss: 3.9778
Epoch 1127/2000
1/1 [=====] - 0s 6ms/step - loss: 3.9495
Epoch 1128/2000
1/1 [=====] - 0s 4ms/step - loss: 3.9213
Epoch 1129/2000
1/1 [=====] - 0s 7ms/step - loss: 3.8934
Epoch 1130/2000
1/1 [=====] - 0s 7ms/step - loss: 3.8657
Epoch 1131/2000
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Epoch 1132/2000
1/1 [=====] - 0s 5ms/step - loss: 3.8109
Epoch 1133/2000
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Epoch 1134/2000
1/1 [=====] - 0s 6ms/step - loss: 3.7570
Epoch 1135/2000
1/1 [=====] - 0s 10ms/step - loss: 3.7304
Epoch 1136/2000
1/1 [=====] - 0s 6ms/step - loss: 3.7039
Epoch 1137/2000
1/1 [=====] - 0s 5ms/step - loss: 3.6777
Epoch 1138/2000
1/1 [=====] - 0s 5ms/step - loss: 3.6517
Epoch 1139/2000
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Epoch 1140/2000
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Epoch 1141/2000
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Epoch 1142/2000
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Epoch 1143/2000
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Epoch 1144/2000
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Epoch 1145/2000
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Epoch 1146/2000
1/1 [=====] - 0s 5ms/step - loss: 3.4507
Epoch 1147/2000
1/1 [=====] - 0s 6ms/step - loss: 3.4265
Epoch 1148/2000
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Epoch 1149/2000
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Epoch 1150/2000
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Epoch 1151/2000
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Epoch 1152/2000
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Epoch 1153/2000
1/1 [=====] - 0s 8ms/step - loss: 3.2851
Epoch 1154/2000
1/1 [=====] - 0s 11ms/step - loss: 3.2622
Epoch 1155/2000
1/1 [=====] - 0s 6ms/step - loss: 3.2395
Epoch 1156/2000
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Epoch 1157/2000
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Epoch 1158/2000
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Epoch 1159/2000
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Epoch 1160/2000
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Epoch 1161/2000
1/1 [=====] - 0s 6ms/step - loss: 3.1070

Epoch 1162/2000
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Epoch 1163/2000
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Epoch 1164/2000
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Epoch 1165/2000
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Epoch 1166/2000
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Epoch 1168/2000
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Epoch 1169/2000
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Epoch 1170/2000
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Epoch 1172/2000
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Epoch 1173/2000
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Epoch 1174/2000
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Epoch 1175/2000
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Epoch 1176/2000
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Epoch 1177/2000
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Epoch 1178/2000
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Epoch 1179/2000
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Epoch 1180/2000
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Epoch 1181/2000
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Epoch 1182/2000
1/1 [=====] - 0s 11ms/step - loss: 2.6911
Epoch 1183/2000
1/1 [=====] - 0s 5ms/step - loss: 2.6730
Epoch 1184/2000
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Epoch 1185/2000
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Epoch 1186/2000
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Epoch 1187/2000
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Epoch 1188/2000
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Epoch 1189/2000
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Epoch 1190/2000
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Epoch 1191/2000
1/1 [=====] - 0s 7ms/step - loss: 2.5338
Epoch 1192/2000

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Epoch 1193/2000
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Epoch 1194/2000
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Epoch 1195/2000
1/1 [=====] - 0s 6ms/step - loss: 2.4676
Epoch 1196/2000
1/1 [=====] - 0s 6ms/step - loss: 2.4514
Epoch 1197/2000
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Epoch 1198/2000
1/1 [=====] - 0s 10ms/step - loss: 2.4194
Epoch 1199/2000
1/1 [=====] - 0s 9ms/step - loss: 2.4036
Epoch 1200/2000
1/1 [=====] - 0s 8ms/step - loss: 2.3879
Epoch 1201/2000
1/1 [=====] - 0s 11ms/step - loss: 2.3724
Epoch 1202/2000
1/1 [=====] - 0s 6ms/step - loss: 2.3570
Epoch 1203/2000
1/1 [=====] - 0s 8ms/step - loss: 2.3417
Epoch 1204/2000
1/1 [=====] - 0s 6ms/step - loss: 2.3265
Epoch 1205/2000
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Epoch 1206/2000
1/1 [=====] - 0s 7ms/step - loss: 2.2966
Epoch 1207/2000
1/1 [=====] - 0s 7ms/step - loss: 2.2818
Epoch 1208/2000
1/1 [=====] - 0s 6ms/step - loss: 2.2672
Epoch 1209/2000
1/1 [=====] - 0s 7ms/step - loss: 2.2527
Epoch 1210/2000
1/1 [=====] - 0s 6ms/step - loss: 2.2383
Epoch 1211/2000
1/1 [=====] - 0s 7ms/step - loss: 2.2240
Epoch 1212/2000
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Epoch 1213/2000
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Epoch 1214/2000
1/1 [=====] - 0s 6ms/step - loss: 2.1819
Epoch 1215/2000
1/1 [=====] - 0s 7ms/step - loss: 2.1681
Epoch 1216/2000
1/1 [=====] - 0s 7ms/step - loss: 2.1544
Epoch 1217/2000
1/1 [=====] - 0s 12ms/step - loss: 2.1408
Epoch 1218/2000
1/1 [=====] - 0s 8ms/step - loss: 2.1273
Epoch 1219/2000
1/1 [=====] - 0s 5ms/step - loss: 2.1140
Epoch 1220/2000
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Epoch 1221/2000
1/1 [=====] - 0s 6ms/step - loss: 2.0877
Epoch 1222/2000
1/1 [=====] - 0s 6ms/step - loss: 2.0746
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Epoch 1223/2000
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Epoch 1224/2000
1/1 [=====] - 0s 5ms/step - loss: 2.0490
Epoch 1225/2000
1/1 [=====] - 0s 6ms/step - loss: 2.0363
Epoch 1226/2000
1/1 [=====] - 0s 6ms/step - loss: 2.0237
Epoch 1227/2000
1/1 [=====] - 0s 12ms/step - loss: 2.0112
Epoch 1228/2000
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Epoch 1229/2000
1/1 [=====] - 0s 5ms/step - loss: 1.9866
Epoch 1230/2000
1/1 [=====] - 0s 13ms/step - loss: 1.9745
Epoch 1231/2000
1/1 [=====] - 0s 7ms/step - loss: 1.9624
Epoch 1232/2000
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Epoch 1233/2000
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Epoch 1234/2000
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Epoch 1235/2000
1/1 [=====] - 0s 16ms/step - loss: 1.9152
Epoch 1236/2000
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Epoch 1237/2000
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Epoch 1238/2000
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Epoch 1239/2000
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Epoch 1241/2000
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Epoch 1242/2000
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Epoch 1243/2000
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Epoch 1244/2000
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Epoch 1245/2000
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Epoch 1246/2000
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Epoch 1247/2000
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Epoch 1248/2000
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Epoch 1249/2000
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Epoch 1250/2000
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Epoch 1251/2000
1/1 [=====] - 0s 5ms/step - loss: 1.7418
Epoch 1252/2000
1/1 [=====] - 0s 6ms/step - loss: 1.7318
Epoch 1253/2000

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Epoch 1254/2000
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Epoch 1255/2000
1/1 [=====] - 0s 11ms/step - loss: 1.7021
Epoch 1256/2000
1/1 [=====] - 0s 8ms/step - loss: 1.6923
Epoch 1257/2000
1/1 [=====] - 0s 13ms/step - loss: 1.6827
Epoch 1258/2000
1/1 [=====] - 0s 22ms/step - loss: 1.6731
Epoch 1259/2000
1/1 [=====] - 0s 5ms/step - loss: 1.6636
Epoch 1260/2000
1/1 [=====] - 0s 4ms/step - loss: 1.6542
Epoch 1261/2000
1/1 [=====] - 0s 5ms/step - loss: 1.6449
Epoch 1262/2000
1/1 [=====] - 0s 7ms/step - loss: 1.6357
Epoch 1263/2000
1/1 [=====] - 0s 4ms/step - loss: 1.6265
Epoch 1264/2000
1/1 [=====] - 0s 6ms/step - loss: 1.6174
Epoch 1265/2000
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Epoch 1266/2000
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Epoch 1267/2000
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Epoch 1268/2000
1/1 [=====] - 0s 8ms/step - loss: 1.5818
Epoch 1269/2000
1/1 [=====] - 0s 7ms/step - loss: 1.5731
Epoch 1270/2000
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Epoch 1271/2000
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Epoch 1272/2000
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Epoch 1273/2000
1/1 [=====] - 0s 5ms/step - loss: 1.5390
Epoch 1274/2000
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Epoch 1275/2000
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Epoch 1277/2000
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Epoch 1278/2000
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Epoch 1279/2000
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Epoch 1280/2000
1/1 [=====] - 0s 6ms/step - loss: 1.4821
Epoch 1281/2000
1/1 [=====] - 0s 8ms/step - loss: 1.4742
Epoch 1282/2000
1/1 [=====] - 0s 7ms/step - loss: 1.4664
Epoch 1283/2000
1/1 [=====] - 0s 10ms/step - loss: 1.4587
```

Epoch 1284/2000
1/1 [=====] - 0s 6ms/step - loss: 1.4510
Epoch 1285/2000
1/1 [=====] - 0s 9ms/step - loss: 1.4434
Epoch 1286/2000
1/1 [=====] - 0s 6ms/step - loss: 1.4359
Epoch 1287/2000
1/1 [=====] - 0s 7ms/step - loss: 1.4284
Epoch 1288/2000
1/1 [=====] - 0s 6ms/step - loss: 1.4210
Epoch 1289/2000
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Epoch 1290/2000
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Epoch 1291/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3992
Epoch 1292/2000
1/1 [=====] - 0s 10ms/step - loss: 1.3920
Epoch 1293/2000
1/1 [=====] - 0s 5ms/step - loss: 1.3849
Epoch 1294/2000
1/1 [=====] - 0s 5ms/step - loss: 1.3779
Epoch 1295/2000
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Epoch 1296/2000
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Epoch 1297/2000
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Epoch 1298/2000
1/1 [=====] - 0s 5ms/step - loss: 1.3503
Epoch 1299/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3436
Epoch 1300/2000
1/1 [=====] - 0s 5ms/step - loss: 1.3369
Epoch 1301/2000
1/1 [=====] - 0s 7ms/step - loss: 1.3302
Epoch 1302/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3237
Epoch 1303/2000
1/1 [=====] - 0s 7ms/step - loss: 1.3171
Epoch 1304/2000
1/1 [=====] - 0s 5ms/step - loss: 1.3107
Epoch 1305/2000
1/1 [=====] - 0s 10ms/step - loss: 1.3043
Epoch 1306/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2979
Epoch 1307/2000
1/1 [=====] - 0s 5ms/step - loss: 1.2916
Epoch 1308/2000
1/1 [=====] - 0s 5ms/step - loss: 1.2854
Epoch 1309/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2792
Epoch 1310/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2730
Epoch 1311/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2669
Epoch 1312/2000
1/1 [=====] - 0s 9ms/step - loss: 1.2609
Epoch 1313/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2549
Epoch 1314/2000

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1/1 [=====] - 0s 8ms/step - loss: 1.2489
Epoch 1315/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2430
Epoch 1316/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2372
Epoch 1317/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2314
Epoch 1318/2000
1/1 [=====] - 0s 9ms/step - loss: 1.2257
Epoch 1319/2000
1/1 [=====] - 0s 9ms/step - loss: 1.2200
Epoch 1320/2000
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Epoch 1321/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2087
Epoch 1322/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2031
Epoch 1323/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1976
Epoch 1324/2000
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Epoch 1325/2000
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Epoch 1326/2000
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Epoch 1327/2000
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Epoch 1328/2000
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Epoch 1329/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1655
Epoch 1330/2000
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Epoch 1331/2000
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Epoch 1332/2000
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Epoch 1333/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1450
Epoch 1334/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1400
Epoch 1335/2000
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Epoch 1336/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1300
Epoch 1337/2000
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Epoch 1338/2000
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Epoch 1339/2000
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Epoch 1340/2000
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Epoch 1341/2000
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Epoch 1342/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1012
Epoch 1343/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0965
Epoch 1344/2000
1/1 [=====] - 0s 9ms/step - loss: 1.0919
```


Epoch 1345/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0873
Epoch 1346/2000
1/1 [=====] - 0s 8ms/step - loss: 1.0827
Epoch 1347/2000
1/1 [=====] - 0s 8ms/step - loss: 1.0782
Epoch 1348/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0737
Epoch 1349/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0693
Epoch 1350/2000
1/1 [=====] - 0s 16ms/step - loss: 1.0649
Epoch 1351/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0605
Epoch 1352/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0562
Epoch 1353/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0519
Epoch 1354/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0476
Epoch 1355/2000
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Epoch 1356/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0392
Epoch 1357/2000
1/1 [=====] - 0s 8ms/step - loss: 1.0350
Epoch 1358/2000
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Epoch 1359/2000
1/1 [=====] - 0s 8ms/step - loss: 1.0268
Epoch 1360/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0227
Epoch 1361/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0187
Epoch 1362/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0147
Epoch 1363/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0107
Epoch 1364/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0068
Epoch 1365/2000
1/1 [=====] - 0s 15ms/step - loss: 1.0029
Epoch 1366/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9990
Epoch 1367/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9952
Epoch 1368/2000
1/1 [=====] - 0s 4ms/step - loss: 0.9914
Epoch 1369/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9876
Epoch 1370/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9839
Epoch 1371/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9801
Epoch 1372/2000
1/1 [=====] - 0s 4ms/step - loss: 0.9764
Epoch 1373/2000
1/1 [=====] - 0s 8ms/step - loss: 0.9728
Epoch 1374/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9692
Epoch 1375/2000

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1/1 [=====] - 0s 7ms/step - loss: 0.9656
Epoch 1376/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9620
Epoch 1377/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9584
Epoch 1378/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9549
Epoch 1379/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9514
Epoch 1380/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9480
Epoch 1381/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9445
Epoch 1382/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9411
Epoch 1383/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9377
Epoch 1384/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9344
Epoch 1385/2000
1/1 [=====] - 0s 4ms/step - loss: 0.9310
Epoch 1386/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9277
Epoch 1387/2000
1/1 [=====] - 0s 17ms/step - loss: 0.9245
Epoch 1388/2000
1/1 [=====] - 0s 4ms/step - loss: 0.9212
Epoch 1389/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9180
Epoch 1390/2000
1/1 [=====] - 0s 9ms/step - loss: 0.9148
Epoch 1391/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9116
Epoch 1392/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9085
Epoch 1393/2000
1/1 [=====] - 0s 9ms/step - loss: 0.9053
Epoch 1394/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9022
Epoch 1395/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8991
Epoch 1396/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8961
Epoch 1397/2000
1/1 [=====] - 0s 63ms/step - loss: 0.8931
Epoch 1398/2000
1/1 [=====] - 0s 4ms/step - loss: 0.8900
Epoch 1399/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8871
Epoch 1400/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8841
Epoch 1401/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8811
Epoch 1402/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8782
Epoch 1403/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8753
Epoch 1404/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8725
Epoch 1405/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8696
```

Epoch 1406/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8668
Epoch 1407/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8640
Epoch 1408/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8612
Epoch 1409/2000
1/1 [=====] - 0s 9ms/step - loss: 0.8584
Epoch 1410/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8557
Epoch 1411/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8529
Epoch 1412/2000
1/1 [=====] - 0s 13ms/step - loss: 0.8502
Epoch 1413/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8475
Epoch 1414/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8449
Epoch 1415/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8422
Epoch 1416/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8396
Epoch 1417/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8370
Epoch 1418/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8344
Epoch 1419/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8318
Epoch 1420/2000
1/1 [=====] - 0s 8ms/step - loss: 0.8293
Epoch 1421/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8267
Epoch 1422/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8242
Epoch 1423/2000
1/1 [=====] - 0s 10ms/step - loss: 0.8217
Epoch 1424/2000
1/1 [=====] - 0s 10ms/step - loss: 0.8193
Epoch 1425/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8168
Epoch 1426/2000
1/1 [=====] - 0s 85ms/step - loss: 0.8144
Epoch 1427/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8119
Epoch 1428/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8095
Epoch 1429/2000
1/1 [=====] - 0s 15ms/step - loss: 0.8071
Epoch 1430/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8048
Epoch 1431/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8024
Epoch 1432/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8001
Epoch 1433/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7978
Epoch 1434/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7954
Epoch 1435/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7932
Epoch 1436/2000

1/1 [=====] - 0s 6ms/step - loss: 0.7909
Epoch 1437/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7886
Epoch 1438/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7864
Epoch 1439/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7842
Epoch 1440/2000
1/1 [=====] - 0s 4ms/step - loss: 0.7820
Epoch 1441/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7798
Epoch 1442/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7776
Epoch 1443/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7754
Epoch 1444/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7733
Epoch 1445/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7712
Epoch 1446/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7690
Epoch 1447/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7669
Epoch 1448/2000
1/1 [=====] - 0s 4ms/step - loss: 0.7648
Epoch 1449/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7628
Epoch 1450/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7607
Epoch 1451/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7587
Epoch 1452/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7566
Epoch 1453/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7546
Epoch 1454/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7526
Epoch 1455/2000
1/1 [=====] - 0s 11ms/step - loss: 0.7506
Epoch 1456/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7486
Epoch 1457/2000
1/1 [=====] - 0s 10ms/step - loss: 0.7467
Epoch 1458/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7447
Epoch 1459/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7428
Epoch 1460/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7409
Epoch 1461/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7390
Epoch 1462/2000
1/1 [=====] - 0s 4ms/step - loss: 0.7371
Epoch 1463/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7352
Epoch 1464/2000
1/1 [=====] - 0s 10ms/step - loss: 0.7333
Epoch 1465/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7314
Epoch 1466/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7296

Epoch 1467/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7278
Epoch 1468/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7259
Epoch 1469/2000
1/1 [=====] - 0s 25ms/step - loss: 0.7241
Epoch 1470/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7223
Epoch 1471/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7205
Epoch 1472/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7187
Epoch 1473/2000
1/1 [=====] - 0s 10ms/step - loss: 0.7170
Epoch 1474/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7152
Epoch 1475/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7135
Epoch 1476/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7117
Epoch 1477/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7100
Epoch 1478/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7083
Epoch 1479/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7066
Epoch 1480/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7049
Epoch 1481/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7032
Epoch 1482/2000
1/1 [=====] - 0s 4ms/step - loss: 0.7016
Epoch 1483/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6999
Epoch 1484/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6983
Epoch 1485/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6966
Epoch 1486/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6950
Epoch 1487/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6934
Epoch 1488/2000
1/1 [=====] - 0s 15ms/step - loss: 0.6918
Epoch 1489/2000
1/1 [=====] - 0s 10ms/step - loss: 0.6902
Epoch 1490/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6886
Epoch 1491/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6870
Epoch 1492/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6855
Epoch 1493/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6839
Epoch 1494/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6823
Epoch 1495/2000
1/1 [=====] - 0s 4ms/step - loss: 0.6808
Epoch 1496/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6793
Epoch 1497/2000

1/1 [=====] - 0s 5ms/step - loss: 0.6777
Epoch 1498/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6762
Epoch 1499/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6747
Epoch 1500/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6732
Epoch 1501/2000
1/1 [=====] - 0s 11ms/step - loss: 0.6717
Epoch 1502/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6703
Epoch 1503/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6688
Epoch 1504/2000
1/1 [=====] - 0s 4ms/step - loss: 0.6673
Epoch 1505/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6659
Epoch 1506/2000
1/1 [=====] - 0s 69ms/step - loss: 0.6644
Epoch 1507/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6630
Epoch 1508/2000
1/1 [=====] - 0s 4ms/step - loss: 0.6616
Epoch 1509/2000
1/1 [=====] - 0s 23ms/step - loss: 0.6602
Epoch 1510/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6588
Epoch 1511/2000
1/1 [=====] - 0s 10ms/step - loss: 0.6573
Epoch 1512/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6560
Epoch 1513/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6546
Epoch 1514/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6532
Epoch 1515/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6518
Epoch 1516/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6504
Epoch 1517/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6491
Epoch 1518/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6477
Epoch 1519/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6464
Epoch 1520/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6451
Epoch 1521/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6437
Epoch 1522/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6424
Epoch 1523/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6411
Epoch 1524/2000
1/1 [=====] - 0s 4ms/step - loss: 0.6398
Epoch 1525/2000
1/1 [=====] - 0s 4ms/step - loss: 0.6385
Epoch 1526/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6372
Epoch 1527/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6359

```
Epoch 1528/2000
1/1 [=====] - 0s 14ms/step - loss: 0.6346
Epoch 1529/2000
1/1 [=====] - 0s 10ms/step - loss: 0.6334
Epoch 1530/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6321
Epoch 1531/2000
1/1 [=====] - 0s 10ms/step - loss: 0.6308
Epoch 1532/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6296
Epoch 1533/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6283
Epoch 1534/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6271
Epoch 1535/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6259
Epoch 1536/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6246
Epoch 1537/2000
1/1 [=====] - 0s 10ms/step - loss: 0.6234
Epoch 1538/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6222
Epoch 1539/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6210
Epoch 1540/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6198
Epoch 1541/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6186
Epoch 1542/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6174
Epoch 1543/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6162
Epoch 1544/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6151
Epoch 1545/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6139
Epoch 1546/2000
1/1 [=====] - 0s 62ms/step - loss: 0.6127
Epoch 1547/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6116
Epoch 1548/2000
1/1 [=====] - 0s 11ms/step - loss: 0.6104
Epoch 1549/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6092
Epoch 1550/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6081
Epoch 1551/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6070
Epoch 1552/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6058
Epoch 1553/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6047
Epoch 1554/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6036
Epoch 1555/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6025
Epoch 1556/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6013
Epoch 1557/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6002
Epoch 1558/2000
```

1/1 [=====] - 0s 5ms/step - loss: 0.5991
Epoch 1559/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5980
Epoch 1560/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5969
Epoch 1561/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5959
Epoch 1562/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5948
Epoch 1563/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5937
Epoch 1564/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5926
Epoch 1565/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5916
Epoch 1566/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5905
Epoch 1567/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5894
Epoch 1568/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5884
Epoch 1569/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5873
Epoch 1570/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5863
Epoch 1571/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5852
Epoch 1572/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5842
Epoch 1573/2000
1/1 [=====] - 0s 14ms/step - loss: 0.5832
Epoch 1574/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5822
Epoch 1575/2000
1/1 [=====] - 0s 12ms/step - loss: 0.5811
Epoch 1576/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5801
Epoch 1577/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5791
Epoch 1578/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5781
Epoch 1579/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5771
Epoch 1580/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5761
Epoch 1581/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5751
Epoch 1582/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5741
Epoch 1583/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5731
Epoch 1584/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5721
Epoch 1585/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5711
Epoch 1586/2000
1/1 [=====] - 0s 20ms/step - loss: 0.5702
Epoch 1587/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5692
Epoch 1588/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5682


```
Epoch 1589/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5672
Epoch 1590/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5663
Epoch 1591/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5653
Epoch 1592/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5644
Epoch 1593/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5634
Epoch 1594/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5625
Epoch 1595/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5615
Epoch 1596/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5606
Epoch 1597/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5596
Epoch 1598/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5587
Epoch 1599/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5578
Epoch 1600/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5569
Epoch 1601/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5559
Epoch 1602/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5550
Epoch 1603/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5541
Epoch 1604/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5532
Epoch 1605/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5523
Epoch 1606/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5514
Epoch 1607/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5505
Epoch 1608/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5496
Epoch 1609/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5487
Epoch 1610/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5478
Epoch 1611/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5469
Epoch 1612/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5460
Epoch 1613/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5451
Epoch 1614/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5442
Epoch 1615/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5434
Epoch 1616/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5425
Epoch 1617/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5416
Epoch 1618/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5407
Epoch 1619/2000
```

1/1 [=====] - 0s 7ms/step - loss: 0.5399
Epoch 1620/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5390
Epoch 1621/2000
1/1 [=====] - 0s 13ms/step - loss: 0.5381
Epoch 1622/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5373
Epoch 1623/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5364
Epoch 1624/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5356
Epoch 1625/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5347
Epoch 1626/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5339
Epoch 1627/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5330
Epoch 1628/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5322
Epoch 1629/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5314
Epoch 1630/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5305
Epoch 1631/2000
1/1 [=====] - 0s 12ms/step - loss: 0.5297
Epoch 1632/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5289
Epoch 1633/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5280
Epoch 1634/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5272
Epoch 1635/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5264
Epoch 1636/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5256
Epoch 1637/2000
1/1 [=====] - 0s 20ms/step - loss: 0.5247
Epoch 1638/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5239
Epoch 1639/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5231
Epoch 1640/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5223
Epoch 1641/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5215
Epoch 1642/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5207
Epoch 1643/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5199
Epoch 1644/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5191
Epoch 1645/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5183
Epoch 1646/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5175
Epoch 1647/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5167
Epoch 1648/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5159
Epoch 1649/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5151

```
Epoch 1650/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5143
Epoch 1651/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5135
Epoch 1652/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5127
Epoch 1653/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5120
Epoch 1654/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5112
Epoch 1655/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5104
Epoch 1656/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5096
Epoch 1657/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5089
Epoch 1658/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5081
Epoch 1659/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5073
Epoch 1660/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5065
Epoch 1661/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5058
Epoch 1662/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5050
Epoch 1663/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5043
Epoch 1664/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5035
Epoch 1665/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5027
Epoch 1666/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5020
Epoch 1667/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5012
Epoch 1668/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5005
Epoch 1669/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4997
Epoch 1670/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4990
Epoch 1671/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4982
Epoch 1672/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4975
Epoch 1673/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4967
Epoch 1674/2000
1/1 [=====] - 0s 15ms/step - loss: 0.4960
Epoch 1675/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4953
Epoch 1676/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4945
Epoch 1677/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4938
Epoch 1678/2000
1/1 [=====] - 0s 11ms/step - loss: 0.4931
Epoch 1679/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4923
Epoch 1680/2000
```

```
1/1 [=====] - 0s 6ms/step - loss: 0.4916
Epoch 1681/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4909
Epoch 1682/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4901
Epoch 1683/2000
1/1 [=====] - 0s 25ms/step - loss: 0.4894
Epoch 1684/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4887
Epoch 1685/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4880
Epoch 1686/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4872
Epoch 1687/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4865
Epoch 1688/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4858
Epoch 1689/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4851
Epoch 1690/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4844
Epoch 1691/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4837
Epoch 1692/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4830
Epoch 1693/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4822
Epoch 1694/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4815
Epoch 1695/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4808
Epoch 1696/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4801
Epoch 1697/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4794
Epoch 1698/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4787
Epoch 1699/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4780
Epoch 1700/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4773
Epoch 1701/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4766
Epoch 1702/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4759
Epoch 1703/2000
1/1 [=====] - 0s 10ms/step - loss: 0.4752
Epoch 1704/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4745
Epoch 1705/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4739
Epoch 1706/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4732
Epoch 1707/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4725
Epoch 1708/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4718
Epoch 1709/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4711
Epoch 1710/2000
1/1 [=====] - 0s 12ms/step - loss: 0.4704
```

```
Epoch 1711/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4697
Epoch 1712/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4691
Epoch 1713/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4684
Epoch 1714/2000
1/1 [=====] - 0s 17ms/step - loss: 0.4677
Epoch 1715/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4670
Epoch 1716/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4663
Epoch 1717/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4657
Epoch 1718/2000
1/1 [=====] - 0s 66ms/step - loss: 0.4650
Epoch 1719/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4643
Epoch 1720/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4636
Epoch 1721/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4630
Epoch 1722/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4623
Epoch 1723/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4616
Epoch 1724/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4610
Epoch 1725/2000
1/1 [=====] - 0s 16ms/step - loss: 0.4603
Epoch 1726/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4596
Epoch 1727/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4590
Epoch 1728/2000
1/1 [=====] - 0s 10ms/step - loss: 0.4583
Epoch 1729/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4577
Epoch 1730/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4570
Epoch 1731/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4563
Epoch 1732/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4557
Epoch 1733/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4550
Epoch 1734/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4544
Epoch 1735/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4537
Epoch 1736/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4531
Epoch 1737/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4524
Epoch 1738/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4518
Epoch 1739/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4511
Epoch 1740/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4505
Epoch 1741/2000
```

1/1 [=====] - 0s 6ms/step - loss: 0.4498
Epoch 1742/2000
1/1 [=====] - 0s 10ms/step - loss: 0.4492
Epoch 1743/2000
1/1 [=====] - 0s 10ms/step - loss: 0.4485
Epoch 1744/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4479
Epoch 1745/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4473
Epoch 1746/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4466
Epoch 1747/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4460
Epoch 1748/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4453
Epoch 1749/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4447
Epoch 1750/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4441
Epoch 1751/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4434
Epoch 1752/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4428
Epoch 1753/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4422
Epoch 1754/2000
1/1 [=====] - 0s 11ms/step - loss: 0.4415
Epoch 1755/2000
1/1 [=====] - 0s 12ms/step - loss: 0.4409
Epoch 1756/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4403
Epoch 1757/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4396
Epoch 1758/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4390
Epoch 1759/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4384
Epoch 1760/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4378
Epoch 1761/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4371
Epoch 1762/2000
1/1 [=====] - 0s 61ms/step - loss: 0.4365
Epoch 1763/2000
1/1 [=====] - 0s 10ms/step - loss: 0.4359
Epoch 1764/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4353
Epoch 1765/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4346
Epoch 1766/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4340
Epoch 1767/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4334
Epoch 1768/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4328
Epoch 1769/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4322
Epoch 1770/2000
1/1 [=====] - 0s 31ms/step - loss: 0.4316
Epoch 1771/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4309

```
Epoch 1772/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4303
Epoch 1773/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4297
Epoch 1774/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4291
Epoch 1775/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4285
Epoch 1776/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4279
Epoch 1777/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4273
Epoch 1778/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4267
Epoch 1779/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4261
Epoch 1780/2000
1/1 [=====] - 0s 11ms/step - loss: 0.4254
Epoch 1781/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4248
Epoch 1782/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4242
Epoch 1783/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4236
Epoch 1784/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4230
Epoch 1785/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4224
Epoch 1786/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4218
Epoch 1787/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4212
Epoch 1788/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4206
Epoch 1789/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4200
Epoch 1790/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4194
Epoch 1791/2000
1/1 [=====] - 0s 16ms/step - loss: 0.4188
Epoch 1792/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4182
Epoch 1793/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4176
Epoch 1794/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4170
Epoch 1795/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4165
Epoch 1796/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4159
Epoch 1797/2000
1/1 [=====] - 0s 11ms/step - loss: 0.4153
Epoch 1798/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4147
Epoch 1799/2000
1/1 [=====] - 0s 35ms/step - loss: 0.4141
Epoch 1800/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4135
Epoch 1801/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4129
Epoch 1802/2000
```

```
1/1 [=====] - 0s 4ms/step - loss: 0.4123
Epoch 1803/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4117
Epoch 1804/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4112
Epoch 1805/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4106
Epoch 1806/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4100
Epoch 1807/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4094
Epoch 1808/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4088
Epoch 1809/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4082
Epoch 1810/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4077
Epoch 1811/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4071
Epoch 1812/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4065
Epoch 1813/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4059
Epoch 1814/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4053
Epoch 1815/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4048
Epoch 1816/2000
1/1 [=====] - 0s 16ms/step - loss: 0.4042
Epoch 1817/2000
1/1 [=====] - 0s 10ms/step - loss: 0.4036
Epoch 1818/2000
1/1 [=====] - 0s 13ms/step - loss: 0.4030
Epoch 1819/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4025
Epoch 1820/2000
1/1 [=====] - 0s 22ms/step - loss: 0.4019
Epoch 1821/2000
1/1 [=====] - 0s 11ms/step - loss: 0.4013
Epoch 1822/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4007
Epoch 1823/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4002
Epoch 1824/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3996
Epoch 1825/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3990
Epoch 1826/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3985
Epoch 1827/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3979
Epoch 1828/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3973
Epoch 1829/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3968
Epoch 1830/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3962
Epoch 1831/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3956
Epoch 1832/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3951
```



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Epoch 1833/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3945
Epoch 1834/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3939
Epoch 1835/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3934
Epoch 1836/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3928
Epoch 1837/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3923
Epoch 1838/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3917
Epoch 1839/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3911
Epoch 1840/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3906
Epoch 1841/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3900
Epoch 1842/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3895
Epoch 1843/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3889
Epoch 1844/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3884
Epoch 1845/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3878
Epoch 1846/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3872
Epoch 1847/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3867
Epoch 1848/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3861
Epoch 1849/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3856
Epoch 1850/2000
1/1 [=====] - 0s 69ms/step - loss: 0.3850
Epoch 1851/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3845
Epoch 1852/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3839
Epoch 1853/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3834
Epoch 1854/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3828
Epoch 1855/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3823
Epoch 1856/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3817
Epoch 1857/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3812
Epoch 1858/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3807
Epoch 1859/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3801
Epoch 1860/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3796
Epoch 1861/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3790
Epoch 1862/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3785
Epoch 1863/2000
```

1/1 [=====] - 0s 6ms/step - loss: 0.3779
Epoch 1864/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3774
Epoch 1865/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3769
Epoch 1866/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3763
Epoch 1867/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3758
Epoch 1868/2000
1/1 [=====] - 0s 16ms/step - loss: 0.3752
Epoch 1869/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3747
Epoch 1870/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3742
Epoch 1871/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3736
Epoch 1872/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3731
Epoch 1873/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3726
Epoch 1874/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3720
Epoch 1875/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3715
Epoch 1876/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3710
Epoch 1877/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3704
Epoch 1878/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3699
Epoch 1879/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3694
Epoch 1880/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3688
Epoch 1881/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3683
Epoch 1882/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3678
Epoch 1883/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3672
Epoch 1884/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3667
Epoch 1885/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3662
Epoch 1886/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3657
Epoch 1887/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3651
Epoch 1888/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3646
Epoch 1889/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3641
Epoch 1890/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3636
Epoch 1891/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3630
Epoch 1892/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3625
Epoch 1893/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3620

```
Epoch 1894/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3615
Epoch 1895/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3610
Epoch 1896/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3604
Epoch 1897/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3599
Epoch 1898/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3594
Epoch 1899/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3589
Epoch 1900/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3584
Epoch 1901/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3579
Epoch 1902/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3573
Epoch 1903/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3568
Epoch 1904/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3563
Epoch 1905/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3558
Epoch 1906/2000
1/1 [=====] - 0s 93ms/step - loss: 0.3553
Epoch 1907/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3548
Epoch 1908/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3543
Epoch 1909/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3537
Epoch 1910/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3532
Epoch 1911/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3527
Epoch 1912/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3522
Epoch 1913/2000
1/1 [=====] - 0s 11ms/step - loss: 0.3517
Epoch 1914/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3512
Epoch 1915/2000
1/1 [=====] - 0s 18ms/step - loss: 0.3507
Epoch 1916/2000
1/1 [=====] - 0s 17ms/step - loss: 0.3502
Epoch 1917/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3497
Epoch 1918/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3492
Epoch 1919/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3487
Epoch 1920/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3482
Epoch 1921/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3477
Epoch 1922/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3472
Epoch 1923/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3466
Epoch 1924/2000
```

1/1 [=====] - 0s 6ms/step - loss: 0.3461
Epoch 1925/2000
1/1 [=====] - 0s 16ms/step - loss: 0.3456
Epoch 1926/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3451
Epoch 1927/2000
1/1 [=====] - 0s 22ms/step - loss: 0.3446
Epoch 1928/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3441
Epoch 1929/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3436
Epoch 1930/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3431
Epoch 1931/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3427
Epoch 1932/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3422
Epoch 1933/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3417
Epoch 1934/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3412
Epoch 1935/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3407
Epoch 1936/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3402
Epoch 1937/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3397
Epoch 1938/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3392
Epoch 1939/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3387
Epoch 1940/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3382
Epoch 1941/2000
1/1 [=====] - 0s 12ms/step - loss: 0.3377
Epoch 1942/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3372
Epoch 1943/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3367
Epoch 1944/2000
1/1 [=====] - 0s 16ms/step - loss: 0.3362
Epoch 1945/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3358
Epoch 1946/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3353
Epoch 1947/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3348
Epoch 1948/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3343
Epoch 1949/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3338
Epoch 1950/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3333
Epoch 1951/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3328
Epoch 1952/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3323
Epoch 1953/2000
1/1 [=====] - 0s 15ms/step - loss: 0.3319
Epoch 1954/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3314

```
Epoch 1955/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3309
Epoch 1956/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3304
Epoch 1957/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3299
Epoch 1958/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3295
Epoch 1959/2000
1/1 [=====] - 0s 11ms/step - loss: 0.3290
Epoch 1960/2000
1/1 [=====] - 0s 18ms/step - loss: 0.3285
Epoch 1961/2000
1/1 [=====] - 0s 58ms/step - loss: 0.3280
Epoch 1962/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3275
Epoch 1963/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3271
Epoch 1964/2000
1/1 [=====] - 0s 36ms/step - loss: 0.3266
Epoch 1965/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3261
Epoch 1966/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3256
Epoch 1967/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3251
Epoch 1968/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3247
Epoch 1969/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3242
Epoch 1970/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3237
Epoch 1971/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3233
Epoch 1972/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3228
Epoch 1973/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3223
Epoch 1974/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3218
Epoch 1975/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3214
Epoch 1976/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3209
Epoch 1977/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3204
Epoch 1978/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3200
Epoch 1979/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3195
Epoch 1980/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3190
Epoch 1981/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3186
Epoch 1982/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3181
Epoch 1983/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3176
Epoch 1984/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3172
Epoch 1985/2000
```

1/1 [=====] - 0s 14ms/step - loss: 0.3167
Epoch 1986/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3162
Epoch 1987/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3158
Epoch 1988/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3153
Epoch 1989/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3148
Epoch 1990/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3144
Epoch 1991/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3139
Epoch 1992/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3134
Epoch 1993/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3130
Epoch 1994/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3125
Epoch 1995/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3121
Epoch 1996/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3116
Epoch 1997/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3112
Epoch 1998/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3107
Epoch 1999/2000
1/1 [=====] - 0s 60ms/step - loss: 0.3102
Epoch 2000/2000
1/1 [=====] - 0s 13ms/step - loss: 0.3098
1/1 [=====] - 0s 127ms/step
SE PREDICE: [[5.7915907]] CUANDO EN REALIDAD LA RESPUESTA ES 6.25
1/1 [=====] - 0s 49ms/step
0.30932551926588975 ERROR CUADRATICO MEDIO, DEBERIA SER LO MAS CERCANO A
0 POSIBLE

CINCO UNIDADES POR CAPA OCULTA

```
In [ ]: import tensorflow as tf
import numpy as np
from tensorflow import keras
# Declare model inputs and outputs for training  $y = x^2$ 
xs = np.array([-4.0, -3.0, -2.0, -1.0, 0.0, 1.0, 2.0, 3.0, 4.0], dtype=float)
ys = np.array([16, 9, 4, 1, 0, 1, 4, 9, 16], dtype=float)

# numero de unidades por capa
n_unidades = 5
# funcion de activacion sigmoid
funcion_activacion = 'sigmoid'

# Build a Sequential model
# 2 capa oculta
# 1 capa de salida con 1 neurona y funcion de activacion lineal
model = tf.keras.Sequential([
    keras.layers.Dense(units=n_unidades, input_shape=(1,)),
    keras.layers.Dense(units=n_unidades, activation=funcion_activacion),
    keras.layers.Dense(units=1, activation='linear')
])

#compile
model.compile(optimizer='sgd', loss='mean_squared_error')
#fit con epochs 2000
model.fit(xs, ys, epochs=2000)

#predict en x=2.5
print('SE PREDICE:', model.predict([2.5]), " CUANDO EN REALIDAD LA RESPUESTA ES 6.25")

# Error cuadratico medio
from sklearn.metrics import mean_squared_error
# calcular error cuadratico medio
print(mean_squared_error(ys, model.predict(xs)), " ERROR CUADRATICO MEDIO")
```

```
Epoch 1/2000
1/1 [=====] - 0s 486ms/step - loss: 71.2830
Epoch 2/2000
1/1 [=====] - 0s 7ms/step - loss: 68.1757
Epoch 3/2000
1/1 [=====] - 0s 11ms/step - loss: 65.2702
Epoch 4/2000
1/1 [=====] - 0s 86ms/step - loss: 62.5520
Epoch 5/2000
1/1 [=====] - 0s 10ms/step - loss: 60.0099
Epoch 6/2000
1/1 [=====] - 0s 14ms/step - loss: 57.6354
Epoch 7/2000
1/1 [=====] - 0s 8ms/step - loss: 55.4220
Epoch 8/2000
1/1 [=====] - 0s 11ms/step - loss: 53.3639
Epoch 9/2000
1/1 [=====] - 0s 9ms/step - loss: 51.4563
Epoch 10/2000
1/1 [=====] - 0s 11ms/step - loss: 49.6945
Epoch 11/2000
1/1 [=====] - 0s 10ms/step - loss: 48.0733
Epoch 12/2000
1/1 [=====] - 0s 9ms/step - loss: 46.5877
```

```
Epoch 13/2000
1/1 [=====] - 0s 9ms/step - loss: 45.2318
Epoch 14/2000
1/1 [=====] - 0s 11ms/step - loss: 43.9995
Epoch 15/2000
1/1 [=====] - 0s 10ms/step - loss: 42.8841
Epoch 16/2000
1/1 [=====] - 0s 8ms/step - loss: 41.8784
Epoch 17/2000
1/1 [=====] - 0s 37ms/step - loss: 40.9753
Epoch 18/2000
1/1 [=====] - 0s 6ms/step - loss: 40.1672
Epoch 19/2000
1/1 [=====] - 0s 8ms/step - loss: 39.4467
Epoch 20/2000
1/1 [=====] - 0s 7ms/step - loss: 38.8064
Epoch 21/2000
1/1 [=====] - 0s 8ms/step - loss: 38.2391
Epoch 22/2000
1/1 [=====] - 0s 8ms/step - loss: 37.7379
Epoch 23/2000
1/1 [=====] - 0s 10ms/step - loss: 37.2963
Epoch 24/2000
1/1 [=====] - 0s 11ms/step - loss: 36.9082
Epoch 25/2000
1/1 [=====] - 0s 12ms/step - loss: 36.5678
Epoch 26/2000
1/1 [=====] - 0s 17ms/step - loss: 36.2699
Epoch 27/2000
1/1 [=====] - 0s 35ms/step - loss: 36.0097
Epoch 28/2000
1/1 [=====] - 0s 12ms/step - loss: 35.7827
Epoch 29/2000
1/1 [=====] - 0s 6ms/step - loss: 35.5850
Epoch 30/2000
1/1 [=====] - 0s 7ms/step - loss: 35.4130
Epoch 31/2000
1/1 [=====] - 0s 7ms/step - loss: 35.2635
Epoch 32/2000
1/1 [=====] - 0s 6ms/step - loss: 35.1338
Epoch 33/2000
1/1 [=====] - 0s 10ms/step - loss: 35.0213
Epoch 34/2000
1/1 [=====] - 0s 8ms/step - loss: 34.9237
Epoch 35/2000
1/1 [=====] - 0s 11ms/step - loss: 34.8391
Epoch 36/2000
1/1 [=====] - 0s 10ms/step - loss: 34.7658
Epoch 37/2000
1/1 [=====] - 0s 8ms/step - loss: 34.7023
Epoch 38/2000
1/1 [=====] - 0s 7ms/step - loss: 34.6472
Epoch 39/2000
1/1 [=====] - 0s 10ms/step - loss: 34.5994
Epoch 40/2000
1/1 [=====] - 0s 13ms/step - loss: 34.5580
Epoch 41/2000
1/1 [=====] - 0s 5ms/step - loss: 34.5219
Epoch 42/2000
1/1 [=====] - 0s 6ms/step - loss: 34.4906
Epoch 43/2000
```


1/1 [=====] - 0s 8ms/step - loss: 34.4633
Epoch 44/2000
1/1 [=====] - 0s 6ms/step - loss: 34.4395
Epoch 45/2000
1/1 [=====] - 0s 8ms/step - loss: 34.4186
Epoch 46/2000
1/1 [=====] - 0s 8ms/step - loss: 34.4004
Epoch 47/2000
1/1 [=====] - 0s 53ms/step - loss: 34.3843
Epoch 48/2000
1/1 [=====] - 0s 18ms/step - loss: 34.3701
Epoch 49/2000
1/1 [=====] - 0s 8ms/step - loss: 34.3575
Epoch 50/2000
1/1 [=====] - 0s 9ms/step - loss: 34.3463
Epoch 51/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3364
Epoch 52/2000
1/1 [=====] - 0s 9ms/step - loss: 34.3274
Epoch 53/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3193
Epoch 54/2000
1/1 [=====] - 0s 8ms/step - loss: 34.3120
Epoch 55/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3053
Epoch 56/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2992
Epoch 57/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2935
Epoch 58/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2883
Epoch 59/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2834
Epoch 60/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2788
Epoch 61/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2745
Epoch 62/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2704
Epoch 63/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2665
Epoch 64/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2627
Epoch 65/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2591
Epoch 66/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2556
Epoch 67/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2522
Epoch 68/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2489
Epoch 69/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2457
Epoch 70/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2425
Epoch 71/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2394
Epoch 72/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2364
Epoch 73/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2334

```
Epoch 74/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2304
Epoch 75/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2275
Epoch 76/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2245
Epoch 77/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2216
Epoch 78/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2188
Epoch 79/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2159
Epoch 80/2000
1/1 [=====] - 0s 30ms/step - loss: 34.2131
Epoch 81/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2102
Epoch 82/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2074
Epoch 83/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2046
Epoch 84/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2018
Epoch 85/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1989
Epoch 86/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1961
Epoch 87/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1933
Epoch 88/2000
1/1 [=====] - 0s 15ms/step - loss: 34.1905
Epoch 89/2000
1/1 [=====] - 0s 15ms/step - loss: 34.1877
Epoch 90/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1848
Epoch 91/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1820
Epoch 92/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1792
Epoch 93/2000
1/1 [=====] - 0s 9ms/step - loss: 34.1763
Epoch 94/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1735
Epoch 95/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1706
Epoch 96/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1677
Epoch 97/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1648
Epoch 98/2000
1/1 [=====] - 0s 9ms/step - loss: 34.1619
Epoch 99/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1590
Epoch 100/2000
1/1 [=====] - 0s 9ms/step - loss: 34.1561
Epoch 101/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1531
Epoch 102/2000
1/1 [=====] - 0s 13ms/step - loss: 34.1501
Epoch 103/2000
1/1 [=====] - 0s 9ms/step - loss: 34.1472
Epoch 104/2000
```

1/1 [=====] - 0s 15ms/step - loss: 34.1441
Epoch 105/2000
1/1 [=====] - 0s 27ms/step - loss: 34.1411
Epoch 106/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1381
Epoch 107/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1350
Epoch 108/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1319
Epoch 109/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1288
Epoch 110/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1257
Epoch 111/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1225
Epoch 112/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1194
Epoch 113/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1161
Epoch 114/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1129
Epoch 115/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1097
Epoch 116/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1064
Epoch 117/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1030
Epoch 118/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0997
Epoch 119/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0963
Epoch 120/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0929
Epoch 121/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0894
Epoch 122/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0860
Epoch 123/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0824
Epoch 124/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0789
Epoch 125/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0753
Epoch 126/2000
1/1 [=====] - 0s 15ms/step - loss: 34.0717
Epoch 127/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0680
Epoch 128/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0643
Epoch 129/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0606
Epoch 130/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0568
Epoch 131/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0529
Epoch 132/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0491
Epoch 133/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0452
Epoch 134/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0412

Epoch 135/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0372
Epoch 136/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0331
Epoch 137/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0290
Epoch 138/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0249
Epoch 139/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0207
Epoch 140/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0165
Epoch 141/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0122
Epoch 142/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0078
Epoch 143/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0034
Epoch 144/2000
1/1 [=====] - 0s 6ms/step - loss: 33.9990
Epoch 145/2000
1/1 [=====] - 0s 59ms/step - loss: 33.9945
Epoch 146/2000
1/1 [=====] - 0s 7ms/step - loss: 33.9899
Epoch 147/2000
1/1 [=====] - 0s 18ms/step - loss: 33.9853
Epoch 148/2000
1/1 [=====] - 0s 7ms/step - loss: 33.9806
Epoch 149/2000
1/1 [=====] - 0s 6ms/step - loss: 33.9759
Epoch 150/2000
1/1 [=====] - 0s 6ms/step - loss: 33.9711
Epoch 151/2000
1/1 [=====] - 0s 5ms/step - loss: 33.9662
Epoch 152/2000
1/1 [=====] - 0s 6ms/step - loss: 33.9613
Epoch 153/2000
1/1 [=====] - 0s 6ms/step - loss: 33.9563
Epoch 154/2000
1/1 [=====] - 0s 5ms/step - loss: 33.9513
Epoch 155/2000
1/1 [=====] - 0s 6ms/step - loss: 33.9462
Epoch 156/2000
1/1 [=====] - 0s 5ms/step - loss: 33.9410
Epoch 157/2000
1/1 [=====] - 0s 7ms/step - loss: 33.9358
Epoch 158/2000
1/1 [=====] - 0s 6ms/step - loss: 33.9305
Epoch 159/2000
1/1 [=====] - 0s 6ms/step - loss: 33.9251
Epoch 160/2000
1/1 [=====] - 0s 6ms/step - loss: 33.9197
Epoch 161/2000
1/1 [=====] - 0s 7ms/step - loss: 33.9142
Epoch 162/2000
1/1 [=====] - 0s 5ms/step - loss: 33.9086
Epoch 163/2000
1/1 [=====] - 0s 5ms/step - loss: 33.9030
Epoch 164/2000
1/1 [=====] - 0s 5ms/step - loss: 33.8973
Epoch 165/2000

1/1 [=====] - 0s 6ms/step - loss: 33.8915
Epoch 166/2000
1/1 [=====] - 0s 8ms/step - loss: 33.8857
Epoch 167/2000
1/1 [=====] - 0s 7ms/step - loss: 33.8797
Epoch 168/2000
1/1 [=====] - 0s 6ms/step - loss: 33.8737
Epoch 169/2000
1/1 [=====] - 0s 6ms/step - loss: 33.8677
Epoch 170/2000
1/1 [=====] - 0s 17ms/step - loss: 33.8615
Epoch 171/2000
1/1 [=====] - 0s 5ms/step - loss: 33.8553
Epoch 172/2000
1/1 [=====] - 0s 11ms/step - loss: 33.8490
Epoch 173/2000
1/1 [=====] - 0s 6ms/step - loss: 33.8426
Epoch 174/2000
1/1 [=====] - 0s 5ms/step - loss: 33.8362
Epoch 175/2000
1/1 [=====] - 0s 5ms/step - loss: 33.8296
Epoch 176/2000
1/1 [=====] - 0s 6ms/step - loss: 33.8230
Epoch 177/2000
1/1 [=====] - 0s 6ms/step - loss: 33.8163
Epoch 178/2000
1/1 [=====] - 0s 5ms/step - loss: 33.8095
Epoch 179/2000
1/1 [=====] - 0s 6ms/step - loss: 33.8026
Epoch 180/2000
1/1 [=====] - 0s 5ms/step - loss: 33.7957
Epoch 181/2000
1/1 [=====] - 0s 6ms/step - loss: 33.7886
Epoch 182/2000
1/1 [=====] - 0s 6ms/step - loss: 33.7815
Epoch 183/2000
1/1 [=====] - 0s 6ms/step - loss: 33.7743
Epoch 184/2000
1/1 [=====] - 0s 6ms/step - loss: 33.7670
Epoch 185/2000
1/1 [=====] - 0s 6ms/step - loss: 33.7596
Epoch 186/2000
1/1 [=====] - 0s 6ms/step - loss: 33.7522
Epoch 187/2000
1/1 [=====] - 0s 8ms/step - loss: 33.7446
Epoch 188/2000
1/1 [=====] - 0s 13ms/step - loss: 33.7369
Epoch 189/2000
1/1 [=====] - 0s 5ms/step - loss: 33.7292
Epoch 190/2000
1/1 [=====] - 0s 6ms/step - loss: 33.7214
Epoch 191/2000
1/1 [=====] - 0s 7ms/step - loss: 33.7134
Epoch 192/2000
1/1 [=====] - 0s 6ms/step - loss: 33.7054
Epoch 193/2000
1/1 [=====] - 0s 6ms/step - loss: 33.6973
Epoch 194/2000
1/1 [=====] - 0s 7ms/step - loss: 33.6891
Epoch 195/2000
1/1 [=====] - 0s 5ms/step - loss: 33.6808

Epoch 196/2000
1/1 [=====] - 0s 6ms/step - loss: 33.6724
Epoch 197/2000
1/1 [=====] - 0s 8ms/step - loss: 33.6639
Epoch 198/2000
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Epoch 199/2000
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Epoch 200/2000
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Epoch 201/2000
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Epoch 202/2000
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Epoch 203/2000
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Epoch 204/2000
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Epoch 205/2000
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Epoch 206/2000
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Epoch 207/2000
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Epoch 208/2000
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Epoch 209/2000
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Epoch 210/2000
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Epoch 211/2000
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Epoch 212/2000
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Epoch 213/2000
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Epoch 214/2000
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Epoch 215/2000
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Epoch 216/2000
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Epoch 217/2000
1/1 [=====] - 0s 8ms/step - loss: 33.4721
Epoch 218/2000
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Epoch 219/2000
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Epoch 220/2000
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Epoch 221/2000
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Epoch 222/2000
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Epoch 224/2000
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Epoch 225/2000
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Epoch 226/2000

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Epoch 227/2000
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Epoch 228/2000
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Epoch 229/2000
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Epoch 230/2000
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Epoch 231/2000
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Epoch 234/2000
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Epoch 236/2000
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Epoch 256/2000
1/1 [=====] - 0s 5ms/step - loss: 32.9524

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Epoch 257/2000
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Epoch 259/2000
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Epoch 260/2000
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Epoch 263/2000
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Epoch 271/2000
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Epoch 272/2000
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Epoch 285/2000
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Epoch 286/2000
1/1 [=====] - 0s 6ms/step - loss: 32.3659
Epoch 287/2000
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Epoch 289/2000
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Epoch 290/2000
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Epoch 292/2000
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Epoch 294/2000
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Epoch 295/2000
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Epoch 296/2000
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Epoch 297/2000
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Epoch 298/2000
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Epoch 307/2000
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Epoch 317/2000
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Epoch 337/2000
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Epoch 348/2000

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Epoch 484/2000
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Epoch 485/2000
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Epoch 486/2000
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Epoch 488/2000
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Epoch 490/2000
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Epoch 492/2000
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Epoch 493/2000
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Epoch 494/2000
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Epoch 495/2000
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Epoch 496/2000
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Epoch 498/2000
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Epoch 500/2000
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Epoch 501/2000
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Epoch 502/2000
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Epoch 503/2000
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Epoch 504/2000
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Epoch 505/2000
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Epoch 506/2000
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Epoch 507/2000
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Epoch 508/2000
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Epoch 510/2000
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Epoch 530/2000
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Epoch 531/2000

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Epoch 538/2000
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Epoch 539/2000
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Epoch 557/2000
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Epoch 559/2000
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Epoch 560/2000
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Epoch 561/2000
1/1 [=====] - 0s 6ms/step - loss: 8.5566

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Epoch 563/2000
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Epoch 564/2000
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Epoch 565/2000
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Epoch 566/2000
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Epoch 567/2000
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Epoch 568/2000
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Epoch 569/2000
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Epoch 570/2000
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Epoch 571/2000
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Epoch 572/2000
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Epoch 576/2000
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Epoch 577/2000
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Epoch 578/2000
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Epoch 579/2000
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Epoch 580/2000
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Epoch 584/2000
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Epoch 590/2000
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Epoch 591/2000
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Epoch 592/2000
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Epoch 595/2000
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Epoch 620/2000
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Epoch 622/2000
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Epoch 653/2000

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Epoch 714/2000

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Epoch 755/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3660
Epoch 756/2000
1/1 [=====] - 0s 19ms/step - loss: 1.3552
Epoch 757/2000
1/1 [=====] - 0s 5ms/step - loss: 1.3446
Epoch 758/2000
1/1 [=====] - 0s 7ms/step - loss: 1.3340
Epoch 759/2000
1/1 [=====] - 0s 5ms/step - loss: 1.3236
Epoch 760/2000
1/1 [=====] - 0s 7ms/step - loss: 1.3132
Epoch 761/2000
1/1 [=====] - 0s 5ms/step - loss: 1.3030
Epoch 762/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2929
Epoch 763/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2829
Epoch 764/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2730
Epoch 765/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2633
Epoch 766/2000
1/1 [=====] - 0s 5ms/step - loss: 1.2536
Epoch 767/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2441
Epoch 768/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2346
Epoch 769/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2253
Epoch 770/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2161
Epoch 771/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2069
Epoch 772/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1979
Epoch 773/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1890
Epoch 774/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1801
Epoch 775/2000

1/1 [=====] - 0s 7ms/step - loss: 1.1714
Epoch 776/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1628
Epoch 777/2000
1/1 [=====] - 0s 8ms/step - loss: 1.1542
Epoch 778/2000
1/1 [=====] - 0s 18ms/step - loss: 1.1458
Epoch 779/2000
1/1 [=====] - 0s 64ms/step - loss: 1.1374
Epoch 780/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1291
Epoch 781/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1210
Epoch 782/2000
1/1 [=====] - 0s 11ms/step - loss: 1.1129
Epoch 783/2000
1/1 [=====] - 0s 12ms/step - loss: 1.1049
Epoch 784/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0970
Epoch 785/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0892
Epoch 786/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0815
Epoch 787/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0738
Epoch 788/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0663
Epoch 789/2000
1/1 [=====] - 0s 8ms/step - loss: 1.0588
Epoch 790/2000
1/1 [=====] - 0s 8ms/step - loss: 1.0514
Epoch 791/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0441
Epoch 792/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0368
Epoch 793/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0297
Epoch 794/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0226
Epoch 795/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0156
Epoch 796/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0087
Epoch 797/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0019
Epoch 798/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9951
Epoch 799/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9884
Epoch 800/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9818
Epoch 801/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9752
Epoch 802/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9688
Epoch 803/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9624
Epoch 804/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9560
Epoch 805/2000
1/1 [=====] - 0s 19ms/step - loss: 0.9498

```
Epoch 806/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9436
Epoch 807/2000
1/1 [=====] - 0s 9ms/step - loss: 0.9374
Epoch 808/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9314
Epoch 809/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9254
Epoch 810/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9195
Epoch 811/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9136
Epoch 812/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9078
Epoch 813/2000
1/1 [=====] - 0s 8ms/step - loss: 0.9021
Epoch 814/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8964
Epoch 815/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8908
Epoch 816/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8852
Epoch 817/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8797
Epoch 818/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8743
Epoch 819/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8689
Epoch 820/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8636
Epoch 821/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8583
Epoch 822/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8531
Epoch 823/2000
1/1 [=====] - 0s 29ms/step - loss: 0.8480
Epoch 824/2000
1/1 [=====] - 0s 19ms/step - loss: 0.8429
Epoch 825/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8379
Epoch 826/2000
1/1 [=====] - 0s 8ms/step - loss: 0.8329
Epoch 827/2000
1/1 [=====] - 0s 11ms/step - loss: 0.8280
Epoch 828/2000
1/1 [=====] - 0s 9ms/step - loss: 0.8231
Epoch 829/2000
1/1 [=====] - 0s 8ms/step - loss: 0.8183
Epoch 830/2000
1/1 [=====] - 0s 8ms/step - loss: 0.8135
Epoch 831/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8088
Epoch 832/2000
1/1 [=====] - 0s 9ms/step - loss: 0.8041
Epoch 833/2000
1/1 [=====] - 0s 13ms/step - loss: 0.7995
Epoch 834/2000
1/1 [=====] - 0s 13ms/step - loss: 0.7950
Epoch 835/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7904
Epoch 836/2000
```

1/1 [=====] - 0s 6ms/step - loss: 0.7860
Epoch 837/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7816
Epoch 838/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7772
Epoch 839/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7729
Epoch 840/2000
1/1 [=====] - 0s 12ms/step - loss: 0.7686
Epoch 841/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7643
Epoch 842/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7601
Epoch 843/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7560
Epoch 844/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7519
Epoch 845/2000
1/1 [=====] - 0s 9ms/step - loss: 0.7478
Epoch 846/2000
1/1 [=====] - 0s 11ms/step - loss: 0.7438
Epoch 847/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7399
Epoch 848/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7359
Epoch 849/2000
1/1 [=====] - 0s 14ms/step - loss: 0.7320
Epoch 850/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7282
Epoch 851/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7244
Epoch 852/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7206
Epoch 853/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7169
Epoch 854/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7132
Epoch 855/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7095
Epoch 856/2000
1/1 [=====] - 0s 23ms/step - loss: 0.7059
Epoch 857/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7024
Epoch 858/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6988
Epoch 859/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6953
Epoch 860/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6919
Epoch 861/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6884
Epoch 862/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6850
Epoch 863/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6817
Epoch 864/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6784
Epoch 865/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6751
Epoch 866/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6718

Epoch 867/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6686
Epoch 868/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6654
Epoch 869/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6622
Epoch 870/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6591
Epoch 871/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6560
Epoch 872/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6530
Epoch 873/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6499
Epoch 874/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6469
Epoch 875/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6440
Epoch 876/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6410
Epoch 877/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6381
Epoch 878/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6353
Epoch 879/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6324
Epoch 880/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6296
Epoch 881/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6268
Epoch 882/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6240
Epoch 883/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6213
Epoch 884/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6186
Epoch 885/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6159
Epoch 886/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6133
Epoch 887/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6106
Epoch 888/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6080
Epoch 889/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6054
Epoch 890/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6029
Epoch 891/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6004
Epoch 892/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5979
Epoch 893/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5954
Epoch 894/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5929
Epoch 895/2000
1/1 [=====] - 0s 20ms/step - loss: 0.5905
Epoch 896/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5881
Epoch 897/2000

1/1 [=====] - 0s 10ms/step - loss: 0.5857
Epoch 898/2000
1/1 [=====] - 0s 15ms/step - loss: 0.5833
Epoch 899/2000
1/1 [=====] - 0s 24ms/step - loss: 0.5810
Epoch 900/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5787
Epoch 901/2000
1/1 [=====] - 0s 14ms/step - loss: 0.5764
Epoch 902/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5741
Epoch 903/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5719
Epoch 904/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5697
Epoch 905/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5674
Epoch 906/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5653
Epoch 907/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5631
Epoch 908/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5610
Epoch 909/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5588
Epoch 910/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5567
Epoch 911/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5546
Epoch 912/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5526
Epoch 913/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5505
Epoch 914/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5485
Epoch 915/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5465
Epoch 916/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5445
Epoch 917/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5425
Epoch 918/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5406
Epoch 919/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5386
Epoch 920/2000
1/1 [=====] - 0s 18ms/step - loss: 0.5367
Epoch 921/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5348
Epoch 922/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5329
Epoch 923/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5311
Epoch 924/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5292
Epoch 925/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5274
Epoch 926/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5256
Epoch 927/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5238

```
Epoch 928/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5220
Epoch 929/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5202
Epoch 930/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5185
Epoch 931/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5167
Epoch 932/2000
1/1 [=====] - 0s 19ms/step - loss: 0.5150
Epoch 933/2000
1/1 [=====] - 0s 36ms/step - loss: 0.5133
Epoch 934/2000
1/1 [=====] - 0s 15ms/step - loss: 0.5116
Epoch 935/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5099
Epoch 936/2000
1/1 [=====] - 0s 13ms/step - loss: 0.5082
Epoch 937/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5066
Epoch 938/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5049
Epoch 939/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5033
Epoch 940/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5017
Epoch 941/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5001
Epoch 942/2000
1/1 [=====] - 0s 16ms/step - loss: 0.4985
Epoch 943/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4970
Epoch 944/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4954
Epoch 945/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4939
Epoch 946/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4923
Epoch 947/2000
1/1 [=====] - 0s 12ms/step - loss: 0.4908
Epoch 948/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4893
Epoch 949/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4878
Epoch 950/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4863
Epoch 951/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4849
Epoch 952/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4834
Epoch 953/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4820
Epoch 954/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4805
Epoch 955/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4791
Epoch 956/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4777
Epoch 957/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4763
Epoch 958/2000
```

```
1/1 [=====] - 0s 5ms/step - loss: 0.4749
Epoch 959/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4735
Epoch 960/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4721
Epoch 961/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4708
Epoch 962/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4694
Epoch 963/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4681
Epoch 964/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4668
Epoch 965/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4655
Epoch 966/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4641
Epoch 967/2000
1/1 [=====] - 0s 61ms/step - loss: 0.4628
Epoch 968/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4616
Epoch 969/2000
1/1 [=====] - 0s 16ms/step - loss: 0.4603
Epoch 970/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4590
Epoch 971/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4578
Epoch 972/2000
1/1 [=====] - 0s 17ms/step - loss: 0.4565
Epoch 973/2000
1/1 [=====] - 0s 11ms/step - loss: 0.4553
Epoch 974/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4540
Epoch 975/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4528
Epoch 976/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4516
Epoch 977/2000
1/1 [=====] - 0s 14ms/step - loss: 0.4504
Epoch 978/2000
1/1 [=====] - 0s 10ms/step - loss: 0.4492
Epoch 979/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4480
Epoch 980/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4468
Epoch 981/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4456
Epoch 982/2000
1/1 [=====] - 0s 12ms/step - loss: 0.4445
Epoch 983/2000
1/1 [=====] - 0s 13ms/step - loss: 0.4433
Epoch 984/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4422
Epoch 985/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4410
Epoch 986/2000
1/1 [=====] - 0s 21ms/step - loss: 0.4399
Epoch 987/2000
1/1 [=====] - 0s 14ms/step - loss: 0.4387
Epoch 988/2000
1/1 [=====] - 0s 14ms/step - loss: 0.4376
```

```
Epoch 989/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4365
Epoch 990/2000
1/1 [=====] - 0s 12ms/step - loss: 0.4354
Epoch 991/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4343
Epoch 992/2000
1/1 [=====] - 0s 15ms/step - loss: 0.4332
Epoch 993/2000
1/1 [=====] - 0s 12ms/step - loss: 0.4321
Epoch 994/2000
1/1 [=====] - 0s 10ms/step - loss: 0.4311
Epoch 995/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4300
Epoch 996/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4289
Epoch 997/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4279
Epoch 998/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4268
Epoch 999/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4258
Epoch 1000/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4247
Epoch 1001/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4237
Epoch 1002/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4227
Epoch 1003/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4217
Epoch 1004/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4206
Epoch 1005/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4196
Epoch 1006/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4186
Epoch 1007/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4176
Epoch 1008/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4167
Epoch 1009/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4157
Epoch 1010/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4147
Epoch 1011/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4137
Epoch 1012/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4128
Epoch 1013/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4118
Epoch 1014/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4108
Epoch 1015/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4099
Epoch 1016/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4089
Epoch 1017/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4080
Epoch 1018/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4071
Epoch 1019/2000
```



```
1/1 [=====] - 0s 17ms/step - loss: 0.4061
Epoch 1020/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4052
Epoch 1021/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4043
Epoch 1022/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4034
Epoch 1023/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4025
Epoch 1024/2000
1/1 [=====] - 0s 14ms/step - loss: 0.4016
Epoch 1025/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4007
Epoch 1026/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3998
Epoch 1027/2000
1/1 [=====] - 0s 21ms/step - loss: 0.3989
Epoch 1028/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3980
Epoch 1029/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3971
Epoch 1030/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3962
Epoch 1031/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3954
Epoch 1032/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3945
Epoch 1033/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3936
Epoch 1034/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3928
Epoch 1035/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3919
Epoch 1036/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3911
Epoch 1037/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3902
Epoch 1038/2000
1/1 [=====] - 0s 15ms/step - loss: 0.3894
Epoch 1039/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3885
Epoch 1040/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3877
Epoch 1041/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3869
Epoch 1042/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3860
Epoch 1043/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3852
Epoch 1044/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3844
Epoch 1045/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3836
Epoch 1046/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3827
Epoch 1047/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3819
Epoch 1048/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3811
Epoch 1049/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3803
```

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Epoch 1050/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3795
Epoch 1051/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3787
Epoch 1052/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3779
Epoch 1053/2000
1/1 [=====] - 0s 75ms/step - loss: 0.3771
Epoch 1054/2000
1/1 [=====] - 0s 20ms/step - loss: 0.3764
Epoch 1055/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3756
Epoch 1056/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3748
Epoch 1057/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3740
Epoch 1058/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3733
Epoch 1059/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3725
Epoch 1060/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3717
Epoch 1061/2000
1/1 [=====] - 0s 12ms/step - loss: 0.3710
Epoch 1062/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3702
Epoch 1063/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3694
Epoch 1064/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3687
Epoch 1065/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3679
Epoch 1066/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3672
Epoch 1067/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3664
Epoch 1068/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3657
Epoch 1069/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3649
Epoch 1070/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3642
Epoch 1071/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3635
Epoch 1072/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3627
Epoch 1073/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3620
Epoch 1074/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3613
Epoch 1075/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3606
Epoch 1076/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3598
Epoch 1077/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3591
Epoch 1078/2000
1/1 [=====] - 0s 80ms/step - loss: 0.3584
Epoch 1079/2000
1/1 [=====] - 0s 19ms/step - loss: 0.3577
Epoch 1080/2000
```

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1/1 [=====] - 0s 7ms/step - loss: 0.3570
Epoch 1081/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3563
Epoch 1082/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3556
Epoch 1083/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3549
Epoch 1084/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3542
Epoch 1085/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3535
Epoch 1086/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3528
Epoch 1087/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3521
Epoch 1088/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3514
Epoch 1089/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3507
Epoch 1090/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3500
Epoch 1091/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3493
Epoch 1092/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3486
Epoch 1093/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3480
Epoch 1094/2000
1/1 [=====] - 0s 19ms/step - loss: 0.3473
Epoch 1095/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3466
Epoch 1096/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3459
Epoch 1097/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3453
Epoch 1098/2000
1/1 [=====] - 0s 13ms/step - loss: 0.3446
Epoch 1099/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3439
Epoch 1100/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3433
Epoch 1101/2000
1/1 [=====] - 0s 66ms/step - loss: 0.3426
Epoch 1102/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3419
Epoch 1103/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3413
Epoch 1104/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3406
Epoch 1105/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3400
Epoch 1106/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3393
Epoch 1107/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3387
Epoch 1108/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3380
Epoch 1109/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3374
Epoch 1110/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3367
```

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Epoch 1111/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3361
Epoch 1112/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3354
Epoch 1113/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3348
Epoch 1114/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3341
Epoch 1115/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3335
Epoch 1116/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3329
Epoch 1117/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3322
Epoch 1118/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3316
Epoch 1119/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3310
Epoch 1120/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3304
Epoch 1121/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3297
Epoch 1122/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3291
Epoch 1123/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3285
Epoch 1124/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3279
Epoch 1125/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3272
Epoch 1126/2000
1/1 [=====] - 0s 16ms/step - loss: 0.3266
Epoch 1127/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3260
Epoch 1128/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3254
Epoch 1129/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3248
Epoch 1130/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3242
Epoch 1131/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3236
Epoch 1132/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3230
Epoch 1133/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3223
Epoch 1134/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3217
Epoch 1135/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3211
Epoch 1136/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3205
Epoch 1137/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3199
Epoch 1138/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3193
Epoch 1139/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3187
Epoch 1140/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3181
Epoch 1141/2000
```

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1/1 [=====] - 0s 6ms/step - loss: 0.3176
Epoch 1142/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3170
Epoch 1143/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3164
Epoch 1144/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3158
Epoch 1145/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3152
Epoch 1146/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3146
Epoch 1147/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3140
Epoch 1148/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3134
Epoch 1149/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3129
Epoch 1150/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3123
Epoch 1151/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3117
Epoch 1152/2000
1/1 [=====] - 0s 63ms/step - loss: 0.3111
Epoch 1153/2000
1/1 [=====] - 0s 25ms/step - loss: 0.3105
Epoch 1154/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3100
Epoch 1155/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3094
Epoch 1156/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3088
Epoch 1157/2000
1/1 [=====] - 0s 17ms/step - loss: 0.3082
Epoch 1158/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3077
Epoch 1159/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3071
Epoch 1160/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3065
Epoch 1161/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3060
Epoch 1162/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3054
Epoch 1163/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3048
Epoch 1164/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3043
Epoch 1165/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3037
Epoch 1166/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3032
Epoch 1167/2000
1/1 [=====] - 0s 61ms/step - loss: 0.3026
Epoch 1168/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3020
Epoch 1169/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3015
Epoch 1170/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3009
Epoch 1171/2000
1/1 [=====] - 0s 14ms/step - loss: 0.3004
```

```
Epoch 1172/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2998
Epoch 1173/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2993
Epoch 1174/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2987
Epoch 1175/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2982
Epoch 1176/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2976
Epoch 1177/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2971
Epoch 1178/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2965
Epoch 1179/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2960
Epoch 1180/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2954
Epoch 1181/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2949
Epoch 1182/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2944
Epoch 1183/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2938
Epoch 1184/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2933
Epoch 1185/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2927
Epoch 1186/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2922
Epoch 1187/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2917
Epoch 1188/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2911
Epoch 1189/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2906
Epoch 1190/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2901
Epoch 1191/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2895
Epoch 1192/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2890
Epoch 1193/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2885
Epoch 1194/2000
1/1 [=====] - 0s 62ms/step - loss: 0.2880
Epoch 1195/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2874
Epoch 1196/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2869
Epoch 1197/2000
1/1 [=====] - 0s 13ms/step - loss: 0.2864
Epoch 1198/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2859
Epoch 1199/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2853
Epoch 1200/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2848
Epoch 1201/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2843
Epoch 1202/2000
```

```
1/1 [=====] - 0s 9ms/step - loss: 0.2838
Epoch 1203/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2833
Epoch 1204/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2828
Epoch 1205/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2822
Epoch 1206/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2817
Epoch 1207/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2812
Epoch 1208/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2807
Epoch 1209/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2802
Epoch 1210/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2797
Epoch 1211/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2792
Epoch 1212/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2787
Epoch 1213/2000
1/1 [=====] - 0s 15ms/step - loss: 0.2782
Epoch 1214/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2776
Epoch 1215/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2771
Epoch 1216/2000
1/1 [=====] - 0s 13ms/step - loss: 0.2766
Epoch 1217/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2761
Epoch 1218/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2756
Epoch 1219/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2751
Epoch 1220/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2746
Epoch 1221/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2741
Epoch 1222/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2736
Epoch 1223/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2731
Epoch 1224/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2726
Epoch 1225/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2722
Epoch 1226/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2717
Epoch 1227/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2712
Epoch 1228/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2707
Epoch 1229/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2702
Epoch 1230/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2697
Epoch 1231/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2692
Epoch 1232/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2687
```

Epoch 1233/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2682
Epoch 1234/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2677
Epoch 1235/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2673
Epoch 1236/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2668
Epoch 1237/2000
1/1 [=====] - 0s 16ms/step - loss: 0.2663
Epoch 1238/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2658
Epoch 1239/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2653
Epoch 1240/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2648
Epoch 1241/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2644
Epoch 1242/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2639
Epoch 1243/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2634
Epoch 1244/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2629
Epoch 1245/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2625
Epoch 1246/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2620
Epoch 1247/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2615
Epoch 1248/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2610
Epoch 1249/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2606
Epoch 1250/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2601
Epoch 1251/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2596
Epoch 1252/2000
1/1 [=====] - 0s 20ms/step - loss: 0.2592
Epoch 1253/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2587
Epoch 1254/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2582
Epoch 1255/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2578
Epoch 1256/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2573
Epoch 1257/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2568
Epoch 1258/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2564
Epoch 1259/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2559
Epoch 1260/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2554
Epoch 1261/2000
1/1 [=====] - 0s 107ms/step - loss: 0.2550
Epoch 1262/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2545
Epoch 1263/2000

1/1 [=====] - 0s 12ms/step - loss: 0.2541
Epoch 1264/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2536
Epoch 1265/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2531
Epoch 1266/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2527
Epoch 1267/2000
1/1 [=====] - 0s 62ms/step - loss: 0.2522
Epoch 1268/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2518
Epoch 1269/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2513
Epoch 1270/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2509
Epoch 1271/2000
1/1 [=====] - 0s 26ms/step - loss: 0.2504
Epoch 1272/2000
1/1 [=====] - 0s 16ms/step - loss: 0.2500
Epoch 1273/2000
1/1 [=====] - 0s 16ms/step - loss: 0.2495
Epoch 1274/2000
1/1 [=====] - 0s 14ms/step - loss: 0.2491
Epoch 1275/2000
1/1 [=====] - 0s 21ms/step - loss: 0.2486
Epoch 1276/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2482
Epoch 1277/2000
1/1 [=====] - 0s 15ms/step - loss: 0.2477
Epoch 1278/2000
1/1 [=====] - 0s 14ms/step - loss: 0.2473
Epoch 1279/2000
1/1 [=====] - 0s 24ms/step - loss: 0.2468
Epoch 1280/2000
1/1 [=====] - 0s 25ms/step - loss: 0.2464
Epoch 1281/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2460
Epoch 1282/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2455
Epoch 1283/2000
1/1 [=====] - 0s 15ms/step - loss: 0.2451
Epoch 1284/2000
1/1 [=====] - 0s 21ms/step - loss: 0.2446
Epoch 1285/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2442
Epoch 1286/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2437
Epoch 1287/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2433
Epoch 1288/2000
1/1 [=====] - 0s 69ms/step - loss: 0.2429
Epoch 1289/2000
1/1 [=====] - 0s 14ms/step - loss: 0.2424
Epoch 1290/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2420
Epoch 1291/2000
1/1 [=====] - 0s 18ms/step - loss: 0.2416
Epoch 1292/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2411
Epoch 1293/2000
1/1 [=====] - 0s 14ms/step - loss: 0.2407

Epoch 1294/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2403
Epoch 1295/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2398
Epoch 1296/2000
1/1 [=====] - 0s 15ms/step - loss: 0.2394
Epoch 1297/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2390
Epoch 1298/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2385
Epoch 1299/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2381
Epoch 1300/2000
1/1 [=====] - 0s 19ms/step - loss: 0.2377
Epoch 1301/2000
1/1 [=====] - 0s 15ms/step - loss: 0.2373
Epoch 1302/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2368
Epoch 1303/2000
1/1 [=====] - 0s 18ms/step - loss: 0.2364
Epoch 1304/2000
1/1 [=====] - 0s 20ms/step - loss: 0.2360
Epoch 1305/2000
1/1 [=====] - 0s 20ms/step - loss: 0.2356
Epoch 1306/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2351
Epoch 1307/2000
1/1 [=====] - 0s 33ms/step - loss: 0.2347
Epoch 1308/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2343
Epoch 1309/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2339
Epoch 1310/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2335
Epoch 1311/2000
1/1 [=====] - 0s 19ms/step - loss: 0.2331
Epoch 1312/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2326
Epoch 1313/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2322
Epoch 1314/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2318
Epoch 1315/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2314
Epoch 1316/2000
1/1 [=====] - 0s 16ms/step - loss: 0.2310
Epoch 1317/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2306
Epoch 1318/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2301
Epoch 1319/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2297
Epoch 1320/2000
1/1 [=====] - 0s 17ms/step - loss: 0.2293
Epoch 1321/2000
1/1 [=====] - 0s 24ms/step - loss: 0.2289
Epoch 1322/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2285
Epoch 1323/2000
1/1 [=====] - 0s 20ms/step - loss: 0.2281
Epoch 1324/2000

```
1/1 [=====] - 0s 9ms/step - loss: 0.2277
Epoch 1325/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2273
Epoch 1326/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2269
Epoch 1327/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2265
Epoch 1328/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2261
Epoch 1329/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2257
Epoch 1330/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2253
Epoch 1331/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2249
Epoch 1332/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2245
Epoch 1333/2000
1/1 [=====] - 0s 16ms/step - loss: 0.2241
Epoch 1334/2000
1/1 [=====] - 0s 17ms/step - loss: 0.2237
Epoch 1335/2000
1/1 [=====] - 0s 27ms/step - loss: 0.2233
Epoch 1336/2000
1/1 [=====] - 0s 22ms/step - loss: 0.2229
Epoch 1337/2000
1/1 [=====] - 0s 13ms/step - loss: 0.2225
Epoch 1338/2000
1/1 [=====] - 0s 14ms/step - loss: 0.2221
Epoch 1339/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2217
Epoch 1340/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2213
Epoch 1341/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2209
Epoch 1342/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2205
Epoch 1343/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2201
Epoch 1344/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2197
Epoch 1345/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2193
Epoch 1346/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2189
Epoch 1347/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2185
Epoch 1348/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2181
Epoch 1349/2000
1/1 [=====] - 0s 13ms/step - loss: 0.2178
Epoch 1350/2000
1/1 [=====] - 0s 15ms/step - loss: 0.2174
Epoch 1351/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2170
Epoch 1352/2000
1/1 [=====] - 0s 15ms/step - loss: 0.2166
Epoch 1353/2000
1/1 [=====] - 0s 37ms/step - loss: 0.2162
Epoch 1354/2000
1/1 [=====] - 0s 23ms/step - loss: 0.2158
```

Epoch 1355/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2155
Epoch 1356/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2151
Epoch 1357/2000
1/1 [=====] - 0s 14ms/step - loss: 0.2147
Epoch 1358/2000
1/1 [=====] - 0s 73ms/step - loss: 0.2143
Epoch 1359/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2139
Epoch 1360/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2135
Epoch 1361/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2132
Epoch 1362/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2128
Epoch 1363/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2124
Epoch 1364/2000
1/1 [=====] - 0s 20ms/step - loss: 0.2120
Epoch 1365/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2117
Epoch 1366/2000
1/1 [=====] - 0s 19ms/step - loss: 0.2113
Epoch 1367/2000
1/1 [=====] - 0s 21ms/step - loss: 0.2109
Epoch 1368/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2105
Epoch 1369/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2102
Epoch 1370/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2098
Epoch 1371/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2094
Epoch 1372/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2090
Epoch 1373/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2087
Epoch 1374/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2083
Epoch 1375/2000
1/1 [=====] - 0s 21ms/step - loss: 0.2079
Epoch 1376/2000
1/1 [=====] - 0s 79ms/step - loss: 0.2076
Epoch 1377/2000
1/1 [=====] - 0s 13ms/step - loss: 0.2072
Epoch 1378/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2068
Epoch 1379/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2065
Epoch 1380/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2061
Epoch 1381/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2057
Epoch 1382/2000
1/1 [=====] - 0s 16ms/step - loss: 0.2054
Epoch 1383/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2050
Epoch 1384/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2047
Epoch 1385/2000

1/1 [=====] - 0s 8ms/step - loss: 0.2043
Epoch 1386/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2039
Epoch 1387/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2036
Epoch 1388/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2032
Epoch 1389/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2029
Epoch 1390/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2025
Epoch 1391/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2021
Epoch 1392/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2018
Epoch 1393/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2014
Epoch 1394/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2011
Epoch 1395/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2007
Epoch 1396/2000
1/1 [=====] - 0s 17ms/step - loss: 0.2004
Epoch 1397/2000
1/1 [=====] - 0s 13ms/step - loss: 0.2000
Epoch 1398/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1997
Epoch 1399/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1993
Epoch 1400/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1990
Epoch 1401/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1986
Epoch 1402/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1983
Epoch 1403/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1979
Epoch 1404/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1976
Epoch 1405/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1972
Epoch 1406/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1969
Epoch 1407/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1965
Epoch 1408/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1962
Epoch 1409/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1958
Epoch 1410/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1955
Epoch 1411/2000
1/1 [=====] - 0s 67ms/step - loss: 0.1951
Epoch 1412/2000
1/1 [=====] - 0s 18ms/step - loss: 0.1948
Epoch 1413/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1945
Epoch 1414/2000
1/1 [=====] - 0s 18ms/step - loss: 0.1941
Epoch 1415/2000
1/1 [=====] - 0s 25ms/step - loss: 0.1938

Epoch 1416/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1934
Epoch 1417/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1931
Epoch 1418/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1928
Epoch 1419/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1924
Epoch 1420/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1921
Epoch 1421/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1918
Epoch 1422/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1914
Epoch 1423/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1911
Epoch 1424/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1908
Epoch 1425/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1904
Epoch 1426/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1901
Epoch 1427/2000
1/1 [=====] - 0s 19ms/step - loss: 0.1898
Epoch 1428/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1894
Epoch 1429/2000
1/1 [=====] - 0s 17ms/step - loss: 0.1891
Epoch 1430/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1888
Epoch 1431/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1884
Epoch 1432/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1881
Epoch 1433/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1878
Epoch 1434/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1874
Epoch 1435/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1871
Epoch 1436/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1868
Epoch 1437/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1865
Epoch 1438/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1861
Epoch 1439/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1858
Epoch 1440/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1855
Epoch 1441/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1852
Epoch 1442/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1848
Epoch 1443/2000
1/1 [=====] - 0s 24ms/step - loss: 0.1845
Epoch 1444/2000
1/1 [=====] - 0s 19ms/step - loss: 0.1842
Epoch 1445/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1839
Epoch 1446/2000

1/1 [=====] - 0s 11ms/step - loss: 0.1836
Epoch 1447/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1832
Epoch 1448/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1829
Epoch 1449/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1826
Epoch 1450/2000
1/1 [=====] - 0s 70ms/step - loss: 0.1823
Epoch 1451/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1820
Epoch 1452/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1817
Epoch 1453/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1813
Epoch 1454/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1810
Epoch 1455/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1807
Epoch 1456/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1804
Epoch 1457/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1801
Epoch 1458/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1798
Epoch 1459/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1795
Epoch 1460/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1792
Epoch 1461/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1788
Epoch 1462/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1785
Epoch 1463/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1782
Epoch 1464/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1779
Epoch 1465/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1776
Epoch 1466/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1773
Epoch 1467/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1770
Epoch 1468/2000
1/1 [=====] - 0s 17ms/step - loss: 0.1767
Epoch 1469/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1764
Epoch 1470/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1761
Epoch 1471/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1758
Epoch 1472/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1755
Epoch 1473/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1752
Epoch 1474/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1749
Epoch 1475/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1746
Epoch 1476/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1743

```
Epoch 1477/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1740
Epoch 1478/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1737
Epoch 1479/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1734
Epoch 1480/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1731
Epoch 1481/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1728
Epoch 1482/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1725
Epoch 1483/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1722
Epoch 1484/2000
1/1 [=====] - 0s 29ms/step - loss: 0.1719
Epoch 1485/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1716
Epoch 1486/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1713
Epoch 1487/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1710
Epoch 1488/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1707
Epoch 1489/2000
1/1 [=====] - 0s 92ms/step - loss: 0.1704
Epoch 1490/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1701
Epoch 1491/2000
1/1 [=====] - 0s 30ms/step - loss: 0.1698
Epoch 1492/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1695
Epoch 1493/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1692
Epoch 1494/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1689
Epoch 1495/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1686
Epoch 1496/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1684
Epoch 1497/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1681
Epoch 1498/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1678
Epoch 1499/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1675
Epoch 1500/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1672
Epoch 1501/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1669
Epoch 1502/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1666
Epoch 1503/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1663
Epoch 1504/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1661
Epoch 1505/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1658
Epoch 1506/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1655
Epoch 1507/2000
```



```
1/1 [=====] - 0s 9ms/step - loss: 0.1652
Epoch 1508/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1649
Epoch 1509/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1646
Epoch 1510/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1644
Epoch 1511/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1641
Epoch 1512/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1638
Epoch 1513/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1635
Epoch 1514/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1632
Epoch 1515/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1630
Epoch 1516/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1627
Epoch 1517/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1624
Epoch 1518/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1621
Epoch 1519/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1619
Epoch 1520/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1616
Epoch 1521/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1613
Epoch 1522/2000
1/1 [=====] - 0s 60ms/step - loss: 0.1610
Epoch 1523/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1608
Epoch 1524/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1605
Epoch 1525/2000
1/1 [=====] - 0s 21ms/step - loss: 0.1602
Epoch 1526/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1599
Epoch 1527/2000
1/1 [=====] - 0s 29ms/step - loss: 0.1597
Epoch 1528/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1594
Epoch 1529/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1591
Epoch 1530/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1589
Epoch 1531/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1586
Epoch 1532/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1583
Epoch 1533/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1580
Epoch 1534/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1578
Epoch 1535/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1575
Epoch 1536/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1572
Epoch 1537/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1570
```

```
Epoch 1538/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1567
Epoch 1539/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1564
Epoch 1540/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1562
Epoch 1541/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1559
Epoch 1542/2000
1/1 [=====] - 0s 26ms/step - loss: 0.1556
Epoch 1543/2000
1/1 [=====] - 0s 28ms/step - loss: 0.1554
Epoch 1544/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1551
Epoch 1545/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1549
Epoch 1546/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1546
Epoch 1547/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1543
Epoch 1548/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1541
Epoch 1549/2000
1/1 [=====] - 0s 18ms/step - loss: 0.1538
Epoch 1550/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1536
Epoch 1551/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1533
Epoch 1552/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1530
Epoch 1553/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1528
Epoch 1554/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1525
Epoch 1555/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1523
Epoch 1556/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1520
Epoch 1557/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1517
Epoch 1558/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1515
Epoch 1559/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1512
Epoch 1560/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1510
Epoch 1561/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1507
Epoch 1562/2000
1/1 [=====] - 0s 22ms/step - loss: 0.1505
Epoch 1563/2000
1/1 [=====] - 0s 21ms/step - loss: 0.1502
Epoch 1564/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1500
Epoch 1565/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1497
Epoch 1566/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1495
Epoch 1567/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1492
Epoch 1568/2000
```

```
1/1 [=====] - 0s 8ms/step - loss: 0.1490
Epoch 1569/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1487
Epoch 1570/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1485
Epoch 1571/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1482
Epoch 1572/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1480
Epoch 1573/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1477
Epoch 1574/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1475
Epoch 1575/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1472
Epoch 1576/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1470
Epoch 1577/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1467
Epoch 1578/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1465
Epoch 1579/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1462
Epoch 1580/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1460
Epoch 1581/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1457
Epoch 1582/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1455
Epoch 1583/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1453
Epoch 1584/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1450
Epoch 1585/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1448
Epoch 1586/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1445
Epoch 1587/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1443
Epoch 1588/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1440
Epoch 1589/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1438
Epoch 1590/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1436
Epoch 1591/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1433
Epoch 1592/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1431
Epoch 1593/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1428
Epoch 1594/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1426
Epoch 1595/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1424
Epoch 1596/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1421
Epoch 1597/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1419
Epoch 1598/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1417
```

```
Epoch 1599/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1414
Epoch 1600/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1412
Epoch 1601/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1409
Epoch 1602/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1407
Epoch 1603/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1405
Epoch 1604/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1402
Epoch 1605/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1400
Epoch 1606/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1398
Epoch 1607/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1395
Epoch 1608/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1393
Epoch 1609/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1391
Epoch 1610/2000
1/1 [=====] - 0s 20ms/step - loss: 0.1388
Epoch 1611/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1386
Epoch 1612/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1384
Epoch 1613/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1382
Epoch 1614/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1379
Epoch 1615/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1377
Epoch 1616/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1375
Epoch 1617/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1372
Epoch 1618/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1370
Epoch 1619/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1368
Epoch 1620/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1366
Epoch 1621/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1363
Epoch 1622/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1361
Epoch 1623/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1359
Epoch 1624/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1357
Epoch 1625/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1354
Epoch 1626/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1352
Epoch 1627/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1350
Epoch 1628/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1348
Epoch 1629/2000
```

```
1/1 [=====] - 0s 8ms/step - loss: 0.1345
Epoch 1630/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1343
Epoch 1631/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1341
Epoch 1632/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1339
Epoch 1633/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1336
Epoch 1634/2000
1/1 [=====] - 0s 68ms/step - loss: 0.1334
Epoch 1635/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1332
Epoch 1636/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1330
Epoch 1637/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1328
Epoch 1638/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1325
Epoch 1639/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1323
Epoch 1640/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1321
Epoch 1641/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1319
Epoch 1642/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1317
Epoch 1643/2000
1/1 [=====] - 0s 19ms/step - loss: 0.1315
Epoch 1644/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1312
Epoch 1645/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1310
Epoch 1646/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1308
Epoch 1647/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1306
Epoch 1648/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1304
Epoch 1649/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1302
Epoch 1650/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1300
Epoch 1651/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1297
Epoch 1652/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1295
Epoch 1653/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1293
Epoch 1654/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1291
Epoch 1655/2000
1/1 [=====] - 0s 22ms/step - loss: 0.1289
Epoch 1656/2000
1/1 [=====] - 0s 18ms/step - loss: 0.1287
Epoch 1657/2000
1/1 [=====] - 0s 23ms/step - loss: 0.1285
Epoch 1658/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1283
Epoch 1659/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1280
```

```
Epoch 1660/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1278
Epoch 1661/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1276
Epoch 1662/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1274
Epoch 1663/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1272
Epoch 1664/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1270
Epoch 1665/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1268
Epoch 1666/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1266
Epoch 1667/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1264
Epoch 1668/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1262
Epoch 1669/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1260
Epoch 1670/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1258
Epoch 1671/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1255
Epoch 1672/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1253
Epoch 1673/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1251
Epoch 1674/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1249
Epoch 1675/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1247
Epoch 1676/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1245
Epoch 1677/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1243
Epoch 1678/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1241
Epoch 1679/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1239
Epoch 1680/2000
1/1 [=====] - 0s 22ms/step - loss: 0.1237
Epoch 1681/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1235
Epoch 1682/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1233
Epoch 1683/2000
1/1 [=====] - 0s 17ms/step - loss: 0.1231
Epoch 1684/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1229
Epoch 1685/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1227
Epoch 1686/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1225
Epoch 1687/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1223
Epoch 1688/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1221
Epoch 1689/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1219
Epoch 1690/2000
```

```
1/1 [=====] - 0s 5ms/step - loss: 0.1217
Epoch 1691/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1215
Epoch 1692/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1213
Epoch 1693/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1211
Epoch 1694/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1209
Epoch 1695/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1207
Epoch 1696/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1205
Epoch 1697/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1203
Epoch 1698/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1201
Epoch 1699/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1199
Epoch 1700/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1197
Epoch 1701/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1195
Epoch 1702/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1194
Epoch 1703/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1192
Epoch 1704/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1190
Epoch 1705/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1188
Epoch 1706/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1186
Epoch 1707/2000
1/1 [=====] - 0s 20ms/step - loss: 0.1184
Epoch 1708/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1182
Epoch 1709/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1180
Epoch 1710/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1178
Epoch 1711/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1176
Epoch 1712/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1174
Epoch 1713/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1172
Epoch 1714/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1171
Epoch 1715/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1169
Epoch 1716/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1167
Epoch 1717/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1165
Epoch 1718/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1163
Epoch 1719/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1161
Epoch 1720/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1159
```

```
Epoch 1721/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1157
Epoch 1722/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1155
Epoch 1723/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1154
Epoch 1724/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1152
Epoch 1725/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1150
Epoch 1726/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1148
Epoch 1727/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1146
Epoch 1728/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1144
Epoch 1729/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1142
Epoch 1730/2000
1/1 [=====] - 0s 42ms/step - loss: 0.1141
Epoch 1731/2000
1/1 [=====] - 0s 52ms/step - loss: 0.1139
Epoch 1732/2000
1/1 [=====] - 0s 19ms/step - loss: 0.1137
Epoch 1733/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1135
Epoch 1734/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1133
Epoch 1735/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1131
Epoch 1736/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1130
Epoch 1737/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1128
Epoch 1738/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1126
Epoch 1739/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1124
Epoch 1740/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1122
Epoch 1741/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1121
Epoch 1742/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1119
Epoch 1743/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1117
Epoch 1744/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1115
Epoch 1745/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1113
Epoch 1746/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1112
Epoch 1747/2000
1/1 [=====] - 0s 30ms/step - loss: 0.1110
Epoch 1748/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1108
Epoch 1749/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1106
Epoch 1750/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1104
Epoch 1751/2000
```



```
1/1 [=====] - 0s 9ms/step - loss: 0.1103
Epoch 1752/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1101
Epoch 1753/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1099
Epoch 1754/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1097
Epoch 1755/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1096
Epoch 1756/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1094
Epoch 1757/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1092
Epoch 1758/2000
1/1 [=====] - 0s 18ms/step - loss: 0.1090
Epoch 1759/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1089
Epoch 1760/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1087
Epoch 1761/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1085
Epoch 1762/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1083
Epoch 1763/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1082
Epoch 1764/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1080
Epoch 1765/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1078
Epoch 1766/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1076
Epoch 1767/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1075
Epoch 1768/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1073
Epoch 1769/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1071
Epoch 1770/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1070
Epoch 1771/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1068
Epoch 1772/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1066
Epoch 1773/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1064
Epoch 1774/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1063
Epoch 1775/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1061
Epoch 1776/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1059
Epoch 1777/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1058
Epoch 1778/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1056
Epoch 1779/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1054
Epoch 1780/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1053
Epoch 1781/2000
1/1 [=====] - 0s 19ms/step - loss: 0.1051
```

```
Epoch 1782/2000
1/1 [=====] - 0s 25ms/step - loss: 0.1049
Epoch 1783/2000
1/1 [=====] - 0s 24ms/step - loss: 0.1047
Epoch 1784/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1046
Epoch 1785/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1044
Epoch 1786/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1042
Epoch 1787/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1041
Epoch 1788/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1039
Epoch 1789/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1037
Epoch 1790/2000
1/1 [=====] - 0s 75ms/step - loss: 0.1036
Epoch 1791/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1034
Epoch 1792/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1033
Epoch 1793/2000
1/1 [=====] - 0s 29ms/step - loss: 0.1031
Epoch 1794/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1029
Epoch 1795/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1028
Epoch 1796/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1026
Epoch 1797/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1024
Epoch 1798/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1023
Epoch 1799/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1021
Epoch 1800/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1019
Epoch 1801/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1018
Epoch 1802/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1016
Epoch 1803/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1015
Epoch 1804/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1013
Epoch 1805/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1011
Epoch 1806/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1010
Epoch 1807/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1008
Epoch 1808/2000
1/1 [=====] - 0s 24ms/step - loss: 0.1006
Epoch 1809/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1005
Epoch 1810/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1003
Epoch 1811/2000
1/1 [=====] - 0s 17ms/step - loss: 0.1002
Epoch 1812/2000
```

```
1/1 [=====] - 0s 13ms/step - loss: 0.1000
Epoch 1813/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0999
Epoch 1814/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0997
Epoch 1815/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0995
Epoch 1816/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0994
Epoch 1817/2000
1/1 [=====] - 0s 19ms/step - loss: 0.0992
Epoch 1818/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0991
Epoch 1819/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0989
Epoch 1820/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0987
Epoch 1821/2000
1/1 [=====] - 0s 20ms/step - loss: 0.0986
Epoch 1822/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0984
Epoch 1823/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0983
Epoch 1824/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0981
Epoch 1825/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0980
Epoch 1826/2000
1/1 [=====] - 0s 28ms/step - loss: 0.0978
Epoch 1827/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0977
Epoch 1828/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0975
Epoch 1829/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0973
Epoch 1830/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0972
Epoch 1831/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0970
Epoch 1832/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0969
Epoch 1833/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0967
Epoch 1834/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0966
Epoch 1835/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0964
Epoch 1836/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0963
Epoch 1837/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0961
Epoch 1838/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0960
Epoch 1839/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0958
Epoch 1840/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0957
Epoch 1841/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0955
Epoch 1842/2000
1/1 [=====] - 0s 19ms/step - loss: 0.0954
```

```
Epoch 1843/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0952
Epoch 1844/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0951
Epoch 1845/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0949
Epoch 1846/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0948
Epoch 1847/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0946
Epoch 1848/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0945
Epoch 1849/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0943
Epoch 1850/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0942
Epoch 1851/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0940
Epoch 1852/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0939
Epoch 1853/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0937
Epoch 1854/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0936
Epoch 1855/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0934
Epoch 1856/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0933
Epoch 1857/2000
1/1 [=====] - 0s 17ms/step - loss: 0.0931
Epoch 1858/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0930
Epoch 1859/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0928
Epoch 1860/2000
1/1 [=====] - 0s 16ms/step - loss: 0.0927
Epoch 1861/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0925
Epoch 1862/2000
1/1 [=====] - 0s 17ms/step - loss: 0.0924
Epoch 1863/2000
1/1 [=====] - 0s 72ms/step - loss: 0.0922
Epoch 1864/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0921
Epoch 1865/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0919
Epoch 1866/2000
1/1 [=====] - 0s 16ms/step - loss: 0.0918
Epoch 1867/2000
1/1 [=====] - 0s 26ms/step - loss: 0.0917
Epoch 1868/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0915
Epoch 1869/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0914
Epoch 1870/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0912
Epoch 1871/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0911
Epoch 1872/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0909
Epoch 1873/2000
```

```
1/1 [=====] - 0s 14ms/step - loss: 0.0908
Epoch 1874/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0906
Epoch 1875/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0905
Epoch 1876/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0904
Epoch 1877/2000
1/1 [=====] - 0s 41ms/step - loss: 0.0902
Epoch 1878/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0901
Epoch 1879/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0899
Epoch 1880/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0898
Epoch 1881/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0896
Epoch 1882/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0895
Epoch 1883/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0894
Epoch 1884/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0892
Epoch 1885/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0891
Epoch 1886/2000
1/1 [=====] - 0s 16ms/step - loss: 0.0889
Epoch 1887/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0888
Epoch 1888/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0887
Epoch 1889/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0885
Epoch 1890/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0884
Epoch 1891/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0882
Epoch 1892/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0881
Epoch 1893/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0880
Epoch 1894/2000
1/1 [=====] - 0s 16ms/step - loss: 0.0878
Epoch 1895/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0877
Epoch 1896/2000
1/1 [=====] - 0s 19ms/step - loss: 0.0875
Epoch 1897/2000
1/1 [=====] - 0s 23ms/step - loss: 0.0874
Epoch 1898/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0873
Epoch 1899/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0871
Epoch 1900/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0870
Epoch 1901/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0869
Epoch 1902/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0867
Epoch 1903/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0866
```

```
Epoch 1904/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0864
Epoch 1905/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0863
Epoch 1906/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0862
Epoch 1907/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0860
Epoch 1908/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0859
Epoch 1909/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0858
Epoch 1910/2000
1/1 [=====] - 0s 19ms/step - loss: 0.0856
Epoch 1911/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0855
Epoch 1912/2000
1/1 [=====] - 0s 16ms/step - loss: 0.0854
Epoch 1913/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0852
Epoch 1914/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0851
Epoch 1915/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0850
Epoch 1916/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0848
Epoch 1917/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0847
Epoch 1918/2000
1/1 [=====] - 0s 17ms/step - loss: 0.0846
Epoch 1919/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0844
Epoch 1920/2000
1/1 [=====] - 0s 17ms/step - loss: 0.0843
Epoch 1921/2000
1/1 [=====] - 0s 21ms/step - loss: 0.0842
Epoch 1922/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0840
Epoch 1923/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0839
Epoch 1924/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0838
Epoch 1925/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0836
Epoch 1926/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0835
Epoch 1927/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0834
Epoch 1928/2000
1/1 [=====] - 0s 18ms/step - loss: 0.0832
Epoch 1929/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0831
Epoch 1930/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0830
Epoch 1931/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0828
Epoch 1932/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0827
Epoch 1933/2000
1/1 [=====] - 0s 23ms/step - loss: 0.0826
Epoch 1934/2000
```

```
1/1 [=====] - 0s 8ms/step - loss: 0.0825
Epoch 1935/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0823
Epoch 1936/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0822
Epoch 1937/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0821
Epoch 1938/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0819
Epoch 1939/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0818
Epoch 1940/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0817
Epoch 1941/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0816
Epoch 1942/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0814
Epoch 1943/2000
1/1 [=====] - 0s 19ms/step - loss: 0.0813
Epoch 1944/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0812
Epoch 1945/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0810
Epoch 1946/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0809
Epoch 1947/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0808
Epoch 1948/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0807
Epoch 1949/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0805
Epoch 1950/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0804
Epoch 1951/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0803
Epoch 1952/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0801
Epoch 1953/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0800
Epoch 1954/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0799
Epoch 1955/2000
1/1 [=====] - 0s 16ms/step - loss: 0.0798
Epoch 1956/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0796
Epoch 1957/2000
1/1 [=====] - 0s 23ms/step - loss: 0.0795
Epoch 1958/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0794
Epoch 1959/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0793
Epoch 1960/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0791
Epoch 1961/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0790
Epoch 1962/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0789
Epoch 1963/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0788
Epoch 1964/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0786
```

Epoch 1965/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0785
Epoch 1966/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0784
Epoch 1967/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0783
Epoch 1968/2000
1/1 [=====] - 0s 20ms/step - loss: 0.0782
Epoch 1969/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0780
Epoch 1970/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0779
Epoch 1971/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0778
Epoch 1972/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0777
Epoch 1973/2000
1/1 [=====] - 0s 16ms/step - loss: 0.0775
Epoch 1974/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0774
Epoch 1975/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0773
Epoch 1976/2000
1/1 [=====] - 0s 20ms/step - loss: 0.0772
Epoch 1977/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0771
Epoch 1978/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0769
Epoch 1979/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0768
Epoch 1980/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0767
Epoch 1981/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0766
Epoch 1982/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0764
Epoch 1983/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0763
Epoch 1984/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0762
Epoch 1985/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0761
Epoch 1986/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0760
Epoch 1987/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0758
Epoch 1988/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0757
Epoch 1989/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0756
Epoch 1990/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0755
Epoch 1991/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0754
Epoch 1992/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0753
Epoch 1993/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0751
Epoch 1994/2000
1/1 [=====] - 0s 67ms/step - loss: 0.0750
Epoch 1995/2000


```

1/1 [=====] - 0s 9ms/step - loss: 0.0749
Epoch 1996/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0748
Epoch 1997/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0747
Epoch 1998/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0745
Epoch 1999/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0744
Epoch 2000/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0743
1/1 [=====] - 0s 162ms/step
SE PREDICE: [[6.1461363]] CUANDO EN REALIDAD LA RESPUESTA ES 6.25
1/1 [=====] - 0s 37ms/step
0.07419401408539272 ERROR CUADRATICO MEDIO, DEBERIA SER LO MAS CERCANO A
0 POSIBLE

```

SEIS UNIDADES POR CAPA OCULTA

```

In [ ]: import tensorflow as tf
import numpy as np
from tensorflow import keras
# Declare model inputs and outputs for training y = x^2
xs = np.array([-4.0, -3.0, -2.0, -1.0, 0.0, 1.0, 2.0, 3.0, 4.0], dtype=float)
ys = np.array([16, 9, 4, 1, 0, 1, 4, 9, 16], dtype=float)

# numero de unidades por capa
n_unidades = 6
# funcion de activacion sigmoid
funcion_activacion = 'sigmoid'

# Build a Sequential model
# 2 capa oculta
# 1 capa de salida con 1 neurona y funcion de activacion lineal
model = tf.keras.Sequential([
    keras.layers.Dense(units=n_unidades, input_shape=(1,)),
    keras.layers.Dense(units=n_unidades, activation=funcion_activacion),
    keras.layers.Dense(units=1, activation='linear')
])

#compile
model.compile(optimizer='sgd', loss='mean_squared_error')
#fit con epochs 2000
model.fit(xs, ys, epochs=2000)

#predict en x=2.5
print('SE PREDICE:', model.predict([2.5]), " CUANDO EN REALIDAD LA RESPUESTA ES 6.25")

# Error cuadratico medio
from sklearn.metrics import mean_squared_error
# calcular error cuadratico medio
print(mean_squared_error(ys, model.predict(xs)), " ERROR CUADRATICO MEDIO")

Epoch 1/2000
1/1 [=====] - 0s 485ms/step - loss: 65.6759
Epoch 2/2000
1/1 [=====] - 0s 23ms/step - loss: 62.3162

```

```
Epoch 3/2000
1/1 [=====] - 0s 36ms/step - loss: 59.2465
Epoch 4/2000
1/1 [=====] - 0s 9ms/step - loss: 56.4457
Epoch 5/2000
1/1 [=====] - 0s 13ms/step - loss: 53.8963
Epoch 6/2000
1/1 [=====] - 0s 8ms/step - loss: 51.5829
Epoch 7/2000
1/1 [=====] - 0s 7ms/step - loss: 49.4917
Epoch 8/2000
1/1 [=====] - 0s 8ms/step - loss: 47.6090
Epoch 9/2000
1/1 [=====] - 0s 6ms/step - loss: 45.9217
Epoch 10/2000
1/1 [=====] - 0s 6ms/step - loss: 44.4163
Epoch 11/2000
1/1 [=====] - 0s 7ms/step - loss: 43.0795
Epoch 12/2000
1/1 [=====] - 0s 7ms/step - loss: 41.8976
Epoch 13/2000
1/1 [=====] - 0s 9ms/step - loss: 40.8576
Epoch 14/2000
1/1 [=====] - 0s 13ms/step - loss: 39.9461
Epoch 15/2000
1/1 [=====] - 0s 9ms/step - loss: 39.1506
Epoch 16/2000
1/1 [=====] - 0s 85ms/step - loss: 38.4590
Epoch 17/2000
1/1 [=====] - 0s 8ms/step - loss: 37.8599
Epoch 18/2000
1/1 [=====] - 0s 7ms/step - loss: 37.3425
Epoch 19/2000
1/1 [=====] - 0s 7ms/step - loss: 36.8972
Epoch 20/2000
1/1 [=====] - 0s 8ms/step - loss: 36.5148
Epoch 21/2000
1/1 [=====] - 0s 9ms/step - loss: 36.1874
Epoch 22/2000
1/1 [=====] - 0s 8ms/step - loss: 35.9076
Epoch 23/2000
1/1 [=====] - 0s 10ms/step - loss: 35.6689
Epoch 24/2000
1/1 [=====] - 0s 8ms/step - loss: 35.4656
Epoch 25/2000
1/1 [=====] - 0s 7ms/step - loss: 35.2926
Epoch 26/2000
1/1 [=====] - 0s 7ms/step - loss: 35.1456
Epoch 27/2000
1/1 [=====] - 0s 7ms/step - loss: 35.0208
Epoch 28/2000
1/1 [=====] - 0s 8ms/step - loss: 34.9147
Epoch 29/2000
1/1 [=====] - 0s 11ms/step - loss: 34.8246
Epoch 30/2000
1/1 [=====] - 0s 6ms/step - loss: 34.7480
Epoch 31/2000
1/1 [=====] - 0s 6ms/step - loss: 34.6829
Epoch 32/2000
1/1 [=====] - 0s 7ms/step - loss: 34.6274
Epoch 33/2000
```

1/1 [=====] - 0s 7ms/step - loss: 34.5800
Epoch 34/2000
1/1 [=====] - 0s 6ms/step - loss: 34.5395
Epoch 35/2000
1/1 [=====] - 0s 6ms/step - loss: 34.5047
Epoch 36/2000
1/1 [=====] - 0s 7ms/step - loss: 34.4747
Epoch 37/2000
1/1 [=====] - 0s 5ms/step - loss: 34.4488
Epoch 38/2000
1/1 [=====] - 0s 5ms/step - loss: 34.4263
Epoch 39/2000
1/1 [=====] - 0s 6ms/step - loss: 34.4067
Epoch 40/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3894
Epoch 41/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3741
Epoch 42/2000
1/1 [=====] - 0s 8ms/step - loss: 34.3605
Epoch 43/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3484
Epoch 44/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3374
Epoch 45/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3274
Epoch 46/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3182
Epoch 47/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3098
Epoch 48/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3019
Epoch 49/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2945
Epoch 50/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2876
Epoch 51/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2810
Epoch 52/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2747
Epoch 53/2000
1/1 [=====] - 0s 13ms/step - loss: 34.2687
Epoch 54/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2629
Epoch 55/2000
1/1 [=====] - 0s 20ms/step - loss: 34.2573
Epoch 56/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2519
Epoch 57/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2466
Epoch 58/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2414
Epoch 59/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2364
Epoch 60/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2314
Epoch 61/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2265
Epoch 62/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2217
Epoch 63/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2170

Epoch 64/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2123
Epoch 65/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2077
Epoch 66/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2031
Epoch 67/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1985
Epoch 68/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1940
Epoch 69/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1896
Epoch 70/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1851
Epoch 71/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1807
Epoch 72/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1764
Epoch 73/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1720
Epoch 74/2000
1/1 [=====] - 0s 17ms/step - loss: 34.1677
Epoch 75/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1634
Epoch 76/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1591
Epoch 77/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1549
Epoch 78/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1506
Epoch 79/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1464
Epoch 80/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1422
Epoch 81/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1379
Epoch 82/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1338
Epoch 83/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1296
Epoch 84/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1254
Epoch 85/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1212
Epoch 86/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1171
Epoch 87/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1129
Epoch 88/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1088
Epoch 89/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1046
Epoch 90/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1005
Epoch 91/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0963
Epoch 92/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0922
Epoch 93/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0881
Epoch 94/2000

1/1 [=====] - 0s 5ms/step - loss: 34.0839
Epoch 95/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0798
Epoch 96/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0756
Epoch 97/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0715
Epoch 98/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0673
Epoch 99/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0632
Epoch 100/2000
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Epoch 101/2000
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Epoch 102/2000
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Epoch 103/2000
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Epoch 104/2000
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Epoch 105/2000
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Epoch 106/2000
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Epoch 107/2000
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Epoch 108/2000
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Epoch 109/2000
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Epoch 110/2000
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Epoch 111/2000
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Epoch 112/2000
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Epoch 113/2000
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Epoch 114/2000
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Epoch 115/2000
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Epoch 116/2000
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Epoch 117/2000
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Epoch 118/2000
1/1 [=====] - 0s 7ms/step - loss: 33.9823
Epoch 119/2000
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Epoch 120/2000
1/1 [=====] - 0s 6ms/step - loss: 33.9734
Epoch 121/2000
1/1 [=====] - 0s 7ms/step - loss: 33.9690
Epoch 122/2000
1/1 [=====] - 0s 7ms/step - loss: 33.9645
Epoch 123/2000
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Epoch 124/2000
1/1 [=====] - 0s 5ms/step - loss: 33.9555

Epoch 125/2000
1/1 [=====] - 0s 5ms/step - loss: 33.9510
Epoch 126/2000
1/1 [=====] - 0s 5ms/step - loss: 33.9465
Epoch 127/2000
1/1 [=====] - 0s 5ms/step - loss: 33.9419
Epoch 128/2000
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Epoch 129/2000
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Epoch 130/2000
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Epoch 131/2000
1/1 [=====] - 0s 6ms/step - loss: 33.9233
Epoch 132/2000
1/1 [=====] - 0s 5ms/step - loss: 33.9186
Epoch 133/2000
1/1 [=====] - 0s 6ms/step - loss: 33.9139
Epoch 134/2000
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Epoch 135/2000
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Epoch 136/2000
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Epoch 137/2000
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Epoch 138/2000
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Epoch 139/2000
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Epoch 140/2000
1/1 [=====] - 0s 5ms/step - loss: 33.8799
Epoch 141/2000
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Epoch 143/2000
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Epoch 144/2000
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Epoch 145/2000
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Epoch 146/2000
1/1 [=====] - 0s 5ms/step - loss: 33.8496
Epoch 147/2000
1/1 [=====] - 0s 6ms/step - loss: 33.8444
Epoch 148/2000
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Epoch 149/2000
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Epoch 150/2000
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Epoch 151/2000
1/1 [=====] - 0s 6ms/step - loss: 33.8233
Epoch 152/2000
1/1 [=====] - 0s 5ms/step - loss: 33.8179
Epoch 153/2000
1/1 [=====] - 0s 87ms/step - loss: 33.8125
Epoch 154/2000
1/1 [=====] - 0s 5ms/step - loss: 33.8071
Epoch 155/2000

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Epoch 156/2000
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Epoch 157/2000
1/1 [=====] - 0s 5ms/step - loss: 33.7905
Epoch 158/2000
1/1 [=====] - 0s 7ms/step - loss: 33.7849
Epoch 159/2000
1/1 [=====] - 0s 6ms/step - loss: 33.7792
Epoch 160/2000
1/1 [=====] - 0s 5ms/step - loss: 33.7735
Epoch 161/2000
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Epoch 162/2000
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Epoch 163/2000
1/1 [=====] - 0s 5ms/step - loss: 33.7561
Epoch 164/2000
1/1 [=====] - 0s 6ms/step - loss: 33.7503
Epoch 165/2000
1/1 [=====] - 0s 6ms/step - loss: 33.7443
Epoch 166/2000
1/1 [=====] - 0s 5ms/step - loss: 33.7383
Epoch 167/2000
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Epoch 168/2000
1/1 [=====] - 0s 6ms/step - loss: 33.7263
Epoch 169/2000
1/1 [=====] - 0s 6ms/step - loss: 33.7201
Epoch 170/2000
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Epoch 171/2000
1/1 [=====] - 0s 7ms/step - loss: 33.7077
Epoch 172/2000
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Epoch 173/2000
1/1 [=====] - 0s 8ms/step - loss: 33.6951
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1/1 [=====] - 0s 5ms/step - loss: 33.6888
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1/1 [=====] - 0s 7ms/step - loss: 33.6823
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Epoch 177/2000
1/1 [=====] - 0s 8ms/step - loss: 33.6693
Epoch 178/2000
1/1 [=====] - 0s 7ms/step - loss: 33.6627
Epoch 179/2000
1/1 [=====] - 0s 6ms/step - loss: 33.6561
Epoch 180/2000
1/1 [=====] - 0s 5ms/step - loss: 33.6494
Epoch 181/2000
1/1 [=====] - 0s 6ms/step - loss: 33.6426
Epoch 182/2000
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Epoch 183/2000
1/1 [=====] - 0s 9ms/step - loss: 33.6289
Epoch 184/2000
1/1 [=====] - 0s 9ms/step - loss: 33.6219
Epoch 185/2000
1/1 [=====] - 0s 10ms/step - loss: 33.6149
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Epoch 186/2000
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Epoch 188/2000
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Epoch 189/2000
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Epoch 190/2000
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Epoch 191/2000
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Epoch 192/2000
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Epoch 193/2000
1/1 [=====] - 0s 9ms/step - loss: 33.5566
Epoch 194/2000
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Epoch 195/2000
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Epoch 196/2000
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Epoch 197/2000
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Epoch 203/2000
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Epoch 204/2000
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Epoch 205/2000
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Epoch 206/2000
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Epoch 207/2000
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Epoch 208/2000
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Epoch 209/2000
1/1 [=====] - 0s 5ms/step - loss: 33.4265
Epoch 210/2000
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Epoch 211/2000
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Epoch 212/2000
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Epoch 213/2000
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Epoch 214/2000
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Epoch 215/2000
1/1 [=====] - 0s 5ms/step - loss: 33.3725
Epoch 216/2000
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Epoch 218/2000
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Epoch 219/2000
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Epoch 220/2000
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Epoch 223/2000
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Epoch 224/2000
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Epoch 225/2000
1/1 [=====] - 0s 5ms/step - loss: 33.2753
Epoch 226/2000
1/1 [=====] - 0s 16ms/step - loss: 33.2650
Epoch 227/2000
1/1 [=====] - 0s 6ms/step - loss: 33.2547
Epoch 228/2000
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Epoch 229/2000
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Epoch 230/2000
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Epoch 231/2000
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Epoch 232/2000
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Epoch 233/2000
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Epoch 234/2000
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Epoch 235/2000
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Epoch 236/2000
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Epoch 237/2000
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Epoch 238/2000
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Epoch 239/2000
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Epoch 240/2000
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Epoch 241/2000
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Epoch 243/2000
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Epoch 244/2000
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Epoch 245/2000
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Epoch 246/2000
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Epoch 247/2000
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Epoch 248/2000
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Epoch 249/2000
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Epoch 250/2000
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Epoch 251/2000
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Epoch 252/2000
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Epoch 253/2000
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Epoch 254/2000
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Epoch 256/2000
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Epoch 257/2000
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Epoch 258/2000
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Epoch 259/2000
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Epoch 260/2000
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Epoch 262/2000
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Epoch 263/2000
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Epoch 264/2000
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Epoch 265/2000
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Epoch 266/2000
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Epoch 267/2000
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Epoch 268/2000
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Epoch 269/2000
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Epoch 270/2000
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Epoch 271/2000
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Epoch 272/2000
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Epoch 273/2000
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Epoch 274/2000
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Epoch 275/2000
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Epoch 276/2000
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Epoch 277/2000

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Epoch 283/2000
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Epoch 284/2000
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Epoch 285/2000
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Epoch 286/2000
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Epoch 287/2000
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Epoch 289/2000
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Epoch 291/2000
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Epoch 293/2000
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Epoch 294/2000
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Epoch 295/2000
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Epoch 296/2000
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Epoch 297/2000
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Epoch 298/2000
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Epoch 299/2000
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Epoch 301/2000
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Epoch 302/2000
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Epoch 304/2000
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Epoch 305/2000
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Epoch 306/2000
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Epoch 307/2000
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Epoch 308/2000
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Epoch 309/2000
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Epoch 310/2000
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Epoch 313/2000
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Epoch 314/2000
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Epoch 322/2000
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Epoch 323/2000
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Epoch 324/2000
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Epoch 328/2000
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Epoch 329/2000
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Epoch 330/2000
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Epoch 331/2000
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Epoch 332/2000
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Epoch 333/2000
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Epoch 334/2000
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Epoch 337/2000
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Epoch 338/2000

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Epoch 339/2000
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Epoch 340/2000
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Epoch 341/2000
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Epoch 348/2000
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Epoch 354/2000
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Epoch 355/2000
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Epoch 366/2000
1/1 [=====] - 0s 6ms/step - loss: 29.8420
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Epoch 368/2000
1/1 [=====] - 0s 7ms/step - loss: 29.7405

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Epoch 370/2000
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Epoch 371/2000
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Epoch 372/2000
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Epoch 373/2000
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Epoch 374/2000
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Epoch 377/2000
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Epoch 378/2000
1/1 [=====] - 0s 6ms/step - loss: 29.1936
Epoch 379/2000
1/1 [=====] - 0s 7ms/step - loss: 29.1351
Epoch 380/2000
1/1 [=====] - 0s 8ms/step - loss: 29.0759
Epoch 381/2000
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Epoch 382/2000
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Epoch 383/2000
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Epoch 384/2000
1/1 [=====] - 0s 6ms/step - loss: 28.8319
Epoch 385/2000
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Epoch 386/2000
1/1 [=====] - 0s 6ms/step - loss: 28.7055
Epoch 387/2000
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Epoch 388/2000
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Epoch 389/2000
1/1 [=====] - 0s 9ms/step - loss: 28.5100
Epoch 390/2000
1/1 [=====] - 0s 9ms/step - loss: 28.4432
Epoch 391/2000
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Epoch 392/2000
1/1 [=====] - 0s 6ms/step - loss: 28.3073
Epoch 393/2000
1/1 [=====] - 0s 7ms/step - loss: 28.2382
Epoch 394/2000
1/1 [=====] - 0s 7ms/step - loss: 28.1682
Epoch 395/2000
1/1 [=====] - 0s 6ms/step - loss: 28.0974
Epoch 396/2000
1/1 [=====] - 0s 6ms/step - loss: 28.0258
Epoch 397/2000
1/1 [=====] - 0s 7ms/step - loss: 27.9533
Epoch 398/2000
1/1 [=====] - 0s 5ms/step - loss: 27.8800
Epoch 399/2000
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1/1 [=====] - 0s 6ms/step - loss: 27.8058
Epoch 400/2000
1/1 [=====] - 0s 5ms/step - loss: 27.7307
Epoch 401/2000
1/1 [=====] - 0s 6ms/step - loss: 27.6548
Epoch 402/2000
1/1 [=====] - 0s 7ms/step - loss: 27.5781
Epoch 403/2000
1/1 [=====] - 0s 5ms/step - loss: 27.5004
Epoch 404/2000
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Epoch 405/2000
1/1 [=====] - 0s 9ms/step - loss: 27.3424
Epoch 406/2000
1/1 [=====] - 0s 5ms/step - loss: 27.2620
Epoch 407/2000
1/1 [=====] - 0s 7ms/step - loss: 27.1808
Epoch 408/2000
1/1 [=====] - 0s 6ms/step - loss: 27.0986
Epoch 409/2000
1/1 [=====] - 0s 6ms/step - loss: 27.0156
Epoch 410/2000
1/1 [=====] - 0s 6ms/step - loss: 26.9316
Epoch 411/2000
1/1 [=====] - 0s 8ms/step - loss: 26.8466
Epoch 412/2000
1/1 [=====] - 0s 6ms/step - loss: 26.7608
Epoch 413/2000
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Epoch 414/2000
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Epoch 415/2000
1/1 [=====] - 0s 7ms/step - loss: 26.4976
Epoch 416/2000
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Epoch 417/2000
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Epoch 418/2000
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Epoch 419/2000
1/1 [=====] - 0s 6ms/step - loss: 26.1334
Epoch 420/2000
1/1 [=====] - 0s 5ms/step - loss: 26.0400
Epoch 421/2000
1/1 [=====] - 0s 7ms/step - loss: 25.9456
Epoch 422/2000
1/1 [=====] - 0s 6ms/step - loss: 25.8502
Epoch 423/2000
1/1 [=====] - 0s 5ms/step - loss: 25.7539
Epoch 424/2000
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Epoch 425/2000
1/1 [=====] - 0s 8ms/step - loss: 25.5583
Epoch 426/2000
1/1 [=====] - 0s 6ms/step - loss: 25.4591
Epoch 427/2000
1/1 [=====] - 0s 7ms/step - loss: 25.3589
Epoch 428/2000
1/1 [=====] - 0s 6ms/step - loss: 25.2577
Epoch 429/2000
1/1 [=====] - 0s 7ms/step - loss: 25.1556

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Epoch 430/2000
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Epoch 431/2000
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Epoch 432/2000
1/1 [=====] - 0s 5ms/step - loss: 24.8433
Epoch 433/2000
1/1 [=====] - 0s 6ms/step - loss: 24.7373
Epoch 434/2000
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Epoch 435/2000
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Epoch 436/2000
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Epoch 437/2000
1/1 [=====] - 0s 83ms/step - loss: 24.3036
Epoch 438/2000
1/1 [=====] - 0s 5ms/step - loss: 24.1928
Epoch 439/2000
1/1 [=====] - 0s 14ms/step - loss: 24.0810
Epoch 440/2000
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Epoch 443/2000
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Epoch 444/2000
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Epoch 445/2000
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Epoch 446/2000
1/1 [=====] - 0s 6ms/step - loss: 23.2726
Epoch 447/2000
1/1 [=====] - 0s 6ms/step - loss: 23.1535
Epoch 448/2000
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Epoch 449/2000
1/1 [=====] - 0s 7ms/step - loss: 22.9126
Epoch 450/2000
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Epoch 451/2000
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Epoch 452/2000
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Epoch 453/2000
1/1 [=====] - 0s 5ms/step - loss: 22.4204
Epoch 454/2000
1/1 [=====] - 0s 5ms/step - loss: 22.2952
Epoch 455/2000
1/1 [=====] - 0s 8ms/step - loss: 22.1693
Epoch 456/2000
1/1 [=====] - 0s 6ms/step - loss: 22.0425
Epoch 457/2000
1/1 [=====] - 0s 9ms/step - loss: 21.9149
Epoch 458/2000
1/1 [=====] - 0s 5ms/step - loss: 21.7866
Epoch 459/2000
1/1 [=====] - 0s 7ms/step - loss: 21.6575
Epoch 460/2000
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Epoch 461/2000
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Epoch 462/2000
1/1 [=====] - 0s 6ms/step - loss: 21.2657
Epoch 463/2000
1/1 [=====] - 0s 5ms/step - loss: 21.1336
Epoch 464/2000
1/1 [=====] - 0s 8ms/step - loss: 21.0009
Epoch 465/2000
1/1 [=====] - 0s 5ms/step - loss: 20.8675
Epoch 466/2000
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Epoch 467/2000
1/1 [=====] - 0s 6ms/step - loss: 20.5988
Epoch 468/2000
1/1 [=====] - 0s 8ms/step - loss: 20.4635
Epoch 469/2000
1/1 [=====] - 0s 7ms/step - loss: 20.3275
Epoch 470/2000
1/1 [=====] - 0s 7ms/step - loss: 20.1910
Epoch 471/2000
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Epoch 472/2000
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Epoch 473/2000
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Epoch 474/2000
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Epoch 475/2000
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Epoch 476/2000
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Epoch 477/2000
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Epoch 478/2000
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Epoch 479/2000
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Epoch 480/2000
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Epoch 481/2000
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Epoch 483/2000
1/1 [=====] - 0s 7ms/step - loss: 18.3717
Epoch 484/2000
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Epoch 485/2000
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Epoch 487/2000
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Epoch 488/2000
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Epoch 489/2000
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Epoch 490/2000
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Epoch 497/2000
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Epoch 504/2000
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Epoch 505/2000
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Epoch 506/2000
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Epoch 508/2000
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Epoch 510/2000
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Epoch 511/2000
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Epoch 516/2000
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Epoch 517/2000
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Epoch 518/2000
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Epoch 519/2000
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Epoch 520/2000
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Epoch 521/2000

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Epoch 522/2000
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Epoch 523/2000
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Epoch 524/2000
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Epoch 533/2000
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Epoch 534/2000
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Epoch 535/2000
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Epoch 537/2000
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Epoch 541/2000
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Epoch 543/2000
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Epoch 544/2000
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Epoch 549/2000
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Epoch 550/2000
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Epoch 551/2000
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Epoch 555/2000
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Epoch 556/2000
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Epoch 557/2000
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Epoch 558/2000
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Epoch 559/2000
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Epoch 560/2000
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Epoch 561/2000
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Epoch 563/2000
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Epoch 565/2000
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Epoch 568/2000
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Epoch 569/2000
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Epoch 572/2000
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Epoch 574/2000
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Epoch 575/2000
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Epoch 576/2000
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Epoch 577/2000
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Epoch 580/2000
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Epoch 581/2000
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Epoch 582/2000

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Epoch 584/2000
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Epoch 585/2000
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Epoch 586/2000
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Epoch 587/2000
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Epoch 588/2000
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Epoch 593/2000
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Epoch 595/2000
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Epoch 612/2000
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Epoch 613/2000
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Epoch 617/2000
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Epoch 618/2000
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Epoch 622/2000
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Epoch 623/2000
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Epoch 625/2000
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Epoch 626/2000
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Epoch 627/2000
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Epoch 628/2000
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Epoch 629/2000
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Epoch 635/2000
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Epoch 638/2000
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Epoch 639/2000
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Epoch 642/2000
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Epoch 643/2000

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Epoch 644/2000
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Epoch 645/2000
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Epoch 646/2000
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Epoch 647/2000
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Epoch 648/2000
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Epoch 652/2000
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Epoch 653/2000
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Epoch 654/2000
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Epoch 655/2000
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Epoch 656/2000
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Epoch 657/2000
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Epoch 658/2000
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Epoch 659/2000
1/1 [=====] - 0s 7ms/step - loss: 2.2040
Epoch 660/2000
1/1 [=====] - 0s 6ms/step - loss: 2.1763
Epoch 661/2000
1/1 [=====] - 0s 6ms/step - loss: 2.1489
Epoch 662/2000
1/1 [=====] - 0s 6ms/step - loss: 2.1220
Epoch 663/2000
1/1 [=====] - 0s 6ms/step - loss: 2.0955
Epoch 664/2000
1/1 [=====] - 0s 6ms/step - loss: 2.0694
Epoch 665/2000
1/1 [=====] - 0s 7ms/step - loss: 2.0436
Epoch 666/2000
1/1 [=====] - 0s 6ms/step - loss: 2.0183
Epoch 667/2000
1/1 [=====] - 0s 6ms/step - loss: 1.9933
Epoch 668/2000
1/1 [=====] - 0s 5ms/step - loss: 1.9687
Epoch 669/2000
1/1 [=====] - 0s 6ms/step - loss: 1.9444
Epoch 670/2000
1/1 [=====] - 0s 7ms/step - loss: 1.9206
Epoch 671/2000
1/1 [=====] - 0s 9ms/step - loss: 1.8970
Epoch 672/2000
1/1 [=====] - 0s 6ms/step - loss: 1.8739
Epoch 673/2000
1/1 [=====] - 0s 5ms/step - loss: 1.8510

Epoch 674/2000
1/1 [=====] - 0s 5ms/step - loss: 1.8286
Epoch 675/2000
1/1 [=====] - 0s 6ms/step - loss: 1.8064
Epoch 676/2000
1/1 [=====] - 0s 5ms/step - loss: 1.7846
Epoch 677/2000
1/1 [=====] - 0s 6ms/step - loss: 1.7631
Epoch 678/2000
1/1 [=====] - 0s 8ms/step - loss: 1.7419
Epoch 679/2000
1/1 [=====] - 0s 6ms/step - loss: 1.7211
Epoch 680/2000
1/1 [=====] - 0s 16ms/step - loss: 1.7005
Epoch 681/2000
1/1 [=====] - 0s 66ms/step - loss: 1.6803
Epoch 682/2000
1/1 [=====] - 0s 6ms/step - loss: 1.6603
Epoch 683/2000
1/1 [=====] - 0s 7ms/step - loss: 1.6407
Epoch 684/2000
1/1 [=====] - 0s 21ms/step - loss: 1.6213
Epoch 685/2000
1/1 [=====] - 0s 5ms/step - loss: 1.6022
Epoch 686/2000
1/1 [=====] - 0s 9ms/step - loss: 1.5834
Epoch 687/2000
1/1 [=====] - 0s 5ms/step - loss: 1.5649
Epoch 688/2000
1/1 [=====] - 0s 6ms/step - loss: 1.5467
Epoch 689/2000
1/1 [=====] - 0s 6ms/step - loss: 1.5287
Epoch 690/2000
1/1 [=====] - 0s 8ms/step - loss: 1.5110
Epoch 691/2000
1/1 [=====] - 0s 6ms/step - loss: 1.4936
Epoch 692/2000
1/1 [=====] - 0s 7ms/step - loss: 1.4764
Epoch 693/2000
1/1 [=====] - 0s 6ms/step - loss: 1.4595
Epoch 694/2000
1/1 [=====] - 0s 6ms/step - loss: 1.4428
Epoch 695/2000
1/1 [=====] - 0s 6ms/step - loss: 1.4264
Epoch 696/2000
1/1 [=====] - 0s 6ms/step - loss: 1.4102
Epoch 697/2000
1/1 [=====] - 0s 7ms/step - loss: 1.3942
Epoch 698/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3785
Epoch 699/2000
1/1 [=====] - 0s 5ms/step - loss: 1.3630
Epoch 700/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3477
Epoch 701/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3327
Epoch 702/2000
1/1 [=====] - 0s 5ms/step - loss: 1.3179
Epoch 703/2000
1/1 [=====] - 0s 7ms/step - loss: 1.3033
Epoch 704/2000

1/1 [=====] - 0s 6ms/step - loss: 1.2889
Epoch 705/2000
1/1 [=====] - 0s 8ms/step - loss: 1.2747
Epoch 706/2000
1/1 [=====] - 0s 9ms/step - loss: 1.2607
Epoch 707/2000
1/1 [=====] - 0s 8ms/step - loss: 1.2469
Epoch 708/2000
1/1 [=====] - 0s 15ms/step - loss: 1.2334
Epoch 709/2000
1/1 [=====] - 0s 8ms/step - loss: 1.2200
Epoch 710/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2068
Epoch 711/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1938
Epoch 712/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1810
Epoch 713/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1684
Epoch 714/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1559
Epoch 715/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1437
Epoch 716/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1316
Epoch 717/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1197
Epoch 718/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1079
Epoch 719/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0963
Epoch 720/2000
1/1 [=====] - 0s 9ms/step - loss: 1.0849
Epoch 721/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0737
Epoch 722/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0626
Epoch 723/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0517
Epoch 724/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0409
Epoch 725/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0303
Epoch 726/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0198
Epoch 727/2000
1/1 [=====] - 0s 4ms/step - loss: 1.0095
Epoch 728/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9993
Epoch 729/2000
1/1 [=====] - 0s 10ms/step - loss: 0.9893
Epoch 730/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9794
Epoch 731/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9696
Epoch 732/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9600
Epoch 733/2000
1/1 [=====] - 0s 16ms/step - loss: 0.9505
Epoch 734/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9412

```
Epoch 735/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9320
Epoch 736/2000
1/1 [=====] - 0s 9ms/step - loss: 0.9229
Epoch 737/2000
1/1 [=====] - 0s 8ms/step - loss: 0.9139
Epoch 738/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9051
Epoch 739/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8964
Epoch 740/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8878
Epoch 741/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8793
Epoch 742/2000
1/1 [=====] - 0s 10ms/step - loss: 0.8709
Epoch 743/2000
1/1 [=====] - 0s 8ms/step - loss: 0.8627
Epoch 744/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8545
Epoch 745/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8465
Epoch 746/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8386
Epoch 747/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8308
Epoch 748/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8231
Epoch 749/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8155
Epoch 750/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8081
Epoch 751/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8007
Epoch 752/2000
1/1 [=====] - 0s 65ms/step - loss: 0.7934
Epoch 753/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7862
Epoch 754/2000
1/1 [=====] - 0s 9ms/step - loss: 0.7791
Epoch 755/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7721
Epoch 756/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7652
Epoch 757/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7584
Epoch 758/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7517
Epoch 759/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7451
Epoch 760/2000
1/1 [=====] - 0s 10ms/step - loss: 0.7386
Epoch 761/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7321
Epoch 762/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7258
Epoch 763/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7195
Epoch 764/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7133
Epoch 765/2000
```

1/1 [=====] - 0s 5ms/step - loss: 0.7072
Epoch 766/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7012
Epoch 767/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6952
Epoch 768/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6894
Epoch 769/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6836
Epoch 770/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6779
Epoch 771/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6722
Epoch 772/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6667
Epoch 773/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6612
Epoch 774/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6557
Epoch 775/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6504
Epoch 776/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6451
Epoch 777/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6399
Epoch 778/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6348
Epoch 779/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6297
Epoch 780/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6247
Epoch 781/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6197
Epoch 782/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6148
Epoch 783/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6100
Epoch 784/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6053
Epoch 785/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6006
Epoch 786/2000
1/1 [=====] - 0s 19ms/step - loss: 0.5959
Epoch 787/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5914
Epoch 788/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5868
Epoch 789/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5824
Epoch 790/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5780
Epoch 791/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5736
Epoch 792/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5693
Epoch 793/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5651
Epoch 794/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5609
Epoch 795/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5568

Epoch 796/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5527
Epoch 797/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5487
Epoch 798/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5447
Epoch 799/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5407
Epoch 800/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5369
Epoch 801/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5330
Epoch 802/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5292
Epoch 803/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5255
Epoch 804/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5218
Epoch 805/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5182
Epoch 806/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5146
Epoch 807/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5110
Epoch 808/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5075
Epoch 809/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5040
Epoch 810/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5006
Epoch 811/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4972
Epoch 812/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4939
Epoch 813/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4905
Epoch 814/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4873
Epoch 815/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4841
Epoch 816/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4809
Epoch 817/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4777
Epoch 818/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4746
Epoch 819/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4715
Epoch 820/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4685
Epoch 821/2000
1/1 [=====] - 0s 17ms/step - loss: 0.4655
Epoch 822/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4625
Epoch 823/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4596
Epoch 824/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4567
Epoch 825/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4538
Epoch 826/2000

```
1/1 [=====] - 0s 5ms/step - loss: 0.4510
Epoch 827/2000
1/1 [=====] - 0s 61ms/step - loss: 0.4482
Epoch 828/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4455
Epoch 829/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4427
Epoch 830/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4400
Epoch 831/2000
1/1 [=====] - 0s 22ms/step - loss: 0.4374
Epoch 832/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4347
Epoch 833/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4321
Epoch 834/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4296
Epoch 835/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4270
Epoch 836/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4245
Epoch 837/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4220
Epoch 838/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4196
Epoch 839/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4171
Epoch 840/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4147
Epoch 841/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4123
Epoch 842/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4100
Epoch 843/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4077
Epoch 844/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4054
Epoch 845/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4031
Epoch 846/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4009
Epoch 847/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3987
Epoch 848/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3965
Epoch 849/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3943
Epoch 850/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3922
Epoch 851/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3900
Epoch 852/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3879
Epoch 853/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3859
Epoch 854/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3838
Epoch 855/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3818
Epoch 856/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3798
```

Epoch 857/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3778
Epoch 858/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3758
Epoch 859/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3739
Epoch 860/2000
1/1 [=====] - 0s 19ms/step - loss: 0.3720
Epoch 861/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3701
Epoch 862/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3682
Epoch 863/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3664
Epoch 864/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3645
Epoch 865/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3627
Epoch 866/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3609
Epoch 867/2000
1/1 [=====] - 0s 71ms/step - loss: 0.3591
Epoch 868/2000
1/1 [=====] - 0s 11ms/step - loss: 0.3574
Epoch 869/2000
1/1 [=====] - 0s 11ms/step - loss: 0.3556
Epoch 870/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3539
Epoch 871/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3522
Epoch 872/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3505
Epoch 873/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3489
Epoch 874/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3472
Epoch 875/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3456
Epoch 876/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3440
Epoch 877/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3424
Epoch 878/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3408
Epoch 879/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3392
Epoch 880/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3377
Epoch 881/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3361
Epoch 882/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3346
Epoch 883/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3331
Epoch 884/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3316
Epoch 885/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3302
Epoch 886/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3287
Epoch 887/2000

```
1/1 [=====] - 0s 6ms/step - loss: 0.3273
Epoch 888/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3258
Epoch 889/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3244
Epoch 890/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3230
Epoch 891/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3216
Epoch 892/2000
1/1 [=====] - 0s 20ms/step - loss: 0.3203
Epoch 893/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3189
Epoch 894/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3176
Epoch 895/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3162
Epoch 896/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3149
Epoch 897/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3136
Epoch 898/2000
1/1 [=====] - 0s 11ms/step - loss: 0.3123
Epoch 899/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3111
Epoch 900/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3098
Epoch 901/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3085
Epoch 902/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3073
Epoch 903/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3061
Epoch 904/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3049
Epoch 905/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3037
Epoch 906/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3025
Epoch 907/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3013
Epoch 908/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3001
Epoch 909/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2990
Epoch 910/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2978
Epoch 911/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2967
Epoch 912/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2955
Epoch 913/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2944
Epoch 914/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2933
Epoch 915/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2922
Epoch 916/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2911
Epoch 917/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2901
```

```
Epoch 918/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2890
Epoch 919/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2880
Epoch 920/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2869
Epoch 921/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2859
Epoch 922/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2849
Epoch 923/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2838
Epoch 924/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2828
Epoch 925/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2818
Epoch 926/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2809
Epoch 927/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2799
Epoch 928/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2789
Epoch 929/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2779
Epoch 930/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2770
Epoch 931/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2760
Epoch 932/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2751
Epoch 933/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2742
Epoch 934/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2733
Epoch 935/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2724
Epoch 936/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2715
Epoch 937/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2706
Epoch 938/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2697
Epoch 939/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2688
Epoch 940/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2679
Epoch 941/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2671
Epoch 942/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2662
Epoch 943/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2654
Epoch 944/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2645
Epoch 945/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2637
Epoch 946/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2629
Epoch 947/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2620
Epoch 948/2000
```



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1/1 [=====] - 0s 6ms/step - loss: 0.2612
Epoch 949/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2604
Epoch 950/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2596
Epoch 951/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2588
Epoch 952/2000
1/1 [=====] - 0s 25ms/step - loss: 0.2580
Epoch 953/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2573
Epoch 954/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2565
Epoch 955/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2557
Epoch 956/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2550
Epoch 957/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2542
Epoch 958/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2535
Epoch 959/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2527
Epoch 960/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2520
Epoch 961/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2513
Epoch 962/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2506
Epoch 963/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2498
Epoch 964/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2491
Epoch 965/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2484
Epoch 966/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2477
Epoch 967/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2470
Epoch 968/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2463
Epoch 969/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2457
Epoch 970/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2450
Epoch 971/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2443
Epoch 972/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2436
Epoch 973/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2430
Epoch 974/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2423
Epoch 975/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2417
Epoch 976/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2410
Epoch 977/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2404
Epoch 978/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2398
```

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Epoch 979/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2391
Epoch 980/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2385
Epoch 981/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2379
Epoch 982/2000
1/1 [=====] - 0s 23ms/step - loss: 0.2373
Epoch 983/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2367
Epoch 984/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2360
Epoch 985/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2354
Epoch 986/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2348
Epoch 987/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2343
Epoch 988/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2337
Epoch 989/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2331
Epoch 990/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2325
Epoch 991/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2319
Epoch 992/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2314
Epoch 993/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2308
Epoch 994/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2302
Epoch 995/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2297
Epoch 996/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2291
Epoch 997/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2286
Epoch 998/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2280
Epoch 999/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2275
Epoch 1000/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2269
Epoch 1001/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2264
Epoch 1002/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2259
Epoch 1003/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2254
Epoch 1004/2000
1/1 [=====] - 0s 14ms/step - loss: 0.2248
Epoch 1005/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2243
Epoch 1006/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2238
Epoch 1007/2000
1/1 [=====] - 0s 78ms/step - loss: 0.2233
Epoch 1008/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2228
Epoch 1009/2000
```

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1/1 [=====] - 0s 6ms/step - loss: 0.2223
Epoch 1010/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2218
Epoch 1011/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2213
Epoch 1012/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2208
Epoch 1013/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2203
Epoch 1014/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2198
Epoch 1015/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2193
Epoch 1016/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2188
Epoch 1017/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2184
Epoch 1018/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2179
Epoch 1019/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2174
Epoch 1020/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2170
Epoch 1021/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2165
Epoch 1022/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2160
Epoch 1023/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2156
Epoch 1024/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2151
Epoch 1025/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2147
Epoch 1026/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2142
Epoch 1027/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2138
Epoch 1028/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2133
Epoch 1029/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2129
Epoch 1030/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2125
Epoch 1031/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2120
Epoch 1032/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2116
Epoch 1033/2000
1/1 [=====] - 0s 62ms/step - loss: 0.2112
Epoch 1034/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2107
Epoch 1035/2000
1/1 [=====] - 0s 15ms/step - loss: 0.2103
Epoch 1036/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2099
Epoch 1037/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2095
Epoch 1038/2000
1/1 [=====] - 0s 14ms/step - loss: 0.2091
Epoch 1039/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2087
```

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Epoch 1040/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2082
Epoch 1041/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2078
Epoch 1042/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2074
Epoch 1043/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2070
Epoch 1044/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2066
Epoch 1045/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2062
Epoch 1046/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2058
Epoch 1047/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2055
Epoch 1048/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2051
Epoch 1049/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2047
Epoch 1050/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2043
Epoch 1051/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2039
Epoch 1052/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2035
Epoch 1053/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2032
Epoch 1054/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2028
Epoch 1055/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2024
Epoch 1056/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2020
Epoch 1057/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2017
Epoch 1058/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2013
Epoch 1059/2000
1/1 [=====] - 0s 17ms/step - loss: 0.2009
Epoch 1060/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2006
Epoch 1061/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2002
Epoch 1062/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1999
Epoch 1063/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1995
Epoch 1064/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1992
Epoch 1065/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1988
Epoch 1066/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1985
Epoch 1067/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1981
Epoch 1068/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1978
Epoch 1069/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1974
Epoch 1070/2000
```

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1/1 [=====] - 0s 5ms/step - loss: 0.1971
Epoch 1071/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1967
Epoch 1072/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1964
Epoch 1073/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1961
Epoch 1074/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1957
Epoch 1075/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1954
Epoch 1076/2000
1/1 [=====] - 0s 80ms/step - loss: 0.1951
Epoch 1077/2000
1/1 [=====] - 0s 23ms/step - loss: 0.1948
Epoch 1078/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1944
Epoch 1079/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1941
Epoch 1080/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1938
Epoch 1081/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1935
Epoch 1082/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1932
Epoch 1083/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1928
Epoch 1084/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1925
Epoch 1085/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1922
Epoch 1086/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1919
Epoch 1087/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1916
Epoch 1088/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1913
Epoch 1089/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1910
Epoch 1090/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1907
Epoch 1091/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1904
Epoch 1092/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1901
Epoch 1093/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1898
Epoch 1094/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1895
Epoch 1095/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1892
Epoch 1096/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1889
Epoch 1097/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1886
Epoch 1098/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1883
Epoch 1099/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1880
Epoch 1100/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1877
```

```
Epoch 1101/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1874
Epoch 1102/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1871
Epoch 1103/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1869
Epoch 1104/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1866
Epoch 1105/2000
1/1 [=====] - 0s 78ms/step - loss: 0.1863
Epoch 1106/2000
1/1 [=====] - 0s 28ms/step - loss: 0.1860
Epoch 1107/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1857
Epoch 1108/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1855
Epoch 1109/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1852
Epoch 1110/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1849
Epoch 1111/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1846
Epoch 1112/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1844
Epoch 1113/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1841
Epoch 1114/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1838
Epoch 1115/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1836
Epoch 1116/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1833
Epoch 1117/2000
1/1 [=====] - 0s 17ms/step - loss: 0.1830
Epoch 1118/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1828
Epoch 1119/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1825
Epoch 1120/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1822
Epoch 1121/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1820
Epoch 1122/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1817
Epoch 1123/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1815
Epoch 1124/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1812
Epoch 1125/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1810
Epoch 1126/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1807
Epoch 1127/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1804
Epoch 1128/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1802
Epoch 1129/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1799
Epoch 1130/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1797
Epoch 1131/2000
```

```
1/1 [=====] - 0s 6ms/step - loss: 0.1794
Epoch 1132/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1792
Epoch 1133/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1790
Epoch 1134/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1787
Epoch 1135/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1785
Epoch 1136/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1782
Epoch 1137/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1780
Epoch 1138/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1777
Epoch 1139/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1775
Epoch 1140/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1773
Epoch 1141/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1770
Epoch 1142/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1768
Epoch 1143/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1766
Epoch 1144/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1763
Epoch 1145/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1761
Epoch 1146/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1759
Epoch 1147/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1756
Epoch 1148/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1754
Epoch 1149/2000
1/1 [=====] - 0s 23ms/step - loss: 0.1752
Epoch 1150/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1749
Epoch 1151/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1747
Epoch 1152/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1745
Epoch 1153/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1743
Epoch 1154/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1740
Epoch 1155/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1738
Epoch 1156/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1736
Epoch 1157/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1734
Epoch 1158/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1732
Epoch 1159/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1729
Epoch 1160/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1727
Epoch 1161/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1725
```

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Epoch 1162/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1723
Epoch 1163/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1721
Epoch 1164/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1719
Epoch 1165/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1716
Epoch 1166/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1714
Epoch 1167/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1712
Epoch 1168/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1710
Epoch 1169/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1708
Epoch 1170/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1706
Epoch 1171/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1704
Epoch 1172/2000
1/1 [=====] - 0s 17ms/step - loss: 0.1702
Epoch 1173/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1700
Epoch 1174/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1698
Epoch 1175/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1695
Epoch 1176/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1693
Epoch 1177/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1691
Epoch 1178/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1689
Epoch 1179/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1687
Epoch 1180/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1685
Epoch 1181/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1683
Epoch 1182/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1681
Epoch 1183/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1679
Epoch 1184/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1677
Epoch 1185/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1675
Epoch 1186/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1673
Epoch 1187/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1671
Epoch 1188/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1669
Epoch 1189/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1668
Epoch 1190/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1666
Epoch 1191/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1664
Epoch 1192/2000
```



```
1/1 [=====] - 0s 5ms/step - loss: 0.1662
Epoch 1193/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1660
Epoch 1194/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1658
Epoch 1195/2000
1/1 [=====] - 0s 20ms/step - loss: 0.1656
Epoch 1196/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1654
Epoch 1197/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1652
Epoch 1198/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1650
Epoch 1199/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1648
Epoch 1200/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1647
Epoch 1201/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1645
Epoch 1202/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1643
Epoch 1203/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1641
Epoch 1204/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1639
Epoch 1205/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1637
Epoch 1206/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1635
Epoch 1207/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1634
Epoch 1208/2000
1/1 [=====] - 0s 30ms/step - loss: 0.1632
Epoch 1209/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1630
Epoch 1210/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1628
Epoch 1211/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1626
Epoch 1212/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1625
Epoch 1213/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1623
Epoch 1214/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1621
Epoch 1215/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1619
Epoch 1216/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1617
Epoch 1217/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1616
Epoch 1218/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1614
Epoch 1219/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1612
Epoch 1220/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1610
Epoch 1221/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1609
Epoch 1222/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1607
```

```
Epoch 1223/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1605
Epoch 1224/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1603
Epoch 1225/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1602
Epoch 1226/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1600
Epoch 1227/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1598
Epoch 1228/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1596
Epoch 1229/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1595
Epoch 1230/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1593
Epoch 1231/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1591
Epoch 1232/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1590
Epoch 1233/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1588
Epoch 1234/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1586
Epoch 1235/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1585
Epoch 1236/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1583
Epoch 1237/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1581
Epoch 1238/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1580
Epoch 1239/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1578
Epoch 1240/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1576
Epoch 1241/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1575
Epoch 1242/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1573
Epoch 1243/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1571
Epoch 1244/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1570
Epoch 1245/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1568
Epoch 1246/2000
1/1 [=====] - 0s 19ms/step - loss: 0.1567
Epoch 1247/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1565
Epoch 1248/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1563
Epoch 1249/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1562
Epoch 1250/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1560
Epoch 1251/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1559
Epoch 1252/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1557
Epoch 1253/2000
```

```
1/1 [=====] - 0s 7ms/step - loss: 0.1555
Epoch 1254/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1554
Epoch 1255/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1552
Epoch 1256/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1551
Epoch 1257/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1549
Epoch 1258/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1547
Epoch 1259/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1546
Epoch 1260/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1544
Epoch 1261/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1543
Epoch 1262/2000
1/1 [=====] - 0s 58ms/step - loss: 0.1541
Epoch 1263/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1540
Epoch 1264/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1538
Epoch 1265/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1537
Epoch 1266/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1535
Epoch 1267/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1534
Epoch 1268/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1532
Epoch 1269/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1531
Epoch 1270/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1529
Epoch 1271/2000
1/1 [=====] - 0s 19ms/step - loss: 0.1527
Epoch 1272/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1526
Epoch 1273/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1524
Epoch 1274/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1523
Epoch 1275/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1521
Epoch 1276/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1520
Epoch 1277/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1519
Epoch 1278/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1517
Epoch 1279/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1516
Epoch 1280/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1514
Epoch 1281/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1513
Epoch 1282/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1511
Epoch 1283/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1510
```

Epoch 1284/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1508
Epoch 1285/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1507
Epoch 1286/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1505
Epoch 1287/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1504
Epoch 1288/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1502
Epoch 1289/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1501
Epoch 1290/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1499
Epoch 1291/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1498
Epoch 1292/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1497
Epoch 1293/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1495
Epoch 1294/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1494
Epoch 1295/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1492
Epoch 1296/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1491
Epoch 1297/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1490
Epoch 1298/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1488
Epoch 1299/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1487
Epoch 1300/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1485
Epoch 1301/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1484
Epoch 1302/2000
1/1 [=====] - 0s 18ms/step - loss: 0.1482
Epoch 1303/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1481
Epoch 1304/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1480
Epoch 1305/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1478
Epoch 1306/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1477
Epoch 1307/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1476
Epoch 1308/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1474
Epoch 1309/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1473
Epoch 1310/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1471
Epoch 1311/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1470
Epoch 1312/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1469
Epoch 1313/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1467
Epoch 1314/2000

1/1 [=====] - 0s 7ms/step - loss: 0.1466
Epoch 1315/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1465
Epoch 1316/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1463
Epoch 1317/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1462
Epoch 1318/2000
1/1 [=====] - 0s 23ms/step - loss: 0.1460
Epoch 1319/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1459
Epoch 1320/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1458
Epoch 1321/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1456
Epoch 1322/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1455
Epoch 1323/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1454
Epoch 1324/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1452
Epoch 1325/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1451
Epoch 1326/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1450
Epoch 1327/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1448
Epoch 1328/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1447
Epoch 1329/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1446
Epoch 1330/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1445
Epoch 1331/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1443
Epoch 1332/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1442
Epoch 1333/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1441
Epoch 1334/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1439
Epoch 1335/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1438
Epoch 1336/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1437
Epoch 1337/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1435
Epoch 1338/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1434
Epoch 1339/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1433
Epoch 1340/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1432
Epoch 1341/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1430
Epoch 1342/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1429
Epoch 1343/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1428
Epoch 1344/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1426

```
Epoch 1345/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1425
Epoch 1346/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1424
Epoch 1347/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1423
Epoch 1348/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1421
Epoch 1349/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1420
Epoch 1350/2000
1/1 [=====] - 0s 87ms/step - loss: 0.1419
Epoch 1351/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1418
Epoch 1352/2000
1/1 [=====] - 0s 22ms/step - loss: 0.1416
Epoch 1353/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1415
Epoch 1354/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1414
Epoch 1355/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1413
Epoch 1356/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1411
Epoch 1357/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1410
Epoch 1358/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1409
Epoch 1359/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1408
Epoch 1360/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1406
Epoch 1361/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1405
Epoch 1362/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1404
Epoch 1363/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1403
Epoch 1364/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1401
Epoch 1365/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1400
Epoch 1366/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1399
Epoch 1367/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1398
Epoch 1368/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1397
Epoch 1369/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1395
Epoch 1370/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1394
Epoch 1371/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1393
Epoch 1372/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1392
Epoch 1373/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1390
Epoch 1374/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1389
Epoch 1375/2000
```

1/1 [=====] - 0s 7ms/step - loss: 0.1388
Epoch 1376/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1387
Epoch 1377/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1386
Epoch 1378/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1384
Epoch 1379/2000
1/1 [=====] - 0s 21ms/step - loss: 0.1383
Epoch 1380/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1382
Epoch 1381/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1381
Epoch 1382/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1380
Epoch 1383/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1379
Epoch 1384/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1377
Epoch 1385/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1376
Epoch 1386/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1375
Epoch 1387/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1374
Epoch 1388/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1373
Epoch 1389/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1372
Epoch 1390/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1370
Epoch 1391/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1369
Epoch 1392/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1368
Epoch 1393/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1367
Epoch 1394/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1366
Epoch 1395/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1365
Epoch 1396/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1363
Epoch 1397/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1362
Epoch 1398/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1361
Epoch 1399/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1360
Epoch 1400/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1359
Epoch 1401/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1358
Epoch 1402/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1356
Epoch 1403/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1355
Epoch 1404/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1354
Epoch 1405/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1353

Epoch 1406/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1352
Epoch 1407/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1351
Epoch 1408/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1350
Epoch 1409/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1349
Epoch 1410/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1347
Epoch 1411/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1346
Epoch 1412/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1345
Epoch 1413/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1344
Epoch 1414/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1343
Epoch 1415/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1342
Epoch 1416/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1341
Epoch 1417/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1340
Epoch 1418/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1338
Epoch 1419/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1337
Epoch 1420/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1336
Epoch 1421/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1335
Epoch 1422/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1334
Epoch 1423/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1333
Epoch 1424/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1332
Epoch 1425/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1331
Epoch 1426/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1330
Epoch 1427/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1329
Epoch 1428/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1327
Epoch 1429/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1326
Epoch 1430/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1325
Epoch 1431/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1324
Epoch 1432/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1323
Epoch 1433/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1322
Epoch 1434/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1321
Epoch 1435/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1320
Epoch 1436/2000

1/1 [=====] - 0s 5ms/step - loss: 0.1319
Epoch 1437/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1318
Epoch 1438/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1317
Epoch 1439/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1315
Epoch 1440/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1314
Epoch 1441/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1313
Epoch 1442/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1312
Epoch 1443/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1311
Epoch 1444/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1310
Epoch 1445/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1309
Epoch 1446/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1308
Epoch 1447/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1307
Epoch 1448/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1306
Epoch 1449/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1305
Epoch 1450/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1304
Epoch 1451/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1303
Epoch 1452/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1302
Epoch 1453/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1301
Epoch 1454/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1300
Epoch 1455/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1299
Epoch 1456/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1297
Epoch 1457/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1296
Epoch 1458/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1295
Epoch 1459/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1294
Epoch 1460/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1293
Epoch 1461/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1292
Epoch 1462/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1291
Epoch 1463/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1290
Epoch 1464/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1289
Epoch 1465/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1288
Epoch 1466/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1287

```
Epoch 1467/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1286
Epoch 1468/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1285
Epoch 1469/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1284
Epoch 1470/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1283
Epoch 1471/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1282
Epoch 1472/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1281
Epoch 1473/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1280
Epoch 1474/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1279
Epoch 1475/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1278
Epoch 1476/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1277
Epoch 1477/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1276
Epoch 1478/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1275
Epoch 1479/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1274
Epoch 1480/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1273
Epoch 1481/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1272
Epoch 1482/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1271
Epoch 1483/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1270
Epoch 1484/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1269
Epoch 1485/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1268
Epoch 1486/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1267
Epoch 1487/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1266
Epoch 1488/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1265
Epoch 1489/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1264
Epoch 1490/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1263
Epoch 1491/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1262
Epoch 1492/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1261
Epoch 1493/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1260
Epoch 1494/2000
1/1 [=====] - 0s 72ms/step - loss: 0.1259
Epoch 1495/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1258
Epoch 1496/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1257
Epoch 1497/2000
```

1/1 [=====] - 0s 6ms/step - loss: 0.1256
Epoch 1498/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1255
Epoch 1499/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1254
Epoch 1500/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1253
Epoch 1501/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1252
Epoch 1502/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1251
Epoch 1503/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1250
Epoch 1504/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1249
Epoch 1505/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1248
Epoch 1506/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1247
Epoch 1507/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1246
Epoch 1508/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1245
Epoch 1509/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1244
Epoch 1510/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1243
Epoch 1511/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1242
Epoch 1512/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1241
Epoch 1513/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1240
Epoch 1514/2000
1/1 [=====] - 0s 17ms/step - loss: 0.1239
Epoch 1515/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1238
Epoch 1516/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1237
Epoch 1517/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1236
Epoch 1518/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1235
Epoch 1519/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1234
Epoch 1520/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1233
Epoch 1521/2000
1/1 [=====] - 0s 66ms/step - loss: 0.1233
Epoch 1522/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1232
Epoch 1523/2000
1/1 [=====] - 0s 18ms/step - loss: 0.1231
Epoch 1524/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1230
Epoch 1525/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1229
Epoch 1526/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1228
Epoch 1527/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1227

```
Epoch 1528/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1226
Epoch 1529/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1225
Epoch 1530/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1224
Epoch 1531/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1223
Epoch 1532/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1222
Epoch 1533/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1221
Epoch 1534/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1220
Epoch 1535/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1219
Epoch 1536/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1218
Epoch 1537/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1217
Epoch 1538/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1216
Epoch 1539/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1216
Epoch 1540/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1215
Epoch 1541/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1214
Epoch 1542/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1213
Epoch 1543/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1212
Epoch 1544/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1211
Epoch 1545/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1210
Epoch 1546/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1209
Epoch 1547/2000
1/1 [=====] - 0s 90ms/step - loss: 0.1208
Epoch 1548/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1207
Epoch 1549/2000
1/1 [=====] - 0s 28ms/step - loss: 0.1206
Epoch 1550/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1205
Epoch 1551/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1204
Epoch 1552/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1203
Epoch 1553/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1203
Epoch 1554/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1202
Epoch 1555/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1201
Epoch 1556/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1200
Epoch 1557/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1199
Epoch 1558/2000
```

1/1 [=====] - 0s 6ms/step - loss: 0.1198
Epoch 1559/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1197
Epoch 1560/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1196
Epoch 1561/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1195
Epoch 1562/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1194
Epoch 1563/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1193
Epoch 1564/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1193
Epoch 1565/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1192
Epoch 1566/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1191
Epoch 1567/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1190
Epoch 1568/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1189
Epoch 1569/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1188
Epoch 1570/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1187
Epoch 1571/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1186
Epoch 1572/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1185
Epoch 1573/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1184
Epoch 1574/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1184
Epoch 1575/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1183
Epoch 1576/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1182
Epoch 1577/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1181
Epoch 1578/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1180
Epoch 1579/2000
1/1 [=====] - 0s 63ms/step - loss: 0.1179
Epoch 1580/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1178
Epoch 1581/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1177
Epoch 1582/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1176
Epoch 1583/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1175
Epoch 1584/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1175
Epoch 1585/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1174
Epoch 1586/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1173
Epoch 1587/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1172
Epoch 1588/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1171

Epoch 1589/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1170
Epoch 1590/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1169
Epoch 1591/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1168
Epoch 1592/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1168
Epoch 1593/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1167
Epoch 1594/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1166
Epoch 1595/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1165
Epoch 1596/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1164
Epoch 1597/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1163
Epoch 1598/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1162
Epoch 1599/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1161
Epoch 1600/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1161
Epoch 1601/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1160
Epoch 1602/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1159
Epoch 1603/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1158
Epoch 1604/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1157
Epoch 1605/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1156
Epoch 1606/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1155
Epoch 1607/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1154
Epoch 1608/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1154
Epoch 1609/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1153
Epoch 1610/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1152
Epoch 1611/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1151
Epoch 1612/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1150
Epoch 1613/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1149
Epoch 1614/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1148
Epoch 1615/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1148
Epoch 1616/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1147
Epoch 1617/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1146
Epoch 1618/2000
1/1 [=====] - 0s 22ms/step - loss: 0.1145
Epoch 1619/2000

```
1/1 [=====] - 0s 6ms/step - loss: 0.1144
Epoch 1620/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1143
Epoch 1621/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1142
Epoch 1622/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1142
Epoch 1623/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1141
Epoch 1624/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1140
Epoch 1625/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1139
Epoch 1626/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1138
Epoch 1627/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1137
Epoch 1628/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1136
Epoch 1629/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1136
Epoch 1630/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1135
Epoch 1631/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1134
Epoch 1632/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1133
Epoch 1633/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1132
Epoch 1634/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1131
Epoch 1635/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1131
Epoch 1636/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1130
Epoch 1637/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1129
Epoch 1638/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1128
Epoch 1639/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1127
Epoch 1640/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1126
Epoch 1641/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1126
Epoch 1642/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1125
Epoch 1643/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1124
Epoch 1644/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1123
Epoch 1645/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1122
Epoch 1646/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1121
Epoch 1647/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1121
Epoch 1648/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1120
Epoch 1649/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1119
```

```
Epoch 1650/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1118
Epoch 1651/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1117
Epoch 1652/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1116
Epoch 1653/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1116
Epoch 1654/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1115
Epoch 1655/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1114
Epoch 1656/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1113
Epoch 1657/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1112
Epoch 1658/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1111
Epoch 1659/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1111
Epoch 1660/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1110
Epoch 1661/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1109
Epoch 1662/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1108
Epoch 1663/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1107
Epoch 1664/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1106
Epoch 1665/2000
1/1 [=====] - 0s 67ms/step - loss: 0.1106
Epoch 1666/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1105
Epoch 1667/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1104
Epoch 1668/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1103
Epoch 1669/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1102
Epoch 1670/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1102
Epoch 1671/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1101
Epoch 1672/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1100
Epoch 1673/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1099
Epoch 1674/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1098
Epoch 1675/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1097
Epoch 1676/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1097
Epoch 1677/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1096
Epoch 1678/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1095
Epoch 1679/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1094
Epoch 1680/2000
```



```
1/1 [=====] - 0s 5ms/step - loss: 0.1093
Epoch 1681/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1093
Epoch 1682/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1092
Epoch 1683/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1091
Epoch 1684/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1090
Epoch 1685/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1089
Epoch 1686/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1089
Epoch 1687/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1088
Epoch 1688/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1087
Epoch 1689/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1086
Epoch 1690/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1085
Epoch 1691/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1085
Epoch 1692/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1084
Epoch 1693/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1083
Epoch 1694/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1082
Epoch 1695/2000
1/1 [=====] - 0s 26ms/step - loss: 0.1081
Epoch 1696/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1081
Epoch 1697/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1080
Epoch 1698/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1079
Epoch 1699/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1078
Epoch 1700/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1077
Epoch 1701/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1077
Epoch 1702/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1076
Epoch 1703/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1075
Epoch 1704/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1074
Epoch 1705/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1073
Epoch 1706/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1073
Epoch 1707/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1072
Epoch 1708/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1071
Epoch 1709/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1070
Epoch 1710/2000
1/1 [=====] - 0s 67ms/step - loss: 0.1069
```

```
Epoch 1711/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1069
Epoch 1712/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1068
Epoch 1713/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1067
Epoch 1714/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1066
Epoch 1715/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1066
Epoch 1716/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1065
Epoch 1717/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1064
Epoch 1718/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1063
Epoch 1719/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1062
Epoch 1720/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1062
Epoch 1721/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1061
Epoch 1722/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1060
Epoch 1723/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1059
Epoch 1724/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1058
Epoch 1725/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1058
Epoch 1726/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1057
Epoch 1727/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1056
Epoch 1728/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1055
Epoch 1729/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1055
Epoch 1730/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1054
Epoch 1731/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1053
Epoch 1732/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1052
Epoch 1733/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1051
Epoch 1734/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1051
Epoch 1735/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1050
Epoch 1736/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1049
Epoch 1737/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1048
Epoch 1738/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1048
Epoch 1739/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1047
Epoch 1740/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1046
Epoch 1741/2000
```

```
1/1 [=====] - 0s 8ms/step - loss: 0.1045
Epoch 1742/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1044
Epoch 1743/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1044
Epoch 1744/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1043
Epoch 1745/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1042
Epoch 1746/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1041
Epoch 1747/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1041
Epoch 1748/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1040
Epoch 1749/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1039
Epoch 1750/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1038
Epoch 1751/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1038
Epoch 1752/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1037
Epoch 1753/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1036
Epoch 1754/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1035
Epoch 1755/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1035
Epoch 1756/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1034
Epoch 1757/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1033
Epoch 1758/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1032
Epoch 1759/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1031
Epoch 1760/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1031
Epoch 1761/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1030
Epoch 1762/2000
1/1 [=====] - 0s 76ms/step - loss: 0.1029
Epoch 1763/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1028
Epoch 1764/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1028
Epoch 1765/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1027
Epoch 1766/2000
1/1 [=====] - 0s 21ms/step - loss: 0.1026
Epoch 1767/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1025
Epoch 1768/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1025
Epoch 1769/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1024
Epoch 1770/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1023
Epoch 1771/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1022
```

```
Epoch 1772/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1022
Epoch 1773/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1021
Epoch 1774/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1020
Epoch 1775/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1019
Epoch 1776/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1019
Epoch 1777/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1018
Epoch 1778/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1017
Epoch 1779/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1016
Epoch 1780/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1016
Epoch 1781/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1015
Epoch 1782/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1014
Epoch 1783/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1013
Epoch 1784/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1013
Epoch 1785/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1012
Epoch 1786/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1011
Epoch 1787/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1010
Epoch 1788/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1010
Epoch 1789/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1009
Epoch 1790/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1008
Epoch 1791/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1007
Epoch 1792/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1007
Epoch 1793/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1006
Epoch 1794/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1005
Epoch 1795/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1004
Epoch 1796/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1004
Epoch 1797/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1003
Epoch 1798/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1002
Epoch 1799/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1001
Epoch 1800/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1001
Epoch 1801/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1000
Epoch 1802/2000
```

```
1/1 [=====] - 0s 8ms/step - loss: 0.0999
Epoch 1803/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0998
Epoch 1804/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0998
Epoch 1805/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0997
Epoch 1806/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0996
Epoch 1807/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0995
Epoch 1808/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0995
Epoch 1809/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0994
Epoch 1810/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0993
Epoch 1811/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0992
Epoch 1812/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0992
Epoch 1813/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0991
Epoch 1814/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0990
Epoch 1815/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0989
Epoch 1816/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0989
Epoch 1817/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0988
Epoch 1818/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0987
Epoch 1819/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0987
Epoch 1820/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0986
Epoch 1821/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0985
Epoch 1822/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0984
Epoch 1823/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0984
Epoch 1824/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0983
Epoch 1825/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0982
Epoch 1826/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0981
Epoch 1827/2000
1/1 [=====] - 0s 34ms/step - loss: 0.0981
Epoch 1828/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0980
Epoch 1829/2000
1/1 [=====] - 0s 69ms/step - loss: 0.0979
Epoch 1830/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0978
Epoch 1831/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0978
Epoch 1832/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0977
```

Epoch 1833/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0976
Epoch 1834/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0976
Epoch 1835/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0975
Epoch 1836/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0974
Epoch 1837/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0973
Epoch 1838/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0973
Epoch 1839/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0972
Epoch 1840/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0971
Epoch 1841/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0970
Epoch 1842/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0970
Epoch 1843/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0969
Epoch 1844/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0968
Epoch 1845/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0968
Epoch 1846/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0967
Epoch 1847/2000
1/1 [=====] - 0s 21ms/step - loss: 0.0966
Epoch 1848/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0965
Epoch 1849/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0965
Epoch 1850/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0964
Epoch 1851/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0963
Epoch 1852/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0963
Epoch 1853/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0962
Epoch 1854/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0961
Epoch 1855/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0960
Epoch 1856/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0960
Epoch 1857/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0959
Epoch 1858/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0958
Epoch 1859/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0957
Epoch 1860/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0957
Epoch 1861/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0956
Epoch 1862/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0955
Epoch 1863/2000

```
1/1 [=====] - 0s 7ms/step - loss: 0.0955
Epoch 1864/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0954
Epoch 1865/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0953
Epoch 1866/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0952
Epoch 1867/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0952
Epoch 1868/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0951
Epoch 1869/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0950
Epoch 1870/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0950
Epoch 1871/2000
1/1 [=====] - 0s 24ms/step - loss: 0.0949
Epoch 1872/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0948
Epoch 1873/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0947
Epoch 1874/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0947
Epoch 1875/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0946
Epoch 1876/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0945
Epoch 1877/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0945
Epoch 1878/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0944
Epoch 1879/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0943
Epoch 1880/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0942
Epoch 1881/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0942
Epoch 1882/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0941
Epoch 1883/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0940
Epoch 1884/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0940
Epoch 1885/2000
1/1 [=====] - 0s 25ms/step - loss: 0.0939
Epoch 1886/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0938
Epoch 1887/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0937
Epoch 1888/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0937
Epoch 1889/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0936
Epoch 1890/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0935
Epoch 1891/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0935
Epoch 1892/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0934
Epoch 1893/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0933
```

Epoch 1894/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0933
Epoch 1895/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0932
Epoch 1896/2000
1/1 [=====] - 0s 23ms/step - loss: 0.0931
Epoch 1897/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0930
Epoch 1898/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0930
Epoch 1899/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0929
Epoch 1900/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0928
Epoch 1901/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0928
Epoch 1902/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0927
Epoch 1903/2000
1/1 [=====] - 0s 80ms/step - loss: 0.0926
Epoch 1904/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0925
Epoch 1905/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0925
Epoch 1906/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0924
Epoch 1907/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0923
Epoch 1908/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0923
Epoch 1909/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0922
Epoch 1910/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0921
Epoch 1911/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0921
Epoch 1912/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0920
Epoch 1913/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0919
Epoch 1914/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0918
Epoch 1915/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0918
Epoch 1916/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0917
Epoch 1917/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0916
Epoch 1918/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0916
Epoch 1919/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0915
Epoch 1920/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0914
Epoch 1921/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0914
Epoch 1922/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0913
Epoch 1923/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0912
Epoch 1924/2000


```
1/1 [=====] - 0s 5ms/step - loss: 0.0911
Epoch 1925/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0911
Epoch 1926/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0910
Epoch 1927/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0909
Epoch 1928/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0909
Epoch 1929/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0908
Epoch 1930/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0907
Epoch 1931/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0907
Epoch 1932/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0906
Epoch 1933/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0905
Epoch 1934/2000
1/1 [=====] - 0s 62ms/step - loss: 0.0905
Epoch 1935/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0904
Epoch 1936/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0903
Epoch 1937/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0902
Epoch 1938/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0902
Epoch 1939/2000
1/1 [=====] - 0s 21ms/step - loss: 0.0901
Epoch 1940/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0900
Epoch 1941/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0900
Epoch 1942/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0899
Epoch 1943/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0898
Epoch 1944/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0898
Epoch 1945/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0897
Epoch 1946/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0896
Epoch 1947/2000
1/1 [=====] - 0s 17ms/step - loss: 0.0896
Epoch 1948/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0895
Epoch 1949/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0894
Epoch 1950/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0893
Epoch 1951/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0893
Epoch 1952/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0892
Epoch 1953/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0891
Epoch 1954/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0891
```

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Epoch 1955/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0890
Epoch 1956/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0889
Epoch 1957/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0889
Epoch 1958/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0888
Epoch 1959/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0887
Epoch 1960/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0887
Epoch 1961/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0886
Epoch 1962/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0885
Epoch 1963/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0885
Epoch 1964/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0884
Epoch 1965/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0883
Epoch 1966/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0883
Epoch 1967/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0882
Epoch 1968/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0881
Epoch 1969/2000
1/1 [=====] - 0s 21ms/step - loss: 0.0880
Epoch 1970/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0880
Epoch 1971/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0879
Epoch 1972/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0878
Epoch 1973/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0878
Epoch 1974/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0877
Epoch 1975/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0876
Epoch 1976/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0876
Epoch 1977/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0875
Epoch 1978/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0874
Epoch 1979/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0874
Epoch 1980/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0873
Epoch 1981/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0872
Epoch 1982/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0872
Epoch 1983/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0871
Epoch 1984/2000
1/1 [=====] - 0s 65ms/step - loss: 0.0870
Epoch 1985/2000
```

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1/1 [=====] - 0s 4ms/step - loss: 0.0870
Epoch 1986/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0869
Epoch 1987/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0868
Epoch 1988/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0868
Epoch 1989/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0867
Epoch 1990/2000
1/1 [=====] - 0s 19ms/step - loss: 0.0866
Epoch 1991/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0866
Epoch 1992/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0865
Epoch 1993/2000
1/1 [=====] - 0s 16ms/step - loss: 0.0864
Epoch 1994/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0864
Epoch 1995/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0863
Epoch 1996/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0862
Epoch 1997/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0861
Epoch 1998/2000
1/1 [=====] - 0s 26ms/step - loss: 0.0861
Epoch 1999/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0860
Epoch 2000/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0859
1/1 [=====] - 0s 127ms/step
SE PREDICE: [[6.0388784]] CUANDO EN REALIDAD LA RESPUESTA ES 6.25
1/1 [=====] - 0s 44ms/step
0.08587869132392001 ERROR CUADRATICO MEDIO, DEBERIA SER LO MAS CERCANO A
0 POSIBLE

```

SIETE UNIDADES POR CAPA OCULTA

```
In [ ]: import tensorflow as tf
import numpy as np
from tensorflow import keras
# Declare model inputs and outputs for training  $y = x^2$ 
xs = np.array([-4.0, -3.0, -2.0, -1.0, 0.0, 1.0, 2.0, 3.0, 4.0], dtype=float)
ys = np.array([16, 9, 4, 1, 0, 1, 4, 9, 16], dtype=float)

# numero de unidades por capa
n_unidades = 7
# funcion de activacion sigmoid
funcion_activacion = 'sigmoid'

# Build a Sequential model
# 2 capa oculta
# 1 capa de salida con 1 neurona y funcion de activacion lineal
model = tf.keras.Sequential([
    keras.layers.Dense(units=n_unidades, input_shape=(1,)),
    keras.layers.Dense(units=n_unidades, activation=funcion_activacion),
    keras.layers.Dense(units=1, activation='linear')
])

#compile
model.compile(optimizer='sgd', loss='mean_squared_error')
#fit con epochs 2000
model.fit(xs, ys, epochs=2000)

#predict en x=2.5
print('SE PREDICE:', model.predict([2.5]), " CUANDO EN REALIDAD LA RESPUESTA ES 6.25")

# Error cuadratico medio
from sklearn.metrics import mean_squared_error
# calcular error cuadratico medio
print(mean_squared_error(ys, model.predict(xs)), " ERROR CUADRATICO MEDIO")
```

```
Epoch 1/2000
1/1 [=====] - 1s 662ms/step - loss: 79.4019
Epoch 2/2000
1/1 [=====] - 0s 5ms/step - loss: 73.4685
Epoch 3/2000
1/1 [=====] - 0s 5ms/step - loss: 68.3017
Epoch 4/2000
1/1 [=====] - 0s 7ms/step - loss: 63.7775
Epoch 5/2000
1/1 [=====] - 0s 7ms/step - loss: 59.8031
Epoch 6/2000
1/1 [=====] - 0s 7ms/step - loss: 56.3077
Epoch 7/2000
1/1 [=====] - 0s 7ms/step - loss: 53.2350
Epoch 8/2000
1/1 [=====] - 0s 20ms/step - loss: 50.5387
Epoch 9/2000
1/1 [=====] - 0s 17ms/step - loss: 48.1793
Epoch 10/2000
1/1 [=====] - 0s 11ms/step - loss: 46.1220
Epoch 11/2000
1/1 [=====] - 0s 8ms/step - loss: 44.3351
Epoch 12/2000
1/1 [=====] - 0s 7ms/step - loss: 42.7899
```

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Epoch 13/2000
1/1 [=====] - 0s 7ms/step - loss: 41.4594
Epoch 14/2000
1/1 [=====] - 0s 9ms/step - loss: 40.3189
Epoch 15/2000
1/1 [=====] - 0s 9ms/step - loss: 39.3454
Epoch 16/2000
1/1 [=====] - 0s 8ms/step - loss: 38.5179
Epoch 17/2000
1/1 [=====] - 0s 6ms/step - loss: 37.8173
Epoch 18/2000
1/1 [=====] - 0s 8ms/step - loss: 37.2262
Epoch 19/2000
1/1 [=====] - 0s 6ms/step - loss: 36.7292
Epoch 20/2000
1/1 [=====] - 0s 8ms/step - loss: 36.3127
Epoch 21/2000
1/1 [=====] - 0s 8ms/step - loss: 35.9645
Epoch 22/2000
1/1 [=====] - 0s 7ms/step - loss: 35.6741
Epoch 23/2000
1/1 [=====] - 0s 7ms/step - loss: 35.4326
Epoch 24/2000
1/1 [=====] - 0s 8ms/step - loss: 35.2320
Epoch 25/2000
1/1 [=====] - 0s 6ms/step - loss: 35.0657
Epoch 26/2000
1/1 [=====] - 0s 7ms/step - loss: 34.9279
Epoch 27/2000
1/1 [=====] - 0s 8ms/step - loss: 34.8139
Epoch 28/2000
1/1 [=====] - 0s 7ms/step - loss: 34.7197
Epoch 29/2000
1/1 [=====] - 0s 5ms/step - loss: 34.6417
Epoch 30/2000
1/1 [=====] - 0s 7ms/step - loss: 34.5773
Epoch 31/2000
1/1 [=====] - 0s 6ms/step - loss: 34.5239
Epoch 32/2000
1/1 [=====] - 0s 5ms/step - loss: 34.4797
Epoch 33/2000
1/1 [=====] - 0s 5ms/step - loss: 34.4430
Epoch 34/2000
1/1 [=====] - 0s 18ms/step - loss: 34.4124
Epoch 35/2000
1/1 [=====] - 0s 61ms/step - loss: 34.3870
Epoch 36/2000
1/1 [=====] - 0s 10ms/step - loss: 34.3656
Epoch 37/2000
1/1 [=====] - 0s 8ms/step - loss: 34.3476
Epoch 38/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3324
Epoch 39/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3194
Epoch 40/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3083
Epoch 41/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2987
Epoch 42/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2903
Epoch 43/2000
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1/1 [=====] - 0s 6ms/step - loss: 34.2829
Epoch 44/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2763
Epoch 45/2000
1/1 [=====] - 0s 16ms/step - loss: 34.2703
Epoch 46/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2650
Epoch 47/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2600
Epoch 48/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2554
Epoch 49/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2511
Epoch 50/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2470
Epoch 51/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2431
Epoch 52/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2394
Epoch 53/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2358
Epoch 54/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2323
Epoch 55/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2289
Epoch 56/2000
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Epoch 57/2000
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Epoch 58/2000
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Epoch 59/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2157
Epoch 60/2000
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Epoch 61/2000
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Epoch 62/2000
1/1 [=====] - 0s 15ms/step - loss: 34.2062
Epoch 63/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2030
Epoch 64/2000
1/1 [=====] - 0s 9ms/step - loss: 34.1999
Epoch 65/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1967
Epoch 66/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1936
Epoch 67/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1904
Epoch 68/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1873
Epoch 69/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1841
Epoch 70/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1809
Epoch 71/2000
1/1 [=====] - 0s 17ms/step - loss: 34.1778
Epoch 72/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1746
Epoch 73/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1714

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Epoch 74/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1682
Epoch 75/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1650
Epoch 76/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1617
Epoch 77/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1585
Epoch 78/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1552
Epoch 79/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1520
Epoch 80/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1487
Epoch 81/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1454
Epoch 82/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1421
Epoch 83/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1387
Epoch 84/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1354
Epoch 85/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1320
Epoch 86/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1286
Epoch 87/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1252
Epoch 88/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1217
Epoch 89/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1183
Epoch 90/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1148
Epoch 91/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1113
Epoch 92/2000
1/1 [=====] - 0s 64ms/step - loss: 34.1077
Epoch 93/2000
1/1 [=====] - 0s 25ms/step - loss: 34.1042
Epoch 94/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1006
Epoch 95/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0970
Epoch 96/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0933
Epoch 97/2000
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Epoch 98/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0860
Epoch 99/2000
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Epoch 100/2000
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Epoch 101/2000
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Epoch 102/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0709
Epoch 103/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0671
Epoch 104/2000
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Epoch 105/2000
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Epoch 106/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0554
Epoch 107/2000
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Epoch 108/2000
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Epoch 109/2000
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Epoch 110/2000
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Epoch 111/2000
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Epoch 112/2000
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Epoch 113/2000
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Epoch 114/2000
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Epoch 115/2000
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Epoch 116/2000
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Epoch 117/2000
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Epoch 118/2000
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Epoch 120/2000
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Epoch 122/2000
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Epoch 123/2000
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Epoch 124/2000
1/1 [=====] - 0s 9ms/step - loss: 33.9785
Epoch 125/2000
1/1 [=====] - 0s 9ms/step - loss: 33.9739
Epoch 126/2000
1/1 [=====] - 0s 6ms/step - loss: 33.9692
Epoch 127/2000
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Epoch 128/2000
1/1 [=====] - 0s 11ms/step - loss: 33.9597
Epoch 129/2000
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Epoch 130/2000
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Epoch 131/2000
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Epoch 132/2000
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Epoch 133/2000
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Epoch 134/2000
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Epoch 135/2000
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Epoch 136/2000
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Epoch 138/2000
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Epoch 139/2000
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Epoch 140/2000
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Epoch 141/2000
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Epoch 142/2000
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Epoch 143/2000
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Epoch 144/2000
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Epoch 145/2000
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Epoch 146/2000
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Epoch 147/2000
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Epoch 148/2000
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Epoch 149/2000
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Epoch 150/2000
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Epoch 151/2000
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Epoch 152/2000
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Epoch 153/2000
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Epoch 154/2000
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Epoch 155/2000
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Epoch 156/2000
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Epoch 157/2000
1/1 [=====] - 0s 7ms/step - loss: 33.8004
Epoch 158/2000
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Epoch 159/2000
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Epoch 160/2000
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Epoch 161/2000
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Epoch 162/2000
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Epoch 163/2000
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Epoch 164/2000
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Epoch 165/2000

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Epoch 166/2000
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Epoch 167/2000
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Epoch 168/2000
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Epoch 169/2000
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Epoch 170/2000
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Epoch 171/2000
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Epoch 172/2000
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Epoch 173/2000
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Epoch 175/2000
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Epoch 176/2000
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Epoch 177/2000
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Epoch 178/2000
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Epoch 179/2000
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Epoch 180/2000
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Epoch 181/2000
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Epoch 182/2000
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Epoch 183/2000
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Epoch 184/2000
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Epoch 185/2000
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Epoch 186/2000
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Epoch 187/2000
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Epoch 188/2000
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Epoch 189/2000
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Epoch 191/2000
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Epoch 193/2000
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Epoch 195/2000
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Epoch 198/2000
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Epoch 204/2000
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Epoch 208/2000
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Epoch 209/2000
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Epoch 210/2000
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Epoch 211/2000
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Epoch 212/2000
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Epoch 213/2000
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Epoch 214/2000
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Epoch 219/2000
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Epoch 220/2000
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Epoch 221/2000
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Epoch 222/2000
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Epoch 223/2000
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Epoch 224/2000
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Epoch 225/2000
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Epoch 226/2000

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Epoch 227/2000
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Epoch 228/2000
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Epoch 229/2000
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Epoch 231/2000
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Epoch 232/2000
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Epoch 236/2000
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Epoch 237/2000
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Epoch 238/2000
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Epoch 239/2000
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Epoch 241/2000
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Epoch 245/2000
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Epoch 249/2000
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Epoch 255/2000
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Epoch 256/2000
1/1 [=====] - 0s 15ms/step - loss: 32.7916

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Epoch 259/2000
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Epoch 260/2000
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Epoch 261/2000
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Epoch 262/2000
1/1 [=====] - 0s 6ms/step - loss: 32.6953
Epoch 263/2000
1/1 [=====] - 0s 7ms/step - loss: 32.6787
Epoch 264/2000
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Epoch 265/2000
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Epoch 266/2000
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Epoch 267/2000
1/1 [=====] - 0s 6ms/step - loss: 32.6107
Epoch 268/2000
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Epoch 269/2000
1/1 [=====] - 0s 7ms/step - loss: 32.5757
Epoch 270/2000
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Epoch 271/2000
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Epoch 272/2000
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Epoch 273/2000
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Epoch 275/2000
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Epoch 276/2000
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Epoch 277/2000
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Epoch 280/2000
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Epoch 281/2000
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Epoch 282/2000
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Epoch 283/2000
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Epoch 285/2000
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Epoch 286/2000
1/1 [=====] - 0s 52ms/step - loss: 32.2490
Epoch 287/2000
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Epoch 289/2000
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Epoch 290/2000
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Epoch 291/2000
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Epoch 298/2000
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Epoch 303/2000
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Epoch 306/2000
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Epoch 309/2000
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Epoch 313/2000
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Epoch 314/2000
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Epoch 317/2000
1/1 [=====] - 0s 8ms/step - loss: 31.4935
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Epoch 348/2000

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Epoch 470/2000

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Epoch 526/2000
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Epoch 531/2000
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Epoch 533/2000
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Epoch 541/2000
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Epoch 564/2000
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Epoch 565/2000
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Epoch 566/2000
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Epoch 567/2000
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Epoch 568/2000
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Epoch 569/2000
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Epoch 570/2000
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Epoch 571/2000
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Epoch 572/2000
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Epoch 573/2000
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Epoch 574/2000
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Epoch 575/2000
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Epoch 576/2000
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Epoch 577/2000
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Epoch 578/2000
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Epoch 579/2000
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Epoch 580/2000
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Epoch 581/2000
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Epoch 582/2000
1/1 [=====] - 0s 5ms/step - loss: 9.7582
Epoch 583/2000
1/1 [=====] - 0s 6ms/step - loss: 9.6558
Epoch 584/2000
1/1 [=====] - 0s 8ms/step - loss: 9.5541
Epoch 585/2000
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Epoch 586/2000
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Epoch 587/2000
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Epoch 588/2000
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Epoch 589/2000
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Epoch 590/2000
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Epoch 591/2000
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Epoch 592/2000

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Epoch 593/2000
1/1 [=====] - 0s 5ms/step - loss: 8.6723
Epoch 594/2000
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Epoch 595/2000
1/1 [=====] - 0s 6ms/step - loss: 8.4846
Epoch 596/2000
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Epoch 599/2000
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Epoch 600/2000
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Epoch 602/2000
1/1 [=====] - 0s 7ms/step - loss: 7.8523
Epoch 603/2000
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Epoch 604/2000
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Epoch 605/2000
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Epoch 606/2000
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Epoch 607/2000
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Epoch 608/2000
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Epoch 609/2000
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Epoch 610/2000
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Epoch 611/2000
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Epoch 612/2000
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Epoch 613/2000
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Epoch 614/2000
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Epoch 615/2000
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Epoch 616/2000
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Epoch 618/2000
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Epoch 619/2000
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Epoch 620/2000
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Epoch 621/2000
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Epoch 622/2000
1/1 [=====] - 0s 6ms/step - loss: 6.2554

Epoch 623/2000
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Epoch 624/2000
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Epoch 625/2000
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Epoch 626/2000
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Epoch 627/2000
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Epoch 628/2000
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Epoch 629/2000
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Epoch 630/2000
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Epoch 631/2000
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Epoch 632/2000
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Epoch 633/2000
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Epoch 634/2000
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Epoch 635/2000
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Epoch 636/2000
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Epoch 637/2000
1/1 [=====] - 0s 6ms/step - loss: 5.2544
Epoch 638/2000
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Epoch 639/2000
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Epoch 640/2000
1/1 [=====] - 0s 7ms/step - loss: 5.0732
Epoch 641/2000
1/1 [=====] - 0s 6ms/step - loss: 5.0141
Epoch 642/2000
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Epoch 643/2000
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Epoch 644/2000
1/1 [=====] - 0s 9ms/step - loss: 4.8409
Epoch 645/2000
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Epoch 646/2000
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Epoch 647/2000
1/1 [=====] - 0s 7ms/step - loss: 4.6735
Epoch 648/2000
1/1 [=====] - 0s 7ms/step - loss: 4.6189
Epoch 649/2000
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Epoch 650/2000
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Epoch 651/2000
1/1 [=====] - 0s 8ms/step - loss: 4.4591
Epoch 652/2000
1/1 [=====] - 0s 6ms/step - loss: 4.4070
Epoch 653/2000

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Epoch 654/2000
1/1 [=====] - 0s 7ms/step - loss: 4.3048
Epoch 655/2000
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Epoch 656/2000
1/1 [=====] - 0s 9ms/step - loss: 4.2049
Epoch 657/2000
1/1 [=====] - 0s 6ms/step - loss: 4.1558
Epoch 658/2000
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Epoch 659/2000
1/1 [=====] - 0s 7ms/step - loss: 4.0594
Epoch 660/2000
1/1 [=====] - 0s 8ms/step - loss: 4.0120
Epoch 661/2000
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Epoch 662/2000
1/1 [=====] - 0s 5ms/step - loss: 3.9190
Epoch 663/2000
1/1 [=====] - 0s 6ms/step - loss: 3.8733
Epoch 664/2000
1/1 [=====] - 0s 6ms/step - loss: 3.8282
Epoch 665/2000
1/1 [=====] - 0s 5ms/step - loss: 3.7836
Epoch 666/2000
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Epoch 667/2000
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Epoch 668/2000
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Epoch 669/2000
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Epoch 670/2000
1/1 [=====] - 0s 13ms/step - loss: 3.5686
Epoch 671/2000
1/1 [=====] - 0s 13ms/step - loss: 3.5272
Epoch 672/2000
1/1 [=====] - 0s 6ms/step - loss: 3.4862
Epoch 673/2000
1/1 [=====] - 0s 6ms/step - loss: 3.4458
Epoch 674/2000
1/1 [=====] - 0s 6ms/step - loss: 3.4058
Epoch 675/2000
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Epoch 676/2000
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Epoch 677/2000
1/1 [=====] - 0s 6ms/step - loss: 3.2889
Epoch 678/2000
1/1 [=====] - 0s 10ms/step - loss: 3.2508
Epoch 679/2000
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Epoch 680/2000
1/1 [=====] - 0s 5ms/step - loss: 3.1762
Epoch 681/2000
1/1 [=====] - 0s 6ms/step - loss: 3.1395
Epoch 682/2000
1/1 [=====] - 0s 8ms/step - loss: 3.1034
Epoch 683/2000
1/1 [=====] - 0s 6ms/step - loss: 3.0676

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Epoch 684/2000
1/1 [=====] - 0s 6ms/step - loss: 3.0323
Epoch 685/2000
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Epoch 686/2000
1/1 [=====] - 0s 6ms/step - loss: 2.9630
Epoch 687/2000
1/1 [=====] - 0s 8ms/step - loss: 2.9290
Epoch 688/2000
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Epoch 689/2000
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Epoch 690/2000
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Epoch 691/2000
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Epoch 692/2000
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Epoch 693/2000
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Epoch 694/2000
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Epoch 695/2000
1/1 [=====] - 0s 7ms/step - loss: 2.6719
Epoch 696/2000
1/1 [=====] - 0s 6ms/step - loss: 2.6415
Epoch 697/2000
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Epoch 698/2000
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Epoch 699/2000
1/1 [=====] - 0s 6ms/step - loss: 2.5527
Epoch 700/2000
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Epoch 701/2000
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Epoch 702/2000
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Epoch 703/2000
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Epoch 704/2000
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Epoch 705/2000
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Epoch 706/2000
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Epoch 707/2000
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Epoch 708/2000
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Epoch 709/2000
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Epoch 710/2000
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Epoch 711/2000
1/1 [=====] - 0s 23ms/step - loss: 2.2295
Epoch 712/2000
1/1 [=====] - 0s 8ms/step - loss: 2.2048
Epoch 713/2000
1/1 [=====] - 0s 17ms/step - loss: 2.1803
Epoch 714/2000
```

1/1 [=====] - 0s 8ms/step - loss: 2.1562
Epoch 715/2000
1/1 [=====] - 0s 6ms/step - loss: 2.1324
Epoch 716/2000
1/1 [=====] - 0s 5ms/step - loss: 2.1088
Epoch 717/2000
1/1 [=====] - 0s 19ms/step - loss: 2.0856
Epoch 718/2000
1/1 [=====] - 0s 5ms/step - loss: 2.0627
Epoch 719/2000
1/1 [=====] - 0s 6ms/step - loss: 2.0401
Epoch 720/2000
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Epoch 721/2000
1/1 [=====] - 0s 7ms/step - loss: 1.9957
Epoch 722/2000
1/1 [=====] - 0s 7ms/step - loss: 1.9739
Epoch 723/2000
1/1 [=====] - 0s 7ms/step - loss: 1.9524
Epoch 724/2000
1/1 [=====] - 0s 8ms/step - loss: 1.9312
Epoch 725/2000
1/1 [=====] - 0s 6ms/step - loss: 1.9102
Epoch 726/2000
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Epoch 727/2000
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Epoch 728/2000
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Epoch 729/2000
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Epoch 730/2000
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Epoch 731/2000
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Epoch 732/2000
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Epoch 733/2000
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Epoch 734/2000
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Epoch 735/2000
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Epoch 736/2000
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Epoch 737/2000
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Epoch 738/2000
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Epoch 739/2000
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Epoch 740/2000
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Epoch 741/2000
1/1 [=====] - 0s 5ms/step - loss: 1.6093
Epoch 742/2000
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Epoch 743/2000
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Epoch 744/2000
1/1 [=====] - 0s 5ms/step - loss: 1.5594

Epoch 745/2000
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Epoch 746/2000
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Epoch 747/2000
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Epoch 748/2000
1/1 [=====] - 0s 5ms/step - loss: 1.4959
Epoch 749/2000
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Epoch 750/2000
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Epoch 751/2000
1/1 [=====] - 0s 5ms/step - loss: 1.4504
Epoch 752/2000
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Epoch 753/2000
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Epoch 754/2000
1/1 [=====] - 0s 8ms/step - loss: 1.4067
Epoch 755/2000
1/1 [=====] - 0s 9ms/step - loss: 1.3925
Epoch 756/2000
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Epoch 757/2000
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Epoch 758/2000
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Epoch 759/2000
1/1 [=====] - 0s 5ms/step - loss: 1.3374
Epoch 760/2000
1/1 [=====] - 0s 7ms/step - loss: 1.3241
Epoch 761/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3109
Epoch 762/2000
1/1 [=====] - 0s 8ms/step - loss: 1.2980
Epoch 763/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2851
Epoch 764/2000
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Epoch 765/2000
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Epoch 766/2000
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Epoch 767/2000
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Epoch 768/2000
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Epoch 769/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2116
Epoch 770/2000
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Epoch 771/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1884
Epoch 772/2000
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Epoch 773/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1657
Epoch 774/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1546
Epoch 775/2000

1/1 [=====] - 0s 8ms/step - loss: 1.1436
Epoch 776/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1328
Epoch 777/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1221
Epoch 778/2000
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Epoch 779/2000
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Epoch 780/2000
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Epoch 781/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0807
Epoch 782/2000
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Epoch 783/2000
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Epoch 784/2000
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Epoch 785/2000
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Epoch 786/2000
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Epoch 787/2000
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Epoch 788/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0132
Epoch 789/2000
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Epoch 790/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9950
Epoch 791/2000
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Epoch 792/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9773
Epoch 793/2000
1/1 [=====] - 0s 8ms/step - loss: 0.9686
Epoch 794/2000
1/1 [=====] - 0s 40ms/step - loss: 0.9600
Epoch 795/2000
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Epoch 796/2000
1/1 [=====] - 0s 32ms/step - loss: 0.9431
Epoch 797/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9349
Epoch 798/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9267
Epoch 799/2000
1/1 [=====] - 0s 9ms/step - loss: 0.9187
Epoch 800/2000
1/1 [=====] - 0s 4ms/step - loss: 0.9107
Epoch 801/2000
1/1 [=====] - 0s 8ms/step - loss: 0.9029
Epoch 802/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8951
Epoch 803/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8875
Epoch 804/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8799
Epoch 805/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8725

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Epoch 806/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8651
Epoch 807/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8579
Epoch 808/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8507
Epoch 809/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8436
Epoch 810/2000
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Epoch 811/2000
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Epoch 812/2000
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Epoch 813/2000
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Epoch 814/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8095
Epoch 815/2000
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Epoch 816/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7965
Epoch 817/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7901
Epoch 818/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7838
Epoch 819/2000
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Epoch 820/2000
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Epoch 821/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7653
Epoch 822/2000
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Epoch 823/2000
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Epoch 824/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7475
Epoch 825/2000
1/1 [=====] - 0s 82ms/step - loss: 0.7417
Epoch 826/2000
1/1 [=====] - 0s 15ms/step - loss: 0.7360
Epoch 827/2000
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Epoch 828/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7248
Epoch 829/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7193
Epoch 830/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7139
Epoch 831/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7085
Epoch 832/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7033
Epoch 833/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6980
Epoch 834/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6929
Epoch 835/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6878
Epoch 836/2000
```

1/1 [=====] - 0s 5ms/step - loss: 0.6827
Epoch 837/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6778
Epoch 838/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6729
Epoch 839/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6680
Epoch 840/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6632
Epoch 841/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6585
Epoch 842/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6538
Epoch 843/2000
1/1 [=====] - 0s 10ms/step - loss: 0.6492
Epoch 844/2000
1/1 [=====] - 0s 14ms/step - loss: 0.6447
Epoch 845/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6402
Epoch 846/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6357
Epoch 847/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6314
Epoch 848/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6270
Epoch 849/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6227
Epoch 850/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6185
Epoch 851/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6143
Epoch 852/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6102
Epoch 853/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6062
Epoch 854/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6021
Epoch 855/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5982
Epoch 856/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5942
Epoch 857/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5903
Epoch 858/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5865
Epoch 859/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5827
Epoch 860/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5790
Epoch 861/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5753
Epoch 862/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5717
Epoch 863/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5680
Epoch 864/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5645
Epoch 865/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5610
Epoch 866/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5575


```
Epoch 867/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5541
Epoch 868/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5507
Epoch 869/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5473
Epoch 870/2000
1/1 [=====] - 0s 81ms/step - loss: 0.5440
Epoch 871/2000
1/1 [=====] - 0s 23ms/step - loss: 0.5407
Epoch 872/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5375
Epoch 873/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5343
Epoch 874/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5311
Epoch 875/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5280
Epoch 876/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5249
Epoch 877/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5219
Epoch 878/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5189
Epoch 879/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5159
Epoch 880/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5130
Epoch 881/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5101
Epoch 882/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5072
Epoch 883/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5044
Epoch 884/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5016
Epoch 885/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4988
Epoch 886/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4960
Epoch 887/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4933
Epoch 888/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4907
Epoch 889/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4880
Epoch 890/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4854
Epoch 891/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4828
Epoch 892/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4803
Epoch 893/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4777
Epoch 894/2000
1/1 [=====] - 0s 22ms/step - loss: 0.4752
Epoch 895/2000
1/1 [=====] - 0s 13ms/step - loss: 0.4728
Epoch 896/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4703
Epoch 897/2000
```

1/1 [=====] - 0s 6ms/step - loss: 0.4679
Epoch 898/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4655
Epoch 899/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4632
Epoch 900/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4608
Epoch 901/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4585
Epoch 902/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4563
Epoch 903/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4540
Epoch 904/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4518
Epoch 905/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4496
Epoch 906/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4474
Epoch 907/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4452
Epoch 908/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4431
Epoch 909/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4410
Epoch 910/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4389
Epoch 911/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4368
Epoch 912/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4348
Epoch 913/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4328
Epoch 914/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4308
Epoch 915/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4288
Epoch 916/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4269
Epoch 917/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4249
Epoch 918/2000
1/1 [=====] - 0s 15ms/step - loss: 0.4230
Epoch 919/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4211
Epoch 920/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4193
Epoch 921/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4174
Epoch 922/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4156
Epoch 923/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4138
Epoch 924/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4120
Epoch 925/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4102
Epoch 926/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4085
Epoch 927/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4067

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Epoch 928/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4050
Epoch 929/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4033
Epoch 930/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4016
Epoch 931/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4000
Epoch 932/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3983
Epoch 933/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3967
Epoch 934/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3951
Epoch 935/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3935
Epoch 936/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3919
Epoch 937/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3903
Epoch 938/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3888
Epoch 939/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3872
Epoch 940/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3857
Epoch 941/2000
1/1 [=====] - 0s 20ms/step - loss: 0.3842
Epoch 942/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3827
Epoch 943/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3813
Epoch 944/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3798
Epoch 945/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3784
Epoch 946/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3769
Epoch 947/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3755
Epoch 948/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3741
Epoch 949/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3727
Epoch 950/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3713
Epoch 951/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3700
Epoch 952/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3686
Epoch 953/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3673
Epoch 954/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3660
Epoch 955/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3647
Epoch 956/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3634
Epoch 957/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3621
Epoch 958/2000
```

1/1 [=====] - 0s 5ms/step - loss: 0.3608
Epoch 959/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3595
Epoch 960/2000
1/1 [=====] - 0s 19ms/step - loss: 0.3583
Epoch 961/2000
1/1 [=====] - 0s 32ms/step - loss: 0.3570
Epoch 962/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3558
Epoch 963/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3546
Epoch 964/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3534
Epoch 965/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3522
Epoch 966/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3510
Epoch 967/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3498
Epoch 968/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3487
Epoch 969/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3475
Epoch 970/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3464
Epoch 971/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3452
Epoch 972/2000
1/1 [=====] - 0s 15ms/step - loss: 0.3441
Epoch 973/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3430
Epoch 974/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3419
Epoch 975/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3408
Epoch 976/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3397
Epoch 977/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3386
Epoch 978/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3376
Epoch 979/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3365
Epoch 980/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3355
Epoch 981/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3344
Epoch 982/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3334
Epoch 983/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3324
Epoch 984/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3313
Epoch 985/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3303
Epoch 986/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3293
Epoch 987/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3283
Epoch 988/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3274

```
Epoch 989/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3264
Epoch 990/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3254
Epoch 991/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3245
Epoch 992/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3235
Epoch 993/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3226
Epoch 994/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3216
Epoch 995/2000
1/1 [=====] - 0s 21ms/step - loss: 0.3207
Epoch 996/2000
1/1 [=====] - 0s 12ms/step - loss: 0.3198
Epoch 997/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3188
Epoch 998/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3179
Epoch 999/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3170
Epoch 1000/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3161
Epoch 1001/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3153
Epoch 1002/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3144
Epoch 1003/2000
1/1 [=====] - 0s 51ms/step - loss: 0.3135
Epoch 1004/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3126
Epoch 1005/2000
1/1 [=====] - 0s 11ms/step - loss: 0.3118
Epoch 1006/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3109
Epoch 1007/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3100
Epoch 1008/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3092
Epoch 1009/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3084
Epoch 1010/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3075
Epoch 1011/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3067
Epoch 1012/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3059
Epoch 1013/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3051
Epoch 1014/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3043
Epoch 1015/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3034
Epoch 1016/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3026
Epoch 1017/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3019
Epoch 1018/2000
1/1 [=====] - 0s 16ms/step - loss: 0.3011
Epoch 1019/2000
```

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1/1 [=====] - 0s 6ms/step - loss: 0.3003
Epoch 1020/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2995
Epoch 1021/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2987
Epoch 1022/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2980
Epoch 1023/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2972
Epoch 1024/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2964
Epoch 1025/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2957
Epoch 1026/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2949
Epoch 1027/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2942
Epoch 1028/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2934
Epoch 1029/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2927
Epoch 1030/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2920
Epoch 1031/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2913
Epoch 1032/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2905
Epoch 1033/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2898
Epoch 1034/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2891
Epoch 1035/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2884
Epoch 1036/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2877
Epoch 1037/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2870
Epoch 1038/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2863
Epoch 1039/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2856
Epoch 1040/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2849
Epoch 1041/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2842
Epoch 1042/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2835
Epoch 1043/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2829
Epoch 1044/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2822
Epoch 1045/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2815
Epoch 1046/2000
1/1 [=====] - 0s 25ms/step - loss: 0.2809
Epoch 1047/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2802
Epoch 1048/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2795
Epoch 1049/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2789
```

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Epoch 1050/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2782
Epoch 1051/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2776
Epoch 1052/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2769
Epoch 1053/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2763
Epoch 1054/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2757
Epoch 1055/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2750
Epoch 1056/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2744
Epoch 1057/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2738
Epoch 1058/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2731
Epoch 1059/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2725
Epoch 1060/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2719
Epoch 1061/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2713
Epoch 1062/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2707
Epoch 1063/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2701
Epoch 1064/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2695
Epoch 1065/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2689
Epoch 1066/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2683
Epoch 1067/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2677
Epoch 1068/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2671
Epoch 1069/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2665
Epoch 1070/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2659
Epoch 1071/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2653
Epoch 1072/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2647
Epoch 1073/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2641
Epoch 1074/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2635
Epoch 1075/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2630
Epoch 1076/2000
1/1 [=====] - 0s 54ms/step - loss: 0.2624
Epoch 1077/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2618
Epoch 1078/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2613
Epoch 1079/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2607
Epoch 1080/2000
```

```
1/1 [=====] - 0s 6ms/step - loss: 0.2601
Epoch 1081/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2596
Epoch 1082/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2590
Epoch 1083/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2585
Epoch 1084/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2579
Epoch 1085/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2574
Epoch 1086/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2568
Epoch 1087/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2563
Epoch 1088/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2557
Epoch 1089/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2552
Epoch 1090/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2546
Epoch 1091/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2541
Epoch 1092/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2536
Epoch 1093/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2530
Epoch 1094/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2525
Epoch 1095/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2520
Epoch 1096/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2514
Epoch 1097/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2509
Epoch 1098/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2504
Epoch 1099/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2499
Epoch 1100/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2494
Epoch 1101/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2488
Epoch 1102/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2483
Epoch 1103/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2478
Epoch 1104/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2473
Epoch 1105/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2468
Epoch 1106/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2463
Epoch 1107/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2458
Epoch 1108/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2453
Epoch 1109/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2448
Epoch 1110/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2443
```


Epoch 1111/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2438
Epoch 1112/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2433
Epoch 1113/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2428
Epoch 1114/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2423
Epoch 1115/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2418
Epoch 1116/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2413
Epoch 1117/2000
1/1 [=====] - 0s 21ms/step - loss: 0.2408
Epoch 1118/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2404
Epoch 1119/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2399
Epoch 1120/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2394
Epoch 1121/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2389
Epoch 1122/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2384
Epoch 1123/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2380
Epoch 1124/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2375
Epoch 1125/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2370
Epoch 1126/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2365
Epoch 1127/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2361
Epoch 1128/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2356
Epoch 1129/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2351
Epoch 1130/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2347
Epoch 1131/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2342
Epoch 1132/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2338
Epoch 1133/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2333
Epoch 1134/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2328
Epoch 1135/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2324
Epoch 1136/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2319
Epoch 1137/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2315
Epoch 1138/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2310
Epoch 1139/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2306
Epoch 1140/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2301
Epoch 1141/2000

1/1 [=====] - 0s 7ms/step - loss: 0.2297
Epoch 1142/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2292
Epoch 1143/2000
1/1 [=====] - 0s 13ms/step - loss: 0.2288
Epoch 1144/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2283
Epoch 1145/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2279
Epoch 1146/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2274
Epoch 1147/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2270
Epoch 1148/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2266
Epoch 1149/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2261
Epoch 1150/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2257
Epoch 1151/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2253
Epoch 1152/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2248
Epoch 1153/2000
1/1 [=====] - 0s 14ms/step - loss: 0.2244
Epoch 1154/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2240
Epoch 1155/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2235
Epoch 1156/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2231
Epoch 1157/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2227
Epoch 1158/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2223
Epoch 1159/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2218
Epoch 1160/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2214
Epoch 1161/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2210
Epoch 1162/2000
1/1 [=====] - 0s 16ms/step - loss: 0.2206
Epoch 1163/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2201
Epoch 1164/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2197
Epoch 1165/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2193
Epoch 1166/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2189
Epoch 1167/2000
1/1 [=====] - 0s 20ms/step - loss: 0.2185
Epoch 1168/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2181
Epoch 1169/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2177
Epoch 1170/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2173
Epoch 1171/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2168

Epoch 1172/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2164
Epoch 1173/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2160
Epoch 1174/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2156
Epoch 1175/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2152
Epoch 1176/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2148
Epoch 1177/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2144
Epoch 1178/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2140
Epoch 1179/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2136
Epoch 1180/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2132
Epoch 1181/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2128
Epoch 1182/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2124
Epoch 1183/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2120
Epoch 1184/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2116
Epoch 1185/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2112
Epoch 1186/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2108
Epoch 1187/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2105
Epoch 1188/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2101
Epoch 1189/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2097
Epoch 1190/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2093
Epoch 1191/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2089
Epoch 1192/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2085
Epoch 1193/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2081
Epoch 1194/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2078
Epoch 1195/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2074
Epoch 1196/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2070
Epoch 1197/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2066
Epoch 1198/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2062
Epoch 1199/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2059
Epoch 1200/2000
1/1 [=====] - 0s 16ms/step - loss: 0.2055
Epoch 1201/2000
1/1 [=====] - 0s 91ms/step - loss: 0.2051
Epoch 1202/2000

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1/1 [=====] - 0s 9ms/step - loss: 0.2047
Epoch 1203/2000
1/1 [=====] - 0s 21ms/step - loss: 0.2044
Epoch 1204/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2040
Epoch 1205/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2036
Epoch 1206/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2032
Epoch 1207/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2029
Epoch 1208/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2025
Epoch 1209/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2021
Epoch 1210/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2018
Epoch 1211/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2014
Epoch 1212/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2010
Epoch 1213/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2007
Epoch 1214/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2003
Epoch 1215/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1999
Epoch 1216/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1996
Epoch 1217/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1992
Epoch 1218/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1989
Epoch 1219/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1985
Epoch 1220/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1981
Epoch 1221/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1978
Epoch 1222/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1974
Epoch 1223/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1971
Epoch 1224/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1967
Epoch 1225/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1964
Epoch 1226/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1960
Epoch 1227/2000
1/1 [=====] - 0s 79ms/step - loss: 0.1957
Epoch 1228/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1953
Epoch 1229/2000
1/1 [=====] - 0s 24ms/step - loss: 0.1950
Epoch 1230/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1946
Epoch 1231/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1943
Epoch 1232/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1939
```

Epoch 1233/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1936
Epoch 1234/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1932
Epoch 1235/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1929
Epoch 1236/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1926
Epoch 1237/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1922
Epoch 1238/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1919
Epoch 1239/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1915
Epoch 1240/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1912
Epoch 1241/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1909
Epoch 1242/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1905
Epoch 1243/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1902
Epoch 1244/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1898
Epoch 1245/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1895
Epoch 1246/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1892
Epoch 1247/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1888
Epoch 1248/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1885
Epoch 1249/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1882
Epoch 1250/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1878
Epoch 1251/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1875
Epoch 1252/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1872
Epoch 1253/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1869
Epoch 1254/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1865
Epoch 1255/2000
1/1 [=====] - 0s 18ms/step - loss: 0.1862
Epoch 1256/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1859
Epoch 1257/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1856
Epoch 1258/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1852
Epoch 1259/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1849
Epoch 1260/2000
1/1 [=====] - 0s 76ms/step - loss: 0.1846
Epoch 1261/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1843
Epoch 1262/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1839
Epoch 1263/2000

```
1/1 [=====] - 0s 8ms/step - loss: 0.1836
Epoch 1264/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1833
Epoch 1265/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1830
Epoch 1266/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1827
Epoch 1267/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1824
Epoch 1268/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1820
Epoch 1269/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1817
Epoch 1270/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1814
Epoch 1271/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1811
Epoch 1272/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1808
Epoch 1273/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1805
Epoch 1274/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1802
Epoch 1275/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1798
Epoch 1276/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1795
Epoch 1277/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1792
Epoch 1278/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1789
Epoch 1279/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1786
Epoch 1280/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1783
Epoch 1281/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1780
Epoch 1282/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1777
Epoch 1283/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1774
Epoch 1284/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1771
Epoch 1285/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1768
Epoch 1286/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1765
Epoch 1287/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1762
Epoch 1288/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1759
Epoch 1289/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1756
Epoch 1290/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1753
Epoch 1291/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1750
Epoch 1292/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1747
Epoch 1293/2000
1/1 [=====] - 0s 85ms/step - loss: 0.1744
```

Epoch 1294/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1741
Epoch 1295/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1738
Epoch 1296/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1735
Epoch 1297/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1732
Epoch 1298/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1729
Epoch 1299/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1726
Epoch 1300/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1723
Epoch 1301/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1720
Epoch 1302/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1717
Epoch 1303/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1714
Epoch 1304/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1711
Epoch 1305/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1709
Epoch 1306/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1706
Epoch 1307/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1703
Epoch 1308/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1700
Epoch 1309/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1697
Epoch 1310/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1694
Epoch 1311/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1691
Epoch 1312/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1689
Epoch 1313/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1686
Epoch 1314/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1683
Epoch 1315/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1680
Epoch 1316/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1677
Epoch 1317/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1674
Epoch 1318/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1672
Epoch 1319/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1669
Epoch 1320/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1666
Epoch 1321/2000
1/1 [=====] - 0s 18ms/step - loss: 0.1663
Epoch 1322/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1660
Epoch 1323/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1658
Epoch 1324/2000

1/1 [=====] - 0s 7ms/step - loss: 0.1655
Epoch 1325/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1652
Epoch 1326/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1649
Epoch 1327/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1647
Epoch 1328/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1644
Epoch 1329/2000
1/1 [=====] - 0s 30ms/step - loss: 0.1641
Epoch 1330/2000
1/1 [=====] - 0s 19ms/step - loss: 0.1638
Epoch 1331/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1636
Epoch 1332/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1633
Epoch 1333/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1630
Epoch 1334/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1628
Epoch 1335/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1625
Epoch 1336/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1622
Epoch 1337/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1619
Epoch 1338/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1617
Epoch 1339/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1614
Epoch 1340/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1611
Epoch 1341/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1609
Epoch 1342/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1606
Epoch 1343/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1603
Epoch 1344/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1601
Epoch 1345/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1598
Epoch 1346/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1596
Epoch 1347/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1593
Epoch 1348/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1590
Epoch 1349/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1588
Epoch 1350/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1585
Epoch 1351/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1582
Epoch 1352/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1580
Epoch 1353/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1577
Epoch 1354/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1575

Epoch 1355/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1572
Epoch 1356/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1570
Epoch 1357/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1567
Epoch 1358/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1564
Epoch 1359/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1562
Epoch 1360/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1559
Epoch 1361/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1557
Epoch 1362/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1554
Epoch 1363/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1552
Epoch 1364/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1549
Epoch 1365/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1547
Epoch 1366/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1544
Epoch 1367/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1542
Epoch 1368/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1539
Epoch 1369/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1537
Epoch 1370/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1534
Epoch 1371/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1532
Epoch 1372/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1529
Epoch 1373/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1527
Epoch 1374/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1524
Epoch 1375/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1522
Epoch 1376/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1519
Epoch 1377/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1517
Epoch 1378/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1514
Epoch 1379/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1512
Epoch 1380/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1509
Epoch 1381/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1507
Epoch 1382/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1505
Epoch 1383/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1502
Epoch 1384/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1500
Epoch 1385/2000

1/1 [=====] - 0s 25ms/step - loss: 0.1497
Epoch 1386/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1495
Epoch 1387/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1492
Epoch 1388/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1490
Epoch 1389/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1488
Epoch 1390/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1485
Epoch 1391/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1483
Epoch 1392/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1481
Epoch 1393/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1478
Epoch 1394/2000
1/1 [=====] - 0s 17ms/step - loss: 0.1476
Epoch 1395/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1473
Epoch 1396/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1471
Epoch 1397/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1469
Epoch 1398/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1466
Epoch 1399/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1464
Epoch 1400/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1462
Epoch 1401/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1459
Epoch 1402/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1457
Epoch 1403/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1455
Epoch 1404/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1452
Epoch 1405/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1450
Epoch 1406/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1448
Epoch 1407/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1445
Epoch 1408/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1443
Epoch 1409/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1441
Epoch 1410/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1439
Epoch 1411/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1436
Epoch 1412/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1434
Epoch 1413/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1432
Epoch 1414/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1429
Epoch 1415/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1427

Epoch 1416/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1425
Epoch 1417/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1423
Epoch 1418/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1420
Epoch 1419/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1418
Epoch 1420/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1416
Epoch 1421/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1414
Epoch 1422/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1411
Epoch 1423/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1409
Epoch 1424/2000
1/1 [=====] - 0s 22ms/step - loss: 0.1407
Epoch 1425/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1405
Epoch 1426/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1402
Epoch 1427/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1400
Epoch 1428/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1398
Epoch 1429/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1396
Epoch 1430/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1394
Epoch 1431/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1391
Epoch 1432/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1389
Epoch 1433/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1387
Epoch 1434/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1385
Epoch 1435/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1383
Epoch 1436/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1381
Epoch 1437/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1378
Epoch 1438/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1376
Epoch 1439/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1374
Epoch 1440/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1372
Epoch 1441/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1370
Epoch 1442/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1368
Epoch 1443/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1365
Epoch 1444/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1363
Epoch 1445/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1361
Epoch 1446/2000

```
1/1 [=====] - 0s 5ms/step - loss: 0.1359
Epoch 1447/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1357
Epoch 1448/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1355
Epoch 1449/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1353
Epoch 1450/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1351
Epoch 1451/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1348
Epoch 1452/2000
1/1 [=====] - 0s 43ms/step - loss: 0.1346
Epoch 1453/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1344
Epoch 1454/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1342
Epoch 1455/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1340
Epoch 1456/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1338
Epoch 1457/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1336
Epoch 1458/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1334
Epoch 1459/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1332
Epoch 1460/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1330
Epoch 1461/2000
1/1 [=====] - 0s 41ms/step - loss: 0.1328
Epoch 1462/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1325
Epoch 1463/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1323
Epoch 1464/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1321
Epoch 1465/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1319
Epoch 1466/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1317
Epoch 1467/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1315
Epoch 1468/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1313
Epoch 1469/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1311
Epoch 1470/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1309
Epoch 1471/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1307
Epoch 1472/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1305
Epoch 1473/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1303
Epoch 1474/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1301
Epoch 1475/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1299
Epoch 1476/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1297
```

Epoch 1477/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1295
Epoch 1478/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1293
Epoch 1479/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1291
Epoch 1480/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1289
Epoch 1481/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1287
Epoch 1482/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1285
Epoch 1483/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1283
Epoch 1484/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1281
Epoch 1485/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1279
Epoch 1486/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1277
Epoch 1487/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1275
Epoch 1488/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1273
Epoch 1489/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1271
Epoch 1490/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1269
Epoch 1491/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1267
Epoch 1492/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1265
Epoch 1493/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1263
Epoch 1494/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1261
Epoch 1495/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1259
Epoch 1496/2000
1/1 [=====] - 0s 37ms/step - loss: 0.1257
Epoch 1497/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1255
Epoch 1498/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1254
Epoch 1499/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1252
Epoch 1500/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1250
Epoch 1501/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1248
Epoch 1502/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1246
Epoch 1503/2000
1/1 [=====] - 0s 91ms/step - loss: 0.1244
Epoch 1504/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1242
Epoch 1505/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1240
Epoch 1506/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1238
Epoch 1507/2000

1/1 [=====] - 0s 6ms/step - loss: 0.1236
Epoch 1508/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1234
Epoch 1509/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1233
Epoch 1510/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1231
Epoch 1511/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1229
Epoch 1512/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1227
Epoch 1513/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1225
Epoch 1514/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1223
Epoch 1515/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1221
Epoch 1516/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1219
Epoch 1517/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1217
Epoch 1518/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1216
Epoch 1519/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1214
Epoch 1520/2000
1/1 [=====] - 0s 22ms/step - loss: 0.1212
Epoch 1521/2000
1/1 [=====] - 0s 23ms/step - loss: 0.1210
Epoch 1522/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1208
Epoch 1523/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1206
Epoch 1524/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1204
Epoch 1525/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1203
Epoch 1526/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1201
Epoch 1527/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1199
Epoch 1528/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1197
Epoch 1529/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1195
Epoch 1530/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1193
Epoch 1531/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1192
Epoch 1532/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1190
Epoch 1533/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1188
Epoch 1534/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1186
Epoch 1535/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1184
Epoch 1536/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1183
Epoch 1537/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1181

Epoch 1538/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1179
Epoch 1539/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1177
Epoch 1540/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1175
Epoch 1541/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1174
Epoch 1542/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1172
Epoch 1543/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1170
Epoch 1544/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1168
Epoch 1545/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1166
Epoch 1546/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1165
Epoch 1547/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1163
Epoch 1548/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1161
Epoch 1549/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1159
Epoch 1550/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1158
Epoch 1551/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1156
Epoch 1552/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1154
Epoch 1553/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1152
Epoch 1554/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1151
Epoch 1555/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1149
Epoch 1556/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1147
Epoch 1557/2000
1/1 [=====] - 0s 21ms/step - loss: 0.1145
Epoch 1558/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1144
Epoch 1559/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1142
Epoch 1560/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1140
Epoch 1561/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1138
Epoch 1562/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1137
Epoch 1563/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1135
Epoch 1564/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1133
Epoch 1565/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1131
Epoch 1566/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1130
Epoch 1567/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1128
Epoch 1568/2000

1/1 [=====] - 0s 7ms/step - loss: 0.1126
Epoch 1569/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1125
Epoch 1570/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1123
Epoch 1571/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1121
Epoch 1572/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1119
Epoch 1573/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1118
Epoch 1574/2000
1/1 [=====] - 0s 62ms/step - loss: 0.1116
Epoch 1575/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1114
Epoch 1576/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1113
Epoch 1577/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1111
Epoch 1578/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1109
Epoch 1579/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1108
Epoch 1580/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1106
Epoch 1581/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1104
Epoch 1582/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1103
Epoch 1583/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1101
Epoch 1584/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1099
Epoch 1585/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1098
Epoch 1586/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1096
Epoch 1587/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1094
Epoch 1588/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1093
Epoch 1589/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1091
Epoch 1590/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1089
Epoch 1591/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1088
Epoch 1592/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1086
Epoch 1593/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1084
Epoch 1594/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1083
Epoch 1595/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1081
Epoch 1596/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1079
Epoch 1597/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1078
Epoch 1598/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1076


```
Epoch 1599/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1074
Epoch 1600/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1073
Epoch 1601/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1071
Epoch 1602/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1070
Epoch 1603/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1068
Epoch 1604/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1066
Epoch 1605/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1065
Epoch 1606/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1063
Epoch 1607/2000
1/1 [=====] - 0s 58ms/step - loss: 0.1061
Epoch 1608/2000
1/1 [=====] - 0s 86ms/step - loss: 0.1060
Epoch 1609/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1058
Epoch 1610/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1057
Epoch 1611/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1055
Epoch 1612/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1053
Epoch 1613/2000
1/1 [=====] - 0s 21ms/step - loss: 0.1052
Epoch 1614/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1050
Epoch 1615/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1049
Epoch 1616/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1047
Epoch 1617/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1045
Epoch 1618/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1044
Epoch 1619/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1042
Epoch 1620/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1041
Epoch 1621/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1039
Epoch 1622/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1038
Epoch 1623/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1036
Epoch 1624/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1034
Epoch 1625/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1033
Epoch 1626/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1031
Epoch 1627/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1030
Epoch 1628/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1028
Epoch 1629/2000
```

```
1/1 [=====] - 0s 5ms/step - loss: 0.1027
Epoch 1630/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1025
Epoch 1631/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1023
Epoch 1632/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1022
Epoch 1633/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1020
Epoch 1634/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1019
Epoch 1635/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1017
Epoch 1636/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1016
Epoch 1637/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1014
Epoch 1638/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1013
Epoch 1639/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1011
Epoch 1640/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1010
Epoch 1641/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1008
Epoch 1642/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1006
Epoch 1643/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1005
Epoch 1644/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1003
Epoch 1645/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1002
Epoch 1646/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1000
Epoch 1647/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0999
Epoch 1648/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0997
Epoch 1649/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0996
Epoch 1650/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0994
Epoch 1651/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0993
Epoch 1652/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0991
Epoch 1653/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0990
Epoch 1654/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0988
Epoch 1655/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0987
Epoch 1656/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0985
Epoch 1657/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0984
Epoch 1658/2000
1/1 [=====] - 0s 18ms/step - loss: 0.0982
Epoch 1659/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0981
```

```
Epoch 1660/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0979
Epoch 1661/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0978
Epoch 1662/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0976
Epoch 1663/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0975
Epoch 1664/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0973
Epoch 1665/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0972
Epoch 1666/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0970
Epoch 1667/2000
1/1 [=====] - 0s 101ms/step - loss: 0.0969
Epoch 1668/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0967
Epoch 1669/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0966
Epoch 1670/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0964
Epoch 1671/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0963
Epoch 1672/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0961
Epoch 1673/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0960
Epoch 1674/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0958
Epoch 1675/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0957
Epoch 1676/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0956
Epoch 1677/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0954
Epoch 1678/2000
1/1 [=====] - 0s 16ms/step - loss: 0.0953
Epoch 1679/2000
1/1 [=====] - 0s 22ms/step - loss: 0.0951
Epoch 1680/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0950
Epoch 1681/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0948
Epoch 1682/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0947
Epoch 1683/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0945
Epoch 1684/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0944
Epoch 1685/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0942
Epoch 1686/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0941
Epoch 1687/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0940
Epoch 1688/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0938
Epoch 1689/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0937
Epoch 1690/2000
```

```
1/1 [=====] - 0s 11ms/step - loss: 0.0935
Epoch 1691/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0934
Epoch 1692/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0932
Epoch 1693/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0931
Epoch 1694/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0930
Epoch 1695/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0928
Epoch 1696/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0927
Epoch 1697/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0925
Epoch 1698/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0924
Epoch 1699/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0922
Epoch 1700/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0921
Epoch 1701/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0920
Epoch 1702/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0918
Epoch 1703/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0917
Epoch 1704/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0915
Epoch 1705/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0914
Epoch 1706/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0912
Epoch 1707/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0911
Epoch 1708/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0910
Epoch 1709/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0908
Epoch 1710/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0907
Epoch 1711/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0905
Epoch 1712/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0904
Epoch 1713/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0903
Epoch 1714/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0901
Epoch 1715/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0900
Epoch 1716/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0899
Epoch 1717/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0897
Epoch 1718/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0896
Epoch 1719/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0894
Epoch 1720/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0893
```

```
Epoch 1721/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0892
Epoch 1722/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0890
Epoch 1723/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0889
Epoch 1724/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0887
Epoch 1725/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0886
Epoch 1726/2000
1/1 [=====] - 0s 21ms/step - loss: 0.0885
Epoch 1727/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0883
Epoch 1728/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0882
Epoch 1729/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0881
Epoch 1730/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0879
Epoch 1731/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0878
Epoch 1732/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0876
Epoch 1733/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0875
Epoch 1734/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0874
Epoch 1735/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0872
Epoch 1736/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0871
Epoch 1737/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0870
Epoch 1738/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0868
Epoch 1739/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0867
Epoch 1740/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0866
Epoch 1741/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0864
Epoch 1742/2000
1/1 [=====] - 0s 17ms/step - loss: 0.0863
Epoch 1743/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0862
Epoch 1744/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0860
Epoch 1745/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0859
Epoch 1746/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0858
Epoch 1747/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0856
Epoch 1748/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0855
Epoch 1749/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0854
Epoch 1750/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0852
Epoch 1751/2000
```

1/1 [=====] - 0s 8ms/step - loss: 0.0851
Epoch 1752/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0850
Epoch 1753/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0848
Epoch 1754/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0847
Epoch 1755/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0846
Epoch 1756/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0844
Epoch 1757/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0843
Epoch 1758/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0842
Epoch 1759/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0840
Epoch 1760/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0839
Epoch 1761/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0838
Epoch 1762/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0836
Epoch 1763/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0835
Epoch 1764/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0834
Epoch 1765/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0832
Epoch 1766/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0831
Epoch 1767/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0830
Epoch 1768/2000
1/1 [=====] - 0s 62ms/step - loss: 0.0828
Epoch 1769/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0827
Epoch 1770/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0826
Epoch 1771/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0824
Epoch 1772/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0823
Epoch 1773/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0822
Epoch 1774/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0821
Epoch 1775/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0819
Epoch 1776/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0818
Epoch 1777/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0817
Epoch 1778/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0815
Epoch 1779/2000
1/1 [=====] - 0s 20ms/step - loss: 0.0814
Epoch 1780/2000
1/1 [=====] - 0s 17ms/step - loss: 0.0813
Epoch 1781/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0812

Epoch 1782/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0810
Epoch 1783/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0809
Epoch 1784/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0808
Epoch 1785/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0806
Epoch 1786/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0805
Epoch 1787/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0804
Epoch 1788/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0803
Epoch 1789/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0801
Epoch 1790/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0800
Epoch 1791/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0799
Epoch 1792/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0797
Epoch 1793/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0796
Epoch 1794/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0795
Epoch 1795/2000
1/1 [=====] - 0s 18ms/step - loss: 0.0794
Epoch 1796/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0792
Epoch 1797/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0791
Epoch 1798/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0790
Epoch 1799/2000
1/1 [=====] - 0s 61ms/step - loss: 0.0789
Epoch 1800/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0787
Epoch 1801/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0786
Epoch 1802/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0785
Epoch 1803/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0784
Epoch 1804/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0782
Epoch 1805/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0781
Epoch 1806/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0780
Epoch 1807/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0778
Epoch 1808/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0777
Epoch 1809/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0776
Epoch 1810/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0775
Epoch 1811/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0774
Epoch 1812/2000

```
1/1 [=====] - 0s 6ms/step - loss: 0.0772
Epoch 1813/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0771
Epoch 1814/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0770
Epoch 1815/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0769
Epoch 1816/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0767
Epoch 1817/2000
1/1 [=====] - 0s 17ms/step - loss: 0.0766
Epoch 1818/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0765
Epoch 1819/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0764
Epoch 1820/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0762
Epoch 1821/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0761
Epoch 1822/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0760
Epoch 1823/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0759
Epoch 1824/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0757
Epoch 1825/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0756
Epoch 1826/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0755
Epoch 1827/2000
1/1 [=====] - 0s 30ms/step - loss: 0.0754
Epoch 1828/2000
1/1 [=====] - 0s 16ms/step - loss: 0.0753
Epoch 1829/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0751
Epoch 1830/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0750
Epoch 1831/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0749
Epoch 1832/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0748
Epoch 1833/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0746
Epoch 1834/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0745
Epoch 1835/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0744
Epoch 1836/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0743
Epoch 1837/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0742
Epoch 1838/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0740
Epoch 1839/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0739
Epoch 1840/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0738
Epoch 1841/2000
1/1 [=====] - 0s 17ms/step - loss: 0.0737
Epoch 1842/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0736
```



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Epoch 1843/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0734
Epoch 1844/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0733
Epoch 1845/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0732
Epoch 1846/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0731
Epoch 1847/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0730
Epoch 1848/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0728
Epoch 1849/2000
1/1 [=====] - 0s 62ms/step - loss: 0.0727
Epoch 1850/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0726
Epoch 1851/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0725
Epoch 1852/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0724
Epoch 1853/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0722
Epoch 1854/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0721
Epoch 1855/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0720
Epoch 1856/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0719
Epoch 1857/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0718
Epoch 1858/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0716
Epoch 1859/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0715
Epoch 1860/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0714
Epoch 1861/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0713
Epoch 1862/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0712
Epoch 1863/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0710
Epoch 1864/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0709
Epoch 1865/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0708
Epoch 1866/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0707
Epoch 1867/2000
1/1 [=====] - 0s 24ms/step - loss: 0.0706
Epoch 1868/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0705
Epoch 1869/2000
1/1 [=====] - 0s 16ms/step - loss: 0.0703
Epoch 1870/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0702
Epoch 1871/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0701
Epoch 1872/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0700
Epoch 1873/2000
```

```
1/1 [=====] - 0s 7ms/step - loss: 0.0699
Epoch 1874/2000
1/1 [=====] - 0s 30ms/step - loss: 0.0698
Epoch 1875/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0696
Epoch 1876/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0695
Epoch 1877/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0694
Epoch 1878/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0693
Epoch 1879/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0692
Epoch 1880/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0691
Epoch 1881/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0689
Epoch 1882/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0688
Epoch 1883/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0687
Epoch 1884/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0686
Epoch 1885/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0685
Epoch 1886/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0684
Epoch 1887/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0683
Epoch 1888/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0681
Epoch 1889/2000
1/1 [=====] - 0s 22ms/step - loss: 0.0680
Epoch 1890/2000
1/1 [=====] - 0s 48ms/step - loss: 0.0679
Epoch 1891/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0678
Epoch 1892/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0677
Epoch 1893/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0676
Epoch 1894/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0675
Epoch 1895/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0673
Epoch 1896/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0672
Epoch 1897/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0671
Epoch 1898/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0670
Epoch 1899/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0669
Epoch 1900/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0668
Epoch 1901/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0667
Epoch 1902/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0666
Epoch 1903/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0664
```

```
Epoch 1904/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0663
Epoch 1905/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0662
Epoch 1906/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0661
Epoch 1907/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0660
Epoch 1908/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0659
Epoch 1909/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0658
Epoch 1910/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0657
Epoch 1911/2000
1/1 [=====] - 0s 22ms/step - loss: 0.0655
Epoch 1912/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0654
Epoch 1913/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0653
Epoch 1914/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0652
Epoch 1915/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0651
Epoch 1916/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0650
Epoch 1917/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0649
Epoch 1918/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0648
Epoch 1919/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0646
Epoch 1920/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0645
Epoch 1921/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0644
Epoch 1922/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0643
Epoch 1923/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0642
Epoch 1924/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0641
Epoch 1925/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0640
Epoch 1926/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0639
Epoch 1927/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0638
Epoch 1928/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0637
Epoch 1929/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0635
Epoch 1930/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0634
Epoch 1931/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0633
Epoch 1932/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0632
Epoch 1933/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0631
Epoch 1934/2000
```

```
1/1 [=====] - 0s 8ms/step - loss: 0.0630
Epoch 1935/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0629
Epoch 1936/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0628
Epoch 1937/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0627
Epoch 1938/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0626
Epoch 1939/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0625
Epoch 1940/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0623
Epoch 1941/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0622
Epoch 1942/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0621
Epoch 1943/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0620
Epoch 1944/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0619
Epoch 1945/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0618
Epoch 1946/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0617
Epoch 1947/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0616
Epoch 1948/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0615
Epoch 1949/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0614
Epoch 1950/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0613
Epoch 1951/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0612
Epoch 1952/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0611
Epoch 1953/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0610
Epoch 1954/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0608
Epoch 1955/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0607
Epoch 1956/2000
1/1 [=====] - 0s 66ms/step - loss: 0.0606
Epoch 1957/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0605
Epoch 1958/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0604
Epoch 1959/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0603
Epoch 1960/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0602
Epoch 1961/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0601
Epoch 1962/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0600
Epoch 1963/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0599
Epoch 1964/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0598
```

```
Epoch 1965/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0597
Epoch 1966/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0596
Epoch 1967/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0595
Epoch 1968/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0594
Epoch 1969/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0593
Epoch 1970/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0592
Epoch 1971/2000
1/1 [=====] - 0s 23ms/step - loss: 0.0590
Epoch 1972/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0589
Epoch 1973/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0588
Epoch 1974/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0587
Epoch 1975/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0586
Epoch 1976/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0585
Epoch 1977/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0584
Epoch 1978/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0583
Epoch 1979/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0582
Epoch 1980/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0581
Epoch 1981/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0580
Epoch 1982/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0579
Epoch 1983/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0578
Epoch 1984/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0577
Epoch 1985/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0576
Epoch 1986/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0575
Epoch 1987/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0574
Epoch 1988/2000
1/1 [=====] - 0s 26ms/step - loss: 0.0573
Epoch 1989/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0572
Epoch 1990/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0571
Epoch 1991/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0570
Epoch 1992/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0569
Epoch 1993/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0568
Epoch 1994/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0567
Epoch 1995/2000
```

```

1/1 [=====] - 0s 4ms/step - loss: 0.0566
Epoch 1996/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0565
Epoch 1997/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0564
Epoch 1998/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0563
Epoch 1999/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0562
Epoch 2000/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0561
1/1 [=====] - 0s 143ms/step
SE PREDICE: [[6.117227]] CUANDO EN REALIDAD LA RESPUESTA ES 6.25
1/1 [=====] - 0s 31ms/step
0.05596976507579478 ERROR CUADRATICO MEDIO, DEBERIA SER LO MAS CERCANO A
0 POSIBLE

```

OCHO UNIDADES POR CAPA OCULTA

```

In [ ]: import tensorflow as tf
import numpy as np
from tensorflow import keras
# Declare model inputs and outputs for training y = x^2
xs = np.array([-4.0, -3.0, -2.0, -1.0, 0.0, 1.0, 2.0, 3.0, 4.0], dtype=float)
ys = np.array([16, 9, 4, 1, 0, 1, 4, 9, 16], dtype=float)

# numero de unidades por capa
n_unidades = 8
# funcion de activacion sigmoid
funcion_activacion = 'sigmoid'

# Build a Sequential model
# 2 capa oculta
# 1 capa de salida con 1 neurona y funcion de activacion lineal
model = tf.keras.Sequential([
    keras.layers.Dense(units=n_unidades, input_shape=(1,)),
    keras.layers.Dense(units=n_unidades, activation=funcion_activacion),
    keras.layers.Dense(units=1, activation='linear')
])

#compile
model.compile(optimizer='sgd', loss='mean_squared_error')
#fit con epochs 2000
model.fit(xs, ys, epochs=2000)

#predict en x=2.5
print('SE PREDICE:', model.predict([2.5]), " CUANDO EN REALIDAD LA RESPUESTA ES 6.25")

# Error cuadratico medio
from sklearn.metrics import mean_squared_error
# calcular error cuadratico medio
print(mean_squared_error(ys, model.predict(xs)), " ERROR CUADRATICO MEDIO")

Epoch 1/2000
1/1 [=====] - 1s 629ms/step - loss: 82.8915
Epoch 2/2000
1/1 [=====] - 0s 11ms/step - loss: 76.8569

```

```
Epoch 3/2000
1/1 [=====] - 0s 12ms/step - loss: 71.6011
Epoch 4/2000
1/1 [=====] - 0s 10ms/step - loss: 66.9836
Epoch 5/2000
1/1 [=====] - 0s 10ms/step - loss: 62.9034
Epoch 6/2000
1/1 [=====] - 0s 11ms/step - loss: 59.2862
Epoch 7/2000
1/1 [=====] - 0s 8ms/step - loss: 56.0752
Epoch 8/2000
1/1 [=====] - 0s 8ms/step - loss: 53.2255
Epoch 9/2000
1/1 [=====] - 0s 9ms/step - loss: 50.7005
Epoch 10/2000
1/1 [=====] - 0s 7ms/step - loss: 48.4684
Epoch 11/2000
1/1 [=====] - 0s 7ms/step - loss: 46.5014
Epoch 12/2000
1/1 [=====] - 0s 8ms/step - loss: 44.7740
Epoch 13/2000
1/1 [=====] - 0s 8ms/step - loss: 43.2627
Epoch 14/2000
1/1 [=====] - 0s 9ms/step - loss: 41.9456
Epoch 15/2000
1/1 [=====] - 0s 9ms/step - loss: 40.8023
Epoch 16/2000
1/1 [=====] - 0s 8ms/step - loss: 39.8136
Epoch 17/2000
1/1 [=====] - 0s 11ms/step - loss: 38.9619
Epoch 18/2000
1/1 [=====] - 0s 12ms/step - loss: 38.2309
Epoch 19/2000
1/1 [=====] - 0s 10ms/step - loss: 37.6056
Epoch 20/2000
1/1 [=====] - 0s 9ms/step - loss: 37.0724
Epoch 21/2000
1/1 [=====] - 0s 9ms/step - loss: 36.6193
Epoch 22/2000
1/1 [=====] - 0s 8ms/step - loss: 36.2352
Epoch 23/2000
1/1 [=====] - 0s 10ms/step - loss: 35.9104
Epoch 24/2000
1/1 [=====] - 0s 8ms/step - loss: 35.6366
Epoch 25/2000
1/1 [=====] - 0s 9ms/step - loss: 35.4061
Epoch 26/2000
1/1 [=====] - 0s 11ms/step - loss: 35.2125
Epoch 27/2000
1/1 [=====] - 0s 7ms/step - loss: 35.0502
Epoch 28/2000
1/1 [=====] - 0s 10ms/step - loss: 34.9144
Epoch 29/2000
1/1 [=====] - 0s 9ms/step - loss: 34.8008
Epoch 30/2000
1/1 [=====] - 0s 9ms/step - loss: 34.7059
Epoch 31/2000
1/1 [=====] - 0s 8ms/step - loss: 34.6267
Epoch 32/2000
1/1 [=====] - 0s 9ms/step - loss: 34.5607
Epoch 33/2000
```

1/1 [=====] - 0s 7ms/step - loss: 34.5056
Epoch 34/2000
1/1 [=====] - 0s 7ms/step - loss: 34.4598
Epoch 35/2000
1/1 [=====] - 0s 8ms/step - loss: 34.4215
Epoch 36/2000
1/1 [=====] - 0s 14ms/step - loss: 34.3896
Epoch 37/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3630
Epoch 38/2000
1/1 [=====] - 0s 9ms/step - loss: 34.3408
Epoch 39/2000
1/1 [=====] - 0s 64ms/step - loss: 34.3221
Epoch 40/2000
1/1 [=====] - 0s 10ms/step - loss: 34.3065
Epoch 41/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2934
Epoch 42/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2823
Epoch 43/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2729
Epoch 44/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2649
Epoch 45/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2581
Epoch 46/2000
1/1 [=====] - 0s 17ms/step - loss: 34.2522
Epoch 47/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2472
Epoch 48/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2427
Epoch 49/2000
1/1 [=====] - 0s 12ms/step - loss: 34.2388
Epoch 50/2000
1/1 [=====] - 0s 13ms/step - loss: 34.2354
Epoch 51/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2323
Epoch 52/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2295
Epoch 53/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2270
Epoch 54/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2247
Epoch 55/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2225
Epoch 56/2000
1/1 [=====] - 0s 19ms/step - loss: 34.2205
Epoch 57/2000
1/1 [=====] - 0s 15ms/step - loss: 34.2186
Epoch 58/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2167
Epoch 59/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2150
Epoch 60/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2133
Epoch 61/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2117
Epoch 62/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2101
Epoch 63/2000
1/1 [=====] - 0s 15ms/step - loss: 34.2086

Epoch 64/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2071
Epoch 65/2000
1/1 [=====] - 0s 12ms/step - loss: 34.2056
Epoch 66/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2041
Epoch 67/2000
1/1 [=====] - 0s 13ms/step - loss: 34.2027
Epoch 68/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2012
Epoch 69/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1998
Epoch 70/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1984
Epoch 71/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1970
Epoch 72/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1956
Epoch 73/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1942
Epoch 74/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1928
Epoch 75/2000
1/1 [=====] - 0s 18ms/step - loss: 34.1914
Epoch 76/2000
1/1 [=====] - 0s 9ms/step - loss: 34.1900
Epoch 77/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1886
Epoch 78/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1873
Epoch 79/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1859
Epoch 80/2000
1/1 [=====] - 0s 12ms/step - loss: 34.1845
Epoch 81/2000
1/1 [=====] - 0s 9ms/step - loss: 34.1831
Epoch 82/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1817
Epoch 83/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1803
Epoch 84/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1789
Epoch 85/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1775
Epoch 86/2000
1/1 [=====] - 0s 14ms/step - loss: 34.1761
Epoch 87/2000
1/1 [=====] - 0s 14ms/step - loss: 34.1747
Epoch 88/2000
1/1 [=====] - 0s 11ms/step - loss: 34.1733
Epoch 89/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1719
Epoch 90/2000
1/1 [=====] - 0s 9ms/step - loss: 34.1705
Epoch 91/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1691
Epoch 92/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1677
Epoch 93/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1663
Epoch 94/2000

1/1 [=====] - 0s 15ms/step - loss: 34.1648
Epoch 95/2000
1/1 [=====] - 0s 81ms/step - loss: 34.1634
Epoch 96/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1620
Epoch 97/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1605
Epoch 98/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1591
Epoch 99/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1576
Epoch 100/2000
1/1 [=====] - 0s 11ms/step - loss: 34.1561
Epoch 101/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1547
Epoch 102/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1532
Epoch 103/2000
1/1 [=====] - 0s 9ms/step - loss: 34.1517
Epoch 104/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1502
Epoch 105/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1488
Epoch 106/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1473
Epoch 107/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1458
Epoch 108/2000
1/1 [=====] - 0s 9ms/step - loss: 34.1442
Epoch 109/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1427
Epoch 110/2000
1/1 [=====] - 0s 11ms/step - loss: 34.1412
Epoch 111/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1396
Epoch 112/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1381
Epoch 113/2000
1/1 [=====] - 0s 9ms/step - loss: 34.1365
Epoch 114/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1350
Epoch 115/2000
1/1 [=====] - 0s 22ms/step - loss: 34.1334
Epoch 116/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1318
Epoch 117/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1302
Epoch 118/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1286
Epoch 119/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1270
Epoch 120/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1254
Epoch 121/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1238
Epoch 122/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1221
Epoch 123/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1205
Epoch 124/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1188

```
Epoch 125/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1171
Epoch 126/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1155
Epoch 127/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1138
Epoch 128/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1120
Epoch 129/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1103
Epoch 130/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1086
Epoch 131/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1068
Epoch 132/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1051
Epoch 133/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1033
Epoch 134/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1015
Epoch 135/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0997
Epoch 136/2000
1/1 [=====] - 0s 20ms/step - loss: 34.0979
Epoch 137/2000
1/1 [=====] - 0s 9ms/step - loss: 34.0961
Epoch 138/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0943
Epoch 139/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0924
Epoch 140/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0905
Epoch 141/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0887
Epoch 142/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0868
Epoch 143/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0849
Epoch 144/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0829
Epoch 145/2000
1/1 [=====] - 0s 9ms/step - loss: 34.0810
Epoch 146/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0790
Epoch 147/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0771
Epoch 148/2000
1/1 [=====] - 0s 9ms/step - loss: 34.0751
Epoch 149/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0730
Epoch 150/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0710
Epoch 151/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0690
Epoch 152/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0669
Epoch 153/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0648
Epoch 154/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0627
Epoch 155/2000
```

1/1 [=====] - 0s 7ms/step - loss: 34.0606
Epoch 156/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0585
Epoch 157/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0563
Epoch 158/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0542
Epoch 159/2000
1/1 [=====] - 0s 9ms/step - loss: 34.0520
Epoch 160/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0498
Epoch 161/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0475
Epoch 162/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0453
Epoch 163/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0430
Epoch 164/2000
1/1 [=====] - 0s 18ms/step - loss: 34.0407
Epoch 165/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0384
Epoch 166/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0361
Epoch 167/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0337
Epoch 168/2000
1/1 [=====] - 0s 10ms/step - loss: 34.0313
Epoch 169/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0289
Epoch 170/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0265
Epoch 171/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0241
Epoch 172/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0216
Epoch 173/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0191
Epoch 174/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0166
Epoch 175/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0141
Epoch 176/2000
1/1 [=====] - 0s 11ms/step - loss: 34.0115
Epoch 177/2000
1/1 [=====] - 0s 10ms/step - loss: 34.0089
Epoch 178/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0063
Epoch 179/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0036
Epoch 180/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0010
Epoch 181/2000
1/1 [=====] - 0s 22ms/step - loss: 33.9983
Epoch 182/2000
1/1 [=====] - 0s 7ms/step - loss: 33.9956
Epoch 183/2000
1/1 [=====] - 0s 7ms/step - loss: 33.9928
Epoch 184/2000
1/1 [=====] - 0s 6ms/step - loss: 33.9900
Epoch 185/2000
1/1 [=====] - 0s 5ms/step - loss: 33.9873

```
Epoch 186/2000
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Epoch 187/2000
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Epoch 190/2000
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Epoch 191/2000
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Epoch 192/2000
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Epoch 194/2000
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Epoch 195/2000
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Epoch 196/2000
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Epoch 197/2000
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Epoch 198/2000
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Epoch 199/2000
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Epoch 200/2000
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Epoch 201/2000
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Epoch 202/2000
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Epoch 203/2000
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Epoch 204/2000
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Epoch 205/2000
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Epoch 206/2000
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Epoch 207/2000
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Epoch 208/2000
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Epoch 209/2000
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Epoch 210/2000
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Epoch 211/2000
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Epoch 212/2000
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Epoch 213/2000
1/1 [=====] - 0s 9ms/step - loss: 33.8963
Epoch 214/2000
1/1 [=====] - 0s 7ms/step - loss: 33.8925
Epoch 215/2000
1/1 [=====] - 0s 62ms/step - loss: 33.8888
Epoch 216/2000
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Epoch 217/2000
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Epoch 218/2000
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Epoch 219/2000
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Epoch 220/2000
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Epoch 222/2000
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Epoch 223/2000
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Epoch 225/2000
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Epoch 226/2000
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Epoch 227/2000
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Epoch 228/2000
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Epoch 277/2000

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Epoch 321/2000
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Epoch 322/2000
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Epoch 326/2000
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Epoch 327/2000
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Epoch 328/2000
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Epoch 329/2000
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Epoch 338/2000

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Epoch 395/2000
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Epoch 399/2000

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Epoch 427/2000
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Epoch 429/2000
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Epoch 430/2000
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Epoch 459/2000
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Epoch 460/2000

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Epoch 464/2000
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Epoch 465/2000
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Epoch 466/2000
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Epoch 467/2000
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Epoch 468/2000
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Epoch 469/2000
1/1 [=====] - 0s 6ms/step - loss: 28.7448
Epoch 470/2000
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Epoch 471/2000
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Epoch 472/2000
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Epoch 473/2000
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Epoch 474/2000
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Epoch 475/2000
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Epoch 476/2000
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Epoch 477/2000
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Epoch 478/2000
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Epoch 479/2000
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Epoch 480/2000
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Epoch 481/2000
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Epoch 482/2000
1/1 [=====] - 0s 5ms/step - loss: 27.9071
Epoch 483/2000
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Epoch 484/2000
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Epoch 485/2000
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Epoch 486/2000
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Epoch 487/2000
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Epoch 488/2000
1/1 [=====] - 0s 6ms/step - loss: 27.4858
Epoch 489/2000
1/1 [=====] - 0s 6ms/step - loss: 27.4135
Epoch 490/2000
1/1 [=====] - 0s 12ms/step - loss: 27.3405
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Epoch 491/2000
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Epoch 492/2000
1/1 [=====] - 0s 8ms/step - loss: 27.1927
Epoch 493/2000
1/1 [=====] - 0s 61ms/step - loss: 27.1179
Epoch 494/2000
1/1 [=====] - 0s 19ms/step - loss: 27.0425
Epoch 495/2000
1/1 [=====] - 0s 12ms/step - loss: 26.9664
Epoch 496/2000
1/1 [=====] - 0s 21ms/step - loss: 26.8897
Epoch 497/2000
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Epoch 498/2000
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Epoch 499/2000
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Epoch 500/2000
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Epoch 501/2000
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Epoch 502/2000
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Epoch 503/2000
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Epoch 504/2000
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Epoch 506/2000
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Epoch 507/2000
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Epoch 509/2000
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Epoch 511/2000
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Epoch 512/2000
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Epoch 513/2000
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Epoch 514/2000
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Epoch 515/2000
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Epoch 516/2000
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Epoch 517/2000
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Epoch 518/2000
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Epoch 519/2000
1/1 [=====] - 0s 8ms/step - loss: 24.9556
Epoch 520/2000
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Epoch 521/2000

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Epoch 522/2000
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Epoch 523/2000
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Epoch 524/2000
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Epoch 525/2000
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Epoch 526/2000
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Epoch 527/2000
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Epoch 528/2000
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Epoch 529/2000
1/1 [=====] - 0s 8ms/step - loss: 24.0146
Epoch 530/2000
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Epoch 531/2000
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Epoch 532/2000
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Epoch 533/2000
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Epoch 534/2000
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Epoch 538/2000
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Epoch 539/2000
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Epoch 540/2000
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Epoch 543/2000
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Epoch 544/2000
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Epoch 545/2000
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Epoch 546/2000
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Epoch 547/2000
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Epoch 548/2000
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Epoch 549/2000
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Epoch 552/2000
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Epoch 553/2000
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Epoch 554/2000
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Epoch 555/2000
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Epoch 556/2000
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Epoch 557/2000
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Epoch 558/2000
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Epoch 559/2000
1/1 [=====] - 0s 6ms/step - loss: 20.8664
Epoch 560/2000
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Epoch 561/2000
1/1 [=====] - 0s 8ms/step - loss: 20.6418
Epoch 562/2000
1/1 [=====] - 0s 7ms/step - loss: 20.5289
Epoch 563/2000
1/1 [=====] - 0s 7ms/step - loss: 20.4157
Epoch 564/2000
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Epoch 565/2000
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Epoch 566/2000
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Epoch 568/2000
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Epoch 569/2000
1/1 [=====] - 0s 7ms/step - loss: 19.7291
Epoch 570/2000
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Epoch 572/2000
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Epoch 573/2000
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Epoch 574/2000
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Epoch 575/2000
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Epoch 576/2000
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Epoch 582/2000

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Epoch 584/2000
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Epoch 593/2000
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Epoch 599/2000
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Epoch 601/2000
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Epoch 607/2000
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Epoch 608/2000
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Epoch 609/2000
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Epoch 610/2000
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1/1 [=====] - 0s 7ms/step - loss: 14.7578
Epoch 612/2000
1/1 [=====] - 0s 7ms/step - loss: 14.6400

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Epoch 613/2000
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Epoch 614/2000
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Epoch 615/2000
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Epoch 616/2000
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Epoch 617/2000
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Epoch 618/2000
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Epoch 620/2000
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Epoch 623/2000
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Epoch 625/2000
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Epoch 626/2000
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Epoch 627/2000
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Epoch 628/2000
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Epoch 629/2000
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Epoch 630/2000
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Epoch 631/2000
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Epoch 633/2000
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Epoch 635/2000
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Epoch 636/2000
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Epoch 637/2000
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Epoch 639/2000
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Epoch 640/2000
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Epoch 642/2000
1/1 [=====] - 0s 10ms/step - loss: 11.2470
Epoch 643/2000
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Epoch 644/2000
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Epoch 646/2000
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Epoch 647/2000
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Epoch 650/2000
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Epoch 651/2000
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Epoch 652/2000
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Epoch 653/2000
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Epoch 654/2000
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Epoch 660/2000
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Epoch 662/2000
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Epoch 663/2000
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Epoch 664/2000
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Epoch 667/2000
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Epoch 668/2000
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Epoch 670/2000
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Epoch 672/2000
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Epoch 673/2000
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Epoch 674/2000
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Epoch 675/2000
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Epoch 676/2000
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Epoch 677/2000
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Epoch 678/2000
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Epoch 679/2000
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Epoch 680/2000
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Epoch 681/2000
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Epoch 682/2000
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Epoch 683/2000
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Epoch 684/2000
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Epoch 685/2000
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Epoch 686/2000
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Epoch 688/2000
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Epoch 689/2000
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Epoch 692/2000
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Epoch 696/2000
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Epoch 697/2000
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Epoch 698/2000
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Epoch 699/2000
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Epoch 700/2000
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Epoch 701/2000
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Epoch 703/2000
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Epoch 704/2000

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Epoch 707/2000
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Epoch 710/2000
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Epoch 711/2000
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Epoch 712/2000
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Epoch 713/2000
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Epoch 714/2000
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Epoch 715/2000
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Epoch 716/2000
1/1 [=====] - 0s 7ms/step - loss: 5.0748
Epoch 717/2000
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Epoch 718/2000
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Epoch 719/2000
1/1 [=====] - 0s 12ms/step - loss: 4.9022
Epoch 720/2000
1/1 [=====] - 0s 5ms/step - loss: 4.8459
Epoch 721/2000
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Epoch 722/2000
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Epoch 723/2000
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Epoch 724/2000
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Epoch 725/2000
1/1 [=====] - 0s 7ms/step - loss: 4.5738
Epoch 726/2000
1/1 [=====] - 0s 9ms/step - loss: 4.5212
Epoch 727/2000
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Epoch 728/2000
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Epoch 729/2000
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Epoch 730/2000
1/1 [=====] - 0s 7ms/step - loss: 4.3167
Epoch 731/2000
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Epoch 732/2000
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Epoch 734/2000
1/1 [=====] - 0s 5ms/step - loss: 4.1215

Epoch 735/2000
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Epoch 736/2000
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Epoch 737/2000
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Epoch 738/2000
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Epoch 739/2000
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Epoch 740/2000
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Epoch 741/2000
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Epoch 742/2000
1/1 [=====] - 0s 7ms/step - loss: 3.7577
Epoch 743/2000
1/1 [=====] - 0s 7ms/step - loss: 3.7146
Epoch 744/2000
1/1 [=====] - 0s 6ms/step - loss: 3.6720
Epoch 745/2000
1/1 [=====] - 0s 23ms/step - loss: 3.6300
Epoch 746/2000
1/1 [=====] - 0s 11ms/step - loss: 3.5884
Epoch 747/2000
1/1 [=====] - 0s 8ms/step - loss: 3.5474
Epoch 748/2000
1/1 [=====] - 0s 10ms/step - loss: 3.5068
Epoch 749/2000
1/1 [=====] - 0s 11ms/step - loss: 3.4668
Epoch 750/2000
1/1 [=====] - 0s 8ms/step - loss: 3.4272
Epoch 751/2000
1/1 [=====] - 0s 5ms/step - loss: 3.3881
Epoch 752/2000
1/1 [=====] - 0s 5ms/step - loss: 3.3495
Epoch 753/2000
1/1 [=====] - 0s 6ms/step - loss: 3.3114
Epoch 754/2000
1/1 [=====] - 0s 6ms/step - loss: 3.2737
Epoch 755/2000
1/1 [=====] - 0s 9ms/step - loss: 3.2365
Epoch 756/2000
1/1 [=====] - 0s 7ms/step - loss: 3.1997
Epoch 757/2000
1/1 [=====] - 0s 6ms/step - loss: 3.1634
Epoch 758/2000
1/1 [=====] - 0s 10ms/step - loss: 3.1276
Epoch 759/2000
1/1 [=====] - 0s 60ms/step - loss: 3.0922
Epoch 760/2000
1/1 [=====] - 0s 7ms/step - loss: 3.0572
Epoch 761/2000
1/1 [=====] - 0s 23ms/step - loss: 3.0227
Epoch 762/2000
1/1 [=====] - 0s 7ms/step - loss: 2.9886
Epoch 763/2000
1/1 [=====] - 0s 26ms/step - loss: 2.9550
Epoch 764/2000
1/1 [=====] - 0s 7ms/step - loss: 2.9217
Epoch 765/2000

1/1 [=====] - 0s 7ms/step - loss: 2.8889
Epoch 766/2000
1/1 [=====] - 0s 6ms/step - loss: 2.8564
Epoch 767/2000
1/1 [=====] - 0s 8ms/step - loss: 2.8244
Epoch 768/2000
1/1 [=====] - 0s 8ms/step - loss: 2.7928
Epoch 769/2000
1/1 [=====] - 0s 7ms/step - loss: 2.7616
Epoch 770/2000
1/1 [=====] - 0s 6ms/step - loss: 2.7308
Epoch 771/2000
1/1 [=====] - 0s 7ms/step - loss: 2.7003
Epoch 772/2000
1/1 [=====] - 0s 7ms/step - loss: 2.6703
Epoch 773/2000
1/1 [=====] - 0s 7ms/step - loss: 2.6406
Epoch 774/2000
1/1 [=====] - 0s 7ms/step - loss: 2.6113
Epoch 775/2000
1/1 [=====] - 0s 11ms/step - loss: 2.5824
Epoch 776/2000
1/1 [=====] - 0s 8ms/step - loss: 2.5538
Epoch 777/2000
1/1 [=====] - 0s 7ms/step - loss: 2.5256
Epoch 778/2000
1/1 [=====] - 0s 15ms/step - loss: 2.4978
Epoch 779/2000
1/1 [=====] - 0s 6ms/step - loss: 2.4703
Epoch 780/2000
1/1 [=====] - 0s 8ms/step - loss: 2.4431
Epoch 781/2000
1/1 [=====] - 0s 8ms/step - loss: 2.4163
Epoch 782/2000
1/1 [=====] - 0s 9ms/step - loss: 2.3899
Epoch 783/2000
1/1 [=====] - 0s 12ms/step - loss: 2.3638
Epoch 784/2000
1/1 [=====] - 0s 5ms/step - loss: 2.3380
Epoch 785/2000
1/1 [=====] - 0s 7ms/step - loss: 2.3125
Epoch 786/2000
1/1 [=====] - 0s 10ms/step - loss: 2.2874
Epoch 787/2000
1/1 [=====] - 0s 7ms/step - loss: 2.2626
Epoch 788/2000
1/1 [=====] - 0s 5ms/step - loss: 2.2381
Epoch 789/2000
1/1 [=====] - 0s 6ms/step - loss: 2.2139
Epoch 790/2000
1/1 [=====] - 0s 7ms/step - loss: 2.1900
Epoch 791/2000
1/1 [=====] - 0s 7ms/step - loss: 2.1665
Epoch 792/2000
1/1 [=====] - 0s 5ms/step - loss: 2.1432
Epoch 793/2000
1/1 [=====] - 0s 7ms/step - loss: 2.1203
Epoch 794/2000
1/1 [=====] - 0s 7ms/step - loss: 2.0976
Epoch 795/2000
1/1 [=====] - 0s 8ms/step - loss: 2.0752

Epoch 796/2000
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Epoch 797/2000
1/1 [=====] - 0s 5ms/step - loss: 2.0313
Epoch 798/2000
1/1 [=====] - 0s 7ms/step - loss: 2.0098
Epoch 799/2000
1/1 [=====] - 0s 5ms/step - loss: 1.9885
Epoch 800/2000
1/1 [=====] - 0s 6ms/step - loss: 1.9675
Epoch 801/2000
1/1 [=====] - 0s 6ms/step - loss: 1.9468
Epoch 802/2000
1/1 [=====] - 0s 7ms/step - loss: 1.9264
Epoch 803/2000
1/1 [=====] - 0s 7ms/step - loss: 1.9062
Epoch 804/2000
1/1 [=====] - 0s 7ms/step - loss: 1.8863
Epoch 805/2000
1/1 [=====] - 0s 11ms/step - loss: 1.8666
Epoch 806/2000
1/1 [=====] - 0s 16ms/step - loss: 1.8472
Epoch 807/2000
1/1 [=====] - 0s 11ms/step - loss: 1.8280
Epoch 808/2000
1/1 [=====] - 0s 10ms/step - loss: 1.8091
Epoch 809/2000
1/1 [=====] - 0s 9ms/step - loss: 1.7904
Epoch 810/2000
1/1 [=====] - 0s 6ms/step - loss: 1.7720
Epoch 811/2000
1/1 [=====] - 0s 7ms/step - loss: 1.7538
Epoch 812/2000
1/1 [=====] - 0s 5ms/step - loss: 1.7358
Epoch 813/2000
1/1 [=====] - 0s 11ms/step - loss: 1.7181
Epoch 814/2000
1/1 [=====] - 0s 7ms/step - loss: 1.7006
Epoch 815/2000
1/1 [=====] - 0s 6ms/step - loss: 1.6833
Epoch 816/2000
1/1 [=====] - 0s 16ms/step - loss: 1.6663
Epoch 817/2000
1/1 [=====] - 0s 10ms/step - loss: 1.6494
Epoch 818/2000
1/1 [=====] - 0s 9ms/step - loss: 1.6328
Epoch 819/2000
1/1 [=====] - 0s 7ms/step - loss: 1.6164
Epoch 820/2000
1/1 [=====] - 0s 7ms/step - loss: 1.6002
Epoch 821/2000
1/1 [=====] - 0s 6ms/step - loss: 1.5842
Epoch 822/2000
1/1 [=====] - 0s 7ms/step - loss: 1.5684
Epoch 823/2000
1/1 [=====] - 0s 6ms/step - loss: 1.5529
Epoch 824/2000
1/1 [=====] - 0s 6ms/step - loss: 1.5375
Epoch 825/2000
1/1 [=====] - 0s 9ms/step - loss: 1.5223
Epoch 826/2000

1/1 [=====] - 0s 8ms/step - loss: 1.5073
Epoch 827/2000
1/1 [=====] - 0s 8ms/step - loss: 1.4925
Epoch 828/2000
1/1 [=====] - 0s 8ms/step - loss: 1.4779
Epoch 829/2000
1/1 [=====] - 0s 7ms/step - loss: 1.4635
Epoch 830/2000
1/1 [=====] - 0s 8ms/step - loss: 1.4493
Epoch 831/2000
1/1 [=====] - 0s 7ms/step - loss: 1.4352
Epoch 832/2000
1/1 [=====] - 0s 13ms/step - loss: 1.4214
Epoch 833/2000
1/1 [=====] - 0s 8ms/step - loss: 1.4077
Epoch 834/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3942
Epoch 835/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3808
Epoch 836/2000
1/1 [=====] - 0s 9ms/step - loss: 1.3677
Epoch 837/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3547
Epoch 838/2000
1/1 [=====] - 0s 7ms/step - loss: 1.3418
Epoch 839/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3292
Epoch 840/2000
1/1 [=====] - 0s 9ms/step - loss: 1.3167
Epoch 841/2000
1/1 [=====] - 0s 7ms/step - loss: 1.3043
Epoch 842/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2921
Epoch 843/2000
1/1 [=====] - 0s 8ms/step - loss: 1.2801
Epoch 844/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2682
Epoch 845/2000
1/1 [=====] - 0s 9ms/step - loss: 1.2565
Epoch 846/2000
1/1 [=====] - 0s 6ms/step - loss: 1.2449
Epoch 847/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2335
Epoch 848/2000
1/1 [=====] - 0s 63ms/step - loss: 1.2222
Epoch 849/2000
1/1 [=====] - 0s 10ms/step - loss: 1.2111
Epoch 850/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2001
Epoch 851/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1892
Epoch 852/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1785
Epoch 853/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1679
Epoch 854/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1575
Epoch 855/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1472
Epoch 856/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1370

Epoch 857/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1270
Epoch 858/2000
1/1 [=====] - 0s 9ms/step - loss: 1.1171
Epoch 859/2000
1/1 [=====] - 0s 8ms/step - loss: 1.1073
Epoch 860/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0976
Epoch 861/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0880
Epoch 862/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0786
Epoch 863/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0693
Epoch 864/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0601
Epoch 865/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0511
Epoch 866/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0421
Epoch 867/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0333
Epoch 868/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0245
Epoch 869/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0159
Epoch 870/2000
1/1 [=====] - 0s 16ms/step - loss: 1.0074
Epoch 871/2000
1/1 [=====] - 0s 9ms/step - loss: 0.9990
Epoch 872/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9907
Epoch 873/2000
1/1 [=====] - 0s 13ms/step - loss: 0.9825
Epoch 874/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9744
Epoch 875/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9665
Epoch 876/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9586
Epoch 877/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9508
Epoch 878/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9431
Epoch 879/2000
1/1 [=====] - 0s 8ms/step - loss: 0.9355
Epoch 880/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9280
Epoch 881/2000
1/1 [=====] - 0s 8ms/step - loss: 0.9206
Epoch 882/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9133
Epoch 883/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9061
Epoch 884/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8990
Epoch 885/2000
1/1 [=====] - 0s 8ms/step - loss: 0.8920
Epoch 886/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8850
Epoch 887/2000

```
1/1 [=====] - 0s 5ms/step - loss: 0.8782
Epoch 888/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8714
Epoch 889/2000
1/1 [=====] - 0s 9ms/step - loss: 0.8647
Epoch 890/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8581
Epoch 891/2000
1/1 [=====] - 0s 69ms/step - loss: 0.8516
Epoch 892/2000
1/1 [=====] - 0s 10ms/step - loss: 0.8452
Epoch 893/2000
1/1 [=====] - 0s 13ms/step - loss: 0.8388
Epoch 894/2000
1/1 [=====] - 0s 9ms/step - loss: 0.8325
Epoch 895/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8263
Epoch 896/2000
1/1 [=====] - 0s 10ms/step - loss: 0.8202
Epoch 897/2000
1/1 [=====] - 0s 10ms/step - loss: 0.8142
Epoch 898/2000
1/1 [=====] - 0s 14ms/step - loss: 0.8082
Epoch 899/2000
1/1 [=====] - 0s 9ms/step - loss: 0.8023
Epoch 900/2000
1/1 [=====] - 0s 11ms/step - loss: 0.7965
Epoch 901/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7907
Epoch 902/2000
1/1 [=====] - 0s 10ms/step - loss: 0.7850
Epoch 903/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7794
Epoch 904/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7739
Epoch 905/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7684
Epoch 906/2000
1/1 [=====] - 0s 9ms/step - loss: 0.7630
Epoch 907/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7577
Epoch 908/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7524
Epoch 909/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7472
Epoch 910/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7421
Epoch 911/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7370
Epoch 912/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7320
Epoch 913/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7270
Epoch 914/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7221
Epoch 915/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7173
Epoch 916/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7125
Epoch 917/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7078
```

```
Epoch 918/2000
1/1 [=====] - 0s 8ms/step - loss: 0.7032
Epoch 919/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6986
Epoch 920/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6940
Epoch 921/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6895
Epoch 922/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6851
Epoch 923/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6807
Epoch 924/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6764
Epoch 925/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6721
Epoch 926/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6679
Epoch 927/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6637
Epoch 928/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6596
Epoch 929/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6556
Epoch 930/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6515
Epoch 931/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6476
Epoch 932/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6436
Epoch 933/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6398
Epoch 934/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6359
Epoch 935/2000
1/1 [=====] - 0s 10ms/step - loss: 0.6322
Epoch 936/2000
1/1 [=====] - 0s 9ms/step - loss: 0.6284
Epoch 937/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6247
Epoch 938/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6211
Epoch 939/2000
1/1 [=====] - 0s 11ms/step - loss: 0.6175
Epoch 940/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6139
Epoch 941/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6104
Epoch 942/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6069
Epoch 943/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6035
Epoch 944/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6001
Epoch 945/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5967
Epoch 946/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5934
Epoch 947/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5901
Epoch 948/2000
```

1/1 [=====] - 0s 6ms/step - loss: 0.5869
Epoch 949/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5837
Epoch 950/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5806
Epoch 951/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5774
Epoch 952/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5743
Epoch 953/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5713
Epoch 954/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5683
Epoch 955/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5653
Epoch 956/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5624
Epoch 957/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5595
Epoch 958/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5566
Epoch 959/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5537
Epoch 960/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5509
Epoch 961/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5482
Epoch 962/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5454
Epoch 963/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5427
Epoch 964/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5400
Epoch 965/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5374
Epoch 966/2000
1/1 [=====] - 0s 10ms/step - loss: 0.5348
Epoch 967/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5322
Epoch 968/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5296
Epoch 969/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5271
Epoch 970/2000
1/1 [=====] - 0s 14ms/step - loss: 0.5246
Epoch 971/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5221
Epoch 972/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5197
Epoch 973/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5173
Epoch 974/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5149
Epoch 975/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5125
Epoch 976/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5102
Epoch 977/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5079
Epoch 978/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5056

```
Epoch 979/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5033
Epoch 980/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5011
Epoch 981/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4989
Epoch 982/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4967
Epoch 983/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4946
Epoch 984/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4924
Epoch 985/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4903
Epoch 986/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4882
Epoch 987/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4862
Epoch 988/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4841
Epoch 989/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4821
Epoch 990/2000
1/1 [=====] - 0s 71ms/step - loss: 0.4801
Epoch 991/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4781
Epoch 992/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4762
Epoch 993/2000
1/1 [=====] - 0s 10ms/step - loss: 0.4743
Epoch 994/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4724
Epoch 995/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4705
Epoch 996/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4686
Epoch 997/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4668
Epoch 998/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4649
Epoch 999/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4631
Epoch 1000/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4613
Epoch 1001/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4596
Epoch 1002/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4578
Epoch 1003/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4561
Epoch 1004/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4544
Epoch 1005/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4527
Epoch 1006/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4510
Epoch 1007/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4494
Epoch 1008/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4477
Epoch 1009/2000
```

```
1/1 [=====] - 0s 4ms/step - loss: 0.4461
Epoch 1010/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4445
Epoch 1011/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4429
Epoch 1012/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4413
Epoch 1013/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4398
Epoch 1014/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4382
Epoch 1015/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4367
Epoch 1016/2000
1/1 [=====] - 0s 92ms/step - loss: 0.4352
Epoch 1017/2000
1/1 [=====] - 0s 23ms/step - loss: 0.4337
Epoch 1018/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4322
Epoch 1019/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4308
Epoch 1020/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4293
Epoch 1021/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4279
Epoch 1022/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4265
Epoch 1023/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4251
Epoch 1024/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4237
Epoch 1025/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4223
Epoch 1026/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4210
Epoch 1027/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4196
Epoch 1028/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4183
Epoch 1029/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4170
Epoch 1030/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4156
Epoch 1031/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4144
Epoch 1032/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4131
Epoch 1033/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4118
Epoch 1034/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4105
Epoch 1035/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4093
Epoch 1036/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4081
Epoch 1037/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4068
Epoch 1038/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4056
Epoch 1039/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4044
```



```
Epoch 1040/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4033
Epoch 1041/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4021
Epoch 1042/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4009
Epoch 1043/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3998
Epoch 1044/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3986
Epoch 1045/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3975
Epoch 1046/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3964
Epoch 1047/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3953
Epoch 1048/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3942
Epoch 1049/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3931
Epoch 1050/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3920
Epoch 1051/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3909
Epoch 1052/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3899
Epoch 1053/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3888
Epoch 1054/2000
1/1 [=====] - 0s 65ms/step - loss: 0.3878
Epoch 1055/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3868
Epoch 1056/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3857
Epoch 1057/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3847
Epoch 1058/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3837
Epoch 1059/2000
1/1 [=====] - 0s 14ms/step - loss: 0.3827
Epoch 1060/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3817
Epoch 1061/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3808
Epoch 1062/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3798
Epoch 1063/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3788
Epoch 1064/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3779
Epoch 1065/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3769
Epoch 1066/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3760
Epoch 1067/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3751
Epoch 1068/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3742
Epoch 1069/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3733
Epoch 1070/2000
```

```
1/1 [=====] - 0s 4ms/step - loss: 0.3724
Epoch 1071/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3715
Epoch 1072/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3706
Epoch 1073/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3697
Epoch 1074/2000
1/1 [=====] - 0s 12ms/step - loss: 0.3688
Epoch 1075/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3680
Epoch 1076/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3671
Epoch 1077/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3662
Epoch 1078/2000
1/1 [=====] - 0s 13ms/step - loss: 0.3654
Epoch 1079/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3646
Epoch 1080/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3637
Epoch 1081/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3629
Epoch 1082/2000
1/1 [=====] - 0s 19ms/step - loss: 0.3621
Epoch 1083/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3613
Epoch 1084/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3605
Epoch 1085/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3597
Epoch 1086/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3589
Epoch 1087/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3581
Epoch 1088/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3573
Epoch 1089/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3565
Epoch 1090/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3558
Epoch 1091/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3550
Epoch 1092/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3542
Epoch 1093/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3535
Epoch 1094/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3527
Epoch 1095/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3520
Epoch 1096/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3513
Epoch 1097/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3505
Epoch 1098/2000
1/1 [=====] - 0s 76ms/step - loss: 0.3498
Epoch 1099/2000
1/1 [=====] - 0s 21ms/step - loss: 0.3491
Epoch 1100/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3484
```

Epoch 1101/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3477
Epoch 1102/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3470
Epoch 1103/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3463
Epoch 1104/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3456
Epoch 1105/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3449
Epoch 1106/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3442
Epoch 1107/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3435
Epoch 1108/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3429
Epoch 1109/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3422
Epoch 1110/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3415
Epoch 1111/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3409
Epoch 1112/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3402
Epoch 1113/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3396
Epoch 1114/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3389
Epoch 1115/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3383
Epoch 1116/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3376
Epoch 1117/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3370
Epoch 1118/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3364
Epoch 1119/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3357
Epoch 1120/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3351
Epoch 1121/2000
1/1 [=====] - 0s 73ms/step - loss: 0.3345
Epoch 1122/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3339
Epoch 1123/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3333
Epoch 1124/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3327
Epoch 1125/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3321
Epoch 1126/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3315
Epoch 1127/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3309
Epoch 1128/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3303
Epoch 1129/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3297
Epoch 1130/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3291
Epoch 1131/2000

1/1 [=====] - 0s 6ms/step - loss: 0.3285
Epoch 1132/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3279
Epoch 1133/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3274
Epoch 1134/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3268
Epoch 1135/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3262
Epoch 1136/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3256
Epoch 1137/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3251
Epoch 1138/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3245
Epoch 1139/2000
1/1 [=====] - 0s 20ms/step - loss: 0.3240
Epoch 1140/2000
1/1 [=====] - 0s 11ms/step - loss: 0.3234
Epoch 1141/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3229
Epoch 1142/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3223
Epoch 1143/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3218
Epoch 1144/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3212
Epoch 1145/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3207
Epoch 1146/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3202
Epoch 1147/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3196
Epoch 1148/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3191
Epoch 1149/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3186
Epoch 1150/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3180
Epoch 1151/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3175
Epoch 1152/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3170
Epoch 1153/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3165
Epoch 1154/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3160
Epoch 1155/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3155
Epoch 1156/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3149
Epoch 1157/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3144
Epoch 1158/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3139
Epoch 1159/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3134
Epoch 1160/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3129
Epoch 1161/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3124

Epoch 1162/2000
1/1 [=====] - 0s 11ms/step - loss: 0.3119
Epoch 1163/2000
1/1 [=====] - 0s 12ms/step - loss: 0.3115
Epoch 1164/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3110
Epoch 1165/2000
1/1 [=====] - 0s 15ms/step - loss: 0.3105
Epoch 1166/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3100
Epoch 1167/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3095
Epoch 1168/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3090
Epoch 1169/2000
1/1 [=====] - 0s 11ms/step - loss: 0.3085
Epoch 1170/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3081
Epoch 1171/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3076
Epoch 1172/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3071
Epoch 1173/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3067
Epoch 1174/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3062
Epoch 1175/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3057
Epoch 1176/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3053
Epoch 1177/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3048
Epoch 1178/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3043
Epoch 1179/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3039
Epoch 1180/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3034
Epoch 1181/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3030
Epoch 1182/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3025
Epoch 1183/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3021
Epoch 1184/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3016
Epoch 1185/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3012
Epoch 1186/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3007
Epoch 1187/2000
1/1 [=====] - 0s 17ms/step - loss: 0.3003
Epoch 1188/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2998
Epoch 1189/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2994
Epoch 1190/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2989
Epoch 1191/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2985
Epoch 1192/2000

```
1/1 [=====] - 0s 8ms/step - loss: 0.2981
Epoch 1193/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2976
Epoch 1194/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2972
Epoch 1195/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2968
Epoch 1196/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2963
Epoch 1197/2000
1/1 [=====] - 0s 16ms/step - loss: 0.2959
Epoch 1198/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2955
Epoch 1199/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2951
Epoch 1200/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2946
Epoch 1201/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2942
Epoch 1202/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2938
Epoch 1203/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2934
Epoch 1204/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2929
Epoch 1205/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2925
Epoch 1206/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2921
Epoch 1207/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2917
Epoch 1208/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2913
Epoch 1209/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2909
Epoch 1210/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2905
Epoch 1211/2000
1/1 [=====] - 0s 25ms/step - loss: 0.2901
Epoch 1212/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2897
Epoch 1213/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2892
Epoch 1214/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2888
Epoch 1215/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2884
Epoch 1216/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2880
Epoch 1217/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2876
Epoch 1218/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2872
Epoch 1219/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2868
Epoch 1220/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2864
Epoch 1221/2000
1/1 [=====] - 0s 19ms/step - loss: 0.2860
Epoch 1222/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2856
```

```
Epoch 1223/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2853
Epoch 1224/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2849
Epoch 1225/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2845
Epoch 1226/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2841
Epoch 1227/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2837
Epoch 1228/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2833
Epoch 1229/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2829
Epoch 1230/2000
1/1 [=====] - 0s 21ms/step - loss: 0.2825
Epoch 1231/2000
1/1 [=====] - 0s 13ms/step - loss: 0.2821
Epoch 1232/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2818
Epoch 1233/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2814
Epoch 1234/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2810
Epoch 1235/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2806
Epoch 1236/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2802
Epoch 1237/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2798
Epoch 1238/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2795
Epoch 1239/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2791
Epoch 1240/2000
1/1 [=====] - 0s 38ms/step - loss: 0.2787
Epoch 1241/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2783
Epoch 1242/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2780
Epoch 1243/2000
1/1 [=====] - 0s 15ms/step - loss: 0.2776
Epoch 1244/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2772
Epoch 1245/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2769
Epoch 1246/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2765
Epoch 1247/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2761
Epoch 1248/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2757
Epoch 1249/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2754
Epoch 1250/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2750
Epoch 1251/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2746
Epoch 1252/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2743
Epoch 1253/2000
```

```
1/1 [=====] - 0s 6ms/step - loss: 0.2739
Epoch 1254/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2735
Epoch 1255/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2732
Epoch 1256/2000
1/1 [=====] - 0s 17ms/step - loss: 0.2728
Epoch 1257/2000
1/1 [=====] - 0s 13ms/step - loss: 0.2725
Epoch 1258/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2721
Epoch 1259/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2717
Epoch 1260/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2714
Epoch 1261/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2710
Epoch 1262/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2707
Epoch 1263/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2703
Epoch 1264/2000
1/1 [=====] - 0s 13ms/step - loss: 0.2700
Epoch 1265/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2696
Epoch 1266/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2693
Epoch 1267/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2689
Epoch 1268/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2685
Epoch 1269/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2682
Epoch 1270/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2678
Epoch 1271/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2675
Epoch 1272/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2671
Epoch 1273/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2668
Epoch 1274/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2664
Epoch 1275/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2661
Epoch 1276/2000
1/1 [=====] - 0s 15ms/step - loss: 0.2658
Epoch 1277/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2654
Epoch 1278/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2651
Epoch 1279/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2647
Epoch 1280/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2644
Epoch 1281/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2640
Epoch 1282/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2637
Epoch 1283/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2633
```


Epoch 1284/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2630
Epoch 1285/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2627
Epoch 1286/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2623
Epoch 1287/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2620
Epoch 1288/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2617
Epoch 1289/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2613
Epoch 1290/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2610
Epoch 1291/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2606
Epoch 1292/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2603
Epoch 1293/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2600
Epoch 1294/2000
1/1 [=====] - 0s 22ms/step - loss: 0.2596
Epoch 1295/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2593
Epoch 1296/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2590
Epoch 1297/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2586
Epoch 1298/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2583
Epoch 1299/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2580
Epoch 1300/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2576
Epoch 1301/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2573
Epoch 1302/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2570
Epoch 1303/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2567
Epoch 1304/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2563
Epoch 1305/2000
1/1 [=====] - 0s 60ms/step - loss: 0.2560
Epoch 1306/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2557
Epoch 1307/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2553
Epoch 1308/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2550
Epoch 1309/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2547
Epoch 1310/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2544
Epoch 1311/2000
1/1 [=====] - 0s 15ms/step - loss: 0.2540
Epoch 1312/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2537
Epoch 1313/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2534
Epoch 1314/2000

```
1/1 [=====] - 0s 5ms/step - loss: 0.2531
Epoch 1315/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2527
Epoch 1316/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2524
Epoch 1317/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2521
Epoch 1318/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2518
Epoch 1319/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2515
Epoch 1320/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2511
Epoch 1321/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2508
Epoch 1322/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2505
Epoch 1323/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2502
Epoch 1324/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2499
Epoch 1325/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2495
Epoch 1326/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2492
Epoch 1327/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2489
Epoch 1328/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2486
Epoch 1329/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2483
Epoch 1330/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2480
Epoch 1331/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2476
Epoch 1332/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2473
Epoch 1333/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2470
Epoch 1334/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2467
Epoch 1335/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2464
Epoch 1336/2000
1/1 [=====] - 0s 16ms/step - loss: 0.2461
Epoch 1337/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2458
Epoch 1338/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2455
Epoch 1339/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2451
Epoch 1340/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2448
Epoch 1341/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2445
Epoch 1342/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2442
Epoch 1343/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2439
Epoch 1344/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2436
```

Epoch 1345/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2433
Epoch 1346/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2430
Epoch 1347/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2427
Epoch 1348/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2424
Epoch 1349/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2421
Epoch 1350/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2418
Epoch 1351/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2415
Epoch 1352/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2411
Epoch 1353/2000
1/1 [=====] - 0s 17ms/step - loss: 0.2408
Epoch 1354/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2405
Epoch 1355/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2402
Epoch 1356/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2399
Epoch 1357/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2396
Epoch 1358/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2393
Epoch 1359/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2390
Epoch 1360/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2387
Epoch 1361/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2384
Epoch 1362/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2381
Epoch 1363/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2378
Epoch 1364/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2375
Epoch 1365/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2372
Epoch 1366/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2369
Epoch 1367/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2366
Epoch 1368/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2363
Epoch 1369/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2360
Epoch 1370/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2357
Epoch 1371/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2354
Epoch 1372/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2351
Epoch 1373/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2348
Epoch 1374/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2345
Epoch 1375/2000

1/1 [=====] - 0s 5ms/step - loss: 0.2342
Epoch 1376/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2339
Epoch 1377/2000
1/1 [=====] - 0s 14ms/step - loss: 0.2337
Epoch 1378/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2334
Epoch 1379/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2331
Epoch 1380/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2328
Epoch 1381/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2325
Epoch 1382/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2322
Epoch 1383/2000
1/1 [=====] - 0s 84ms/step - loss: 0.2319
Epoch 1384/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2316
Epoch 1385/2000
1/1 [=====] - 0s 26ms/step - loss: 0.2313
Epoch 1386/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2310
Epoch 1387/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2307
Epoch 1388/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2304
Epoch 1389/2000
1/1 [=====] - 0s 16ms/step - loss: 0.2301
Epoch 1390/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2298
Epoch 1391/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2296
Epoch 1392/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2293
Epoch 1393/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2290
Epoch 1394/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2287
Epoch 1395/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2284
Epoch 1396/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2281
Epoch 1397/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2278
Epoch 1398/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2275
Epoch 1399/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2272
Epoch 1400/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2270
Epoch 1401/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2267
Epoch 1402/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2264
Epoch 1403/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2261
Epoch 1404/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2258
Epoch 1405/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2255

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Epoch 1406/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2252
Epoch 1407/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2250
Epoch 1408/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2247
Epoch 1409/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2244
Epoch 1410/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2241
Epoch 1411/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2238
Epoch 1412/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2235
Epoch 1413/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2233
Epoch 1414/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2230
Epoch 1415/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2227
Epoch 1416/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2224
Epoch 1417/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2221
Epoch 1418/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2219
Epoch 1419/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2216
Epoch 1420/2000
1/1 [=====] - 0s 85ms/step - loss: 0.2213
Epoch 1421/2000
1/1 [=====] - 0s 14ms/step - loss: 0.2210
Epoch 1422/2000
1/1 [=====] - 0s 31ms/step - loss: 0.2207
Epoch 1423/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2204
Epoch 1424/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2202
Epoch 1425/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2199
Epoch 1426/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2196
Epoch 1427/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2193
Epoch 1428/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2191
Epoch 1429/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2188
Epoch 1430/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2185
Epoch 1431/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2182
Epoch 1432/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2179
Epoch 1433/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2177
Epoch 1434/2000
1/1 [=====] - 0s 15ms/step - loss: 0.2174
Epoch 1435/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2171
Epoch 1436/2000
```

1/1 [=====] - 0s 9ms/step - loss: 0.2168
Epoch 1437/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2166
Epoch 1438/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2163
Epoch 1439/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2160
Epoch 1440/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2157
Epoch 1441/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2155
Epoch 1442/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2152
Epoch 1443/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2149
Epoch 1444/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2147
Epoch 1445/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2144
Epoch 1446/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2141
Epoch 1447/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2138
Epoch 1448/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2136
Epoch 1449/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2133
Epoch 1450/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2130
Epoch 1451/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2127
Epoch 1452/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2125
Epoch 1453/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2122
Epoch 1454/2000
1/1 [=====] - 0s 16ms/step - loss: 0.2119
Epoch 1455/2000
1/1 [=====] - 0s 47ms/step - loss: 0.2117
Epoch 1456/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2114
Epoch 1457/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2111
Epoch 1458/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2109
Epoch 1459/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2106
Epoch 1460/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2103
Epoch 1461/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2101
Epoch 1462/2000
1/1 [=====] - 0s 29ms/step - loss: 0.2098
Epoch 1463/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2095
Epoch 1464/2000
1/1 [=====] - 0s 26ms/step - loss: 0.2092
Epoch 1465/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2090
Epoch 1466/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2087

Epoch 1467/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2084
Epoch 1468/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2082
Epoch 1469/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2079
Epoch 1470/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2076
Epoch 1471/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2074
Epoch 1472/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2071
Epoch 1473/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2069
Epoch 1474/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2066
Epoch 1475/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2063
Epoch 1476/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2061
Epoch 1477/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2058
Epoch 1478/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2055
Epoch 1479/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2053
Epoch 1480/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2050
Epoch 1481/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2047
Epoch 1482/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2045
Epoch 1483/2000
1/1 [=====] - 0s 28ms/step - loss: 0.2042
Epoch 1484/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2040
Epoch 1485/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2037
Epoch 1486/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2034
Epoch 1487/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2032
Epoch 1488/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2029
Epoch 1489/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2026
Epoch 1490/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2024
Epoch 1491/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2021
Epoch 1492/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2019
Epoch 1493/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2016
Epoch 1494/2000
1/1 [=====] - 0s 92ms/step - loss: 0.2014
Epoch 1495/2000
1/1 [=====] - 0s 24ms/step - loss: 0.2011
Epoch 1496/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2008
Epoch 1497/2000

1/1 [=====] - 0s 7ms/step - loss: 0.2006
Epoch 1498/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2003
Epoch 1499/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2001
Epoch 1500/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1998
Epoch 1501/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1995
Epoch 1502/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1993
Epoch 1503/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1990
Epoch 1504/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1988
Epoch 1505/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1985
Epoch 1506/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1983
Epoch 1507/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1980
Epoch 1508/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1977
Epoch 1509/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1975
Epoch 1510/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1972
Epoch 1511/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1970
Epoch 1512/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1967
Epoch 1513/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1965
Epoch 1514/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1962
Epoch 1515/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1960
Epoch 1516/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1957
Epoch 1517/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1955
Epoch 1518/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1952
Epoch 1519/2000
1/1 [=====] - 0s 23ms/step - loss: 0.1949
Epoch 1520/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1947
Epoch 1521/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1944
Epoch 1522/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1942
Epoch 1523/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1939
Epoch 1524/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1937
Epoch 1525/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1934
Epoch 1526/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1932
Epoch 1527/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1929

Epoch 1528/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1927
Epoch 1529/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1924
Epoch 1530/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1922
Epoch 1531/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1919
Epoch 1532/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1917
Epoch 1533/2000
1/1 [=====] - 0s 17ms/step - loss: 0.1914
Epoch 1534/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1912
Epoch 1535/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1909
Epoch 1536/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1907
Epoch 1537/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1904
Epoch 1538/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1902
Epoch 1539/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1899
Epoch 1540/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1897
Epoch 1541/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1894
Epoch 1542/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1892
Epoch 1543/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1890
Epoch 1544/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1887
Epoch 1545/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1885
Epoch 1546/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1882
Epoch 1547/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1880
Epoch 1548/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1877
Epoch 1549/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1875
Epoch 1550/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1872
Epoch 1551/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1870
Epoch 1552/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1867
Epoch 1553/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1865
Epoch 1554/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1863
Epoch 1555/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1860
Epoch 1556/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1858
Epoch 1557/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1855
Epoch 1558/2000

1/1 [=====] - 0s 10ms/step - loss: 0.1853
Epoch 1559/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1850
Epoch 1560/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1848
Epoch 1561/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1845
Epoch 1562/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1843
Epoch 1563/2000
1/1 [=====] - 0s 76ms/step - loss: 0.1841
Epoch 1564/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1838
Epoch 1565/2000
1/1 [=====] - 0s 18ms/step - loss: 0.1836
Epoch 1566/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1833
Epoch 1567/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1831
Epoch 1568/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1829
Epoch 1569/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1826
Epoch 1570/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1824
Epoch 1571/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1821
Epoch 1572/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1819
Epoch 1573/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1817
Epoch 1574/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1814
Epoch 1575/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1812
Epoch 1576/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1809
Epoch 1577/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1807
Epoch 1578/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1805
Epoch 1579/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1802
Epoch 1580/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1800
Epoch 1581/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1797
Epoch 1582/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1795
Epoch 1583/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1793
Epoch 1584/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1790
Epoch 1585/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1788
Epoch 1586/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1786
Epoch 1587/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1783
Epoch 1588/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1781

```
Epoch 1589/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1778
Epoch 1590/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1776
Epoch 1591/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1774
Epoch 1592/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1771
Epoch 1593/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1769
Epoch 1594/2000
1/1 [=====] - 0s 20ms/step - loss: 0.1767
Epoch 1595/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1764
Epoch 1596/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1762
Epoch 1597/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1760
Epoch 1598/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1757
Epoch 1599/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1755
Epoch 1600/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1753
Epoch 1601/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1750
Epoch 1602/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1748
Epoch 1603/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1746
Epoch 1604/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1743
Epoch 1605/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1741
Epoch 1606/2000
1/1 [=====] - 0s 18ms/step - loss: 0.1739
Epoch 1607/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1736
Epoch 1608/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1734
Epoch 1609/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1732
Epoch 1610/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1729
Epoch 1611/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1727
Epoch 1612/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1725
Epoch 1613/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1722
Epoch 1614/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1720
Epoch 1615/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1718
Epoch 1616/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1716
Epoch 1617/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1713
Epoch 1618/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1711
Epoch 1619/2000
```

```
1/1 [=====] - 0s 13ms/step - loss: 0.1709
Epoch 1620/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1706
Epoch 1621/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1704
Epoch 1622/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1702
Epoch 1623/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1700
Epoch 1624/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1697
Epoch 1625/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1695
Epoch 1626/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1693
Epoch 1627/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1690
Epoch 1628/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1688
Epoch 1629/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1686
Epoch 1630/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1684
Epoch 1631/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1681
Epoch 1632/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1679
Epoch 1633/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1677
Epoch 1634/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1675
Epoch 1635/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1672
Epoch 1636/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1670
Epoch 1637/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1668
Epoch 1638/2000
1/1 [=====] - 0s 81ms/step - loss: 0.1666
Epoch 1639/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1663
Epoch 1640/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1661
Epoch 1641/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1659
Epoch 1642/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1657
Epoch 1643/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1654
Epoch 1644/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1652
Epoch 1645/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1650
Epoch 1646/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1648
Epoch 1647/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1645
Epoch 1648/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1643
Epoch 1649/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1641
```

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Epoch 1650/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1639
Epoch 1651/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1637
Epoch 1652/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1634
Epoch 1653/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1632
Epoch 1654/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1630
Epoch 1655/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1628
Epoch 1656/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1625
Epoch 1657/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1623
Epoch 1658/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1621
Epoch 1659/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1619
Epoch 1660/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1617
Epoch 1661/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1614
Epoch 1662/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1612
Epoch 1663/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1610
Epoch 1664/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1608
Epoch 1665/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1606
Epoch 1666/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1604
Epoch 1667/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1601
Epoch 1668/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1599
Epoch 1669/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1597
Epoch 1670/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1595
Epoch 1671/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1593
Epoch 1672/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1590
Epoch 1673/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1588
Epoch 1674/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1586
Epoch 1675/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1584
Epoch 1676/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1582
Epoch 1677/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1580
Epoch 1678/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1577
Epoch 1679/2000
1/1 [=====] - 0s 60ms/step - loss: 0.1575
Epoch 1680/2000
```

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1/1 [=====] - 0s 9ms/step - loss: 0.1573
Epoch 1681/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1571
Epoch 1682/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1569
Epoch 1683/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1567
Epoch 1684/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1565
Epoch 1685/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1562
Epoch 1686/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1560
Epoch 1687/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1558
Epoch 1688/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1556
Epoch 1689/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1554
Epoch 1690/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1552
Epoch 1691/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1550
Epoch 1692/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1547
Epoch 1693/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1545
Epoch 1694/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1543
Epoch 1695/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1541
Epoch 1696/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1539
Epoch 1697/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1537
Epoch 1698/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1535
Epoch 1699/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1533
Epoch 1700/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1531
Epoch 1701/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1528
Epoch 1702/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1526
Epoch 1703/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1524
Epoch 1704/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1522
Epoch 1705/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1520
Epoch 1706/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1518
Epoch 1707/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1516
Epoch 1708/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1514
Epoch 1709/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1512
Epoch 1710/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1510
```

Epoch 1711/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1507
Epoch 1712/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1505
Epoch 1713/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1503
Epoch 1714/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1501
Epoch 1715/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1499
Epoch 1716/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1497
Epoch 1717/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1495
Epoch 1718/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1493
Epoch 1719/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1491
Epoch 1720/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1489
Epoch 1721/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1487
Epoch 1722/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1485
Epoch 1723/2000
1/1 [=====] - 0s 93ms/step - loss: 0.1483
Epoch 1724/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1481
Epoch 1725/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1478
Epoch 1726/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1476
Epoch 1727/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1474
Epoch 1728/2000
1/1 [=====] - 0s 21ms/step - loss: 0.1472
Epoch 1729/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1470
Epoch 1730/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1468
Epoch 1731/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1466
Epoch 1732/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1464
Epoch 1733/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1462
Epoch 1734/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1460
Epoch 1735/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1458
Epoch 1736/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1456
Epoch 1737/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1454
Epoch 1738/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1452
Epoch 1739/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1450
Epoch 1740/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1448
Epoch 1741/2000

1/1 [=====] - 0s 5ms/step - loss: 0.1446
Epoch 1742/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1444
Epoch 1743/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1442
Epoch 1744/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1440
Epoch 1745/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1438
Epoch 1746/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1436
Epoch 1747/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1434
Epoch 1748/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1432
Epoch 1749/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1430
Epoch 1750/2000
1/1 [=====] - 0s 66ms/step - loss: 0.1428
Epoch 1751/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1426
Epoch 1752/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1424
Epoch 1753/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1422
Epoch 1754/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1420
Epoch 1755/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1418
Epoch 1756/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1416
Epoch 1757/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1414
Epoch 1758/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1412
Epoch 1759/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1410
Epoch 1760/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1408
Epoch 1761/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1406
Epoch 1762/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1404
Epoch 1763/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1402
Epoch 1764/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1400
Epoch 1765/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1398
Epoch 1766/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1396
Epoch 1767/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1394
Epoch 1768/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1392
Epoch 1769/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1390
Epoch 1770/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1388
Epoch 1771/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1386


```
Epoch 1772/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1384
Epoch 1773/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1382
Epoch 1774/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1380
Epoch 1775/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1378
Epoch 1776/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1376
Epoch 1777/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1374
Epoch 1778/2000
1/1 [=====] - 0s 27ms/step - loss: 0.1373
Epoch 1779/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1371
Epoch 1780/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1369
Epoch 1781/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1367
Epoch 1782/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1365
Epoch 1783/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1363
Epoch 1784/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1361
Epoch 1785/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1359
Epoch 1786/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1357
Epoch 1787/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1355
Epoch 1788/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1353
Epoch 1789/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1351
Epoch 1790/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1349
Epoch 1791/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1347
Epoch 1792/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1346
Epoch 1793/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1344
Epoch 1794/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1342
Epoch 1795/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1340
Epoch 1796/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1338
Epoch 1797/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1336
Epoch 1798/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1334
Epoch 1799/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1332
Epoch 1800/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1330
Epoch 1801/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1328
Epoch 1802/2000
```

```
1/1 [=====] - 0s 8ms/step - loss: 0.1327
Epoch 1803/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1325
Epoch 1804/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1323
Epoch 1805/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1321
Epoch 1806/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1319
Epoch 1807/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1317
Epoch 1808/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1315
Epoch 1809/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1313
Epoch 1810/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1311
Epoch 1811/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1310
Epoch 1812/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1308
Epoch 1813/2000
1/1 [=====] - 0s 71ms/step - loss: 0.1306
Epoch 1814/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1304
Epoch 1815/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1302
Epoch 1816/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1300
Epoch 1817/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1298
Epoch 1818/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1297
Epoch 1819/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1295
Epoch 1820/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1293
Epoch 1821/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1291
Epoch 1822/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1289
Epoch 1823/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1287
Epoch 1824/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1285
Epoch 1825/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1284
Epoch 1826/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1282
Epoch 1827/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1280
Epoch 1828/2000
1/1 [=====] - 0s 21ms/step - loss: 0.1278
Epoch 1829/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1276
Epoch 1830/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1274
Epoch 1831/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1273
Epoch 1832/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1271
```

Epoch 1833/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1269
Epoch 1834/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1267
Epoch 1835/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1265
Epoch 1836/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1263
Epoch 1837/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1262
Epoch 1838/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1260
Epoch 1839/2000
1/1 [=====] - 0s 24ms/step - loss: 0.1258
Epoch 1840/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1256
Epoch 1841/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1254
Epoch 1842/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1253
Epoch 1843/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1251
Epoch 1844/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1249
Epoch 1845/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1247
Epoch 1846/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1245
Epoch 1847/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1244
Epoch 1848/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1242
Epoch 1849/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1240
Epoch 1850/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1238
Epoch 1851/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1236
Epoch 1852/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1235
Epoch 1853/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1233
Epoch 1854/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1231
Epoch 1855/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1229
Epoch 1856/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1228
Epoch 1857/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1226
Epoch 1858/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1224
Epoch 1859/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1222
Epoch 1860/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1220
Epoch 1861/2000
1/1 [=====] - 0s 61ms/step - loss: 0.1219
Epoch 1862/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1217
Epoch 1863/2000

```
1/1 [=====] - 0s 6ms/step - loss: 0.1215
Epoch 1864/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1213
Epoch 1865/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1212
Epoch 1866/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1210
Epoch 1867/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1208
Epoch 1868/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1206
Epoch 1869/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1205
Epoch 1870/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1203
Epoch 1871/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1201
Epoch 1872/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1199
Epoch 1873/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1198
Epoch 1874/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1196
Epoch 1875/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1194
Epoch 1876/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1192
Epoch 1877/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1191
Epoch 1878/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1189
Epoch 1879/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1187
Epoch 1880/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1185
Epoch 1881/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1184
Epoch 1882/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1182
Epoch 1883/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1180
Epoch 1884/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1179
Epoch 1885/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1177
Epoch 1886/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1175
Epoch 1887/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1173
Epoch 1888/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1172
Epoch 1889/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1170
Epoch 1890/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1168
Epoch 1891/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1167
Epoch 1892/2000
1/1 [=====] - 0s 20ms/step - loss: 0.1165
Epoch 1893/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1163
```

Epoch 1894/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1161
Epoch 1895/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1160
Epoch 1896/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1158
Epoch 1897/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1156
Epoch 1898/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1155
Epoch 1899/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1153
Epoch 1900/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1151
Epoch 1901/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1150
Epoch 1902/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1148
Epoch 1903/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1146
Epoch 1904/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1145
Epoch 1905/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1143
Epoch 1906/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1141
Epoch 1907/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1140
Epoch 1908/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1138
Epoch 1909/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1136
Epoch 1910/2000
1/1 [=====] - 0s 62ms/step - loss: 0.1135
Epoch 1911/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1133
Epoch 1912/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1131
Epoch 1913/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1130
Epoch 1914/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1128
Epoch 1915/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1126
Epoch 1916/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1125
Epoch 1917/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1123
Epoch 1918/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1121
Epoch 1919/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1120
Epoch 1920/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1118
Epoch 1921/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1116
Epoch 1922/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1115
Epoch 1923/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1113
Epoch 1924/2000

1/1 [=====] - 0s 15ms/step - loss: 0.1111
Epoch 1925/2000
1/1 [=====] - 0s 21ms/step - loss: 0.1110
Epoch 1926/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1108
Epoch 1927/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1107
Epoch 1928/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1105
Epoch 1929/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1103
Epoch 1930/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1102
Epoch 1931/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1100
Epoch 1932/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1098
Epoch 1933/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1097
Epoch 1934/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1095
Epoch 1935/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1094
Epoch 1936/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1092
Epoch 1937/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1090
Epoch 1938/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1089
Epoch 1939/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1087
Epoch 1940/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1085
Epoch 1941/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1084
Epoch 1942/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1082
Epoch 1943/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1081
Epoch 1944/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1079
Epoch 1945/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1077
Epoch 1946/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1076
Epoch 1947/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1074
Epoch 1948/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1073
Epoch 1949/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1071
Epoch 1950/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1070
Epoch 1951/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1068
Epoch 1952/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1066
Epoch 1953/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1065
Epoch 1954/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1063

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Epoch 1955/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1062
Epoch 1956/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1060
Epoch 1957/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1058
Epoch 1958/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1057
Epoch 1959/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1055
Epoch 1960/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1054
Epoch 1961/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1052
Epoch 1962/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1051
Epoch 1963/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1049
Epoch 1964/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1048
Epoch 1965/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1046
Epoch 1966/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1044
Epoch 1967/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1043
Epoch 1968/2000
1/1 [=====] - 0s 64ms/step - loss: 0.1041
Epoch 1969/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1040
Epoch 1970/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1038
Epoch 1971/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1037
Epoch 1972/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1035
Epoch 1973/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1034
Epoch 1974/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1032
Epoch 1975/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1031
Epoch 1976/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1029
Epoch 1977/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1027
Epoch 1978/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1026
Epoch 1979/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1024
Epoch 1980/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1023
Epoch 1981/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1021
Epoch 1982/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1020
Epoch 1983/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1018
Epoch 1984/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1017
Epoch 1985/2000
```

1/1 [=====] - 0s 6ms/step - loss: 0.1015
Epoch 1986/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1014
Epoch 1987/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1012
Epoch 1988/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1011
Epoch 1989/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1009
Epoch 1990/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1008
Epoch 1991/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1006
Epoch 1992/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1005
Epoch 1993/2000
1/1 [=====] - 0s 31ms/step - loss: 0.1003
Epoch 1994/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1002
Epoch 1995/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1000
Epoch 1996/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0999
Epoch 1997/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0997
Epoch 1998/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0996
Epoch 1999/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0994
Epoch 2000/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0993
1/1 [=====] - 0s 120ms/step
SE PREDICE: [[5.7998753]] CUANDO EN REALIDAD LA RESPUESTA ES 6.25
1/1 [=====] - 0s 84ms/step
0.0991274608837896 ERROR CUADRATICO MEDIO, DEBERIA SER LO MAS CERCANO A
0 POSIBLE

NUEVE UNIDADES POR CAPA OCULTA


```
In [ ]: import tensorflow as tf
import numpy as np
from tensorflow import keras
# Declare model inputs and outputs for training  $y = x^2$ 
xs = np.array([-4.0, -3.0, -2.0, -1.0, 0.0, 1.0, 2.0, 3.0, 4.0], dtype=float)
ys = np.array([16, 9, 4, 1, 0, 1, 4, 9, 16], dtype=float)

# numero de unidades por capa
n_unidades = 9
# funcion de activacion sigmoid
funcion_activacion = 'sigmoid'

# Build a Sequential model
# 2 capa oculta
# 1 capa de salida con 1 neurona y funcion de activacion lineal
model = tf.keras.Sequential([
    keras.layers.Dense(units=n_unidades, input_shape=(1,)),
    keras.layers.Dense(units=n_unidades, activation=funcion_activacion),
    keras.layers.Dense(units=1, activation='linear')
])

#compile
model.compile(optimizer='sgd', loss='mean_squared_error')
#fit con epochs 2000
model.fit(xs, ys, epochs=2000)

#predict en x=2.5
print('SE PREDICE:', model.predict([2.5]), " CUANDO EN REALIDAD LA RESPUESTA ES 6.25")

# Error cuadratico medio
from sklearn.metrics import mean_squared_error
# calcular error cuadratico medio
print(mean_squared_error(ys, model.predict(xs)), " ERROR CUADRATICO MEDIO")
```

```
Epoch 1/2000
1/1 [=====] - 0s 458ms/step - loss: 72.4038
Epoch 2/2000
1/1 [=====] - 0s 5ms/step - loss: 67.1407
Epoch 3/2000
1/1 [=====] - 0s 7ms/step - loss: 62.5258
Epoch 4/2000
1/1 [=====] - 0s 10ms/step - loss: 58.4711
Epoch 5/2000
1/1 [=====] - 0s 7ms/step - loss: 54.9108
Epoch 6/2000
1/1 [=====] - 0s 9ms/step - loss: 51.7932
Epoch 7/2000
1/1 [=====] - 0s 13ms/step - loss: 49.0748
Epoch 8/2000
1/1 [=====] - 0s 11ms/step - loss: 46.7170
Epoch 9/2000
1/1 [=====] - 0s 17ms/step - loss: 44.6839
Epoch 10/2000
1/1 [=====] - 0s 10ms/step - loss: 42.9417
Epoch 11/2000
1/1 [=====] - 0s 8ms/step - loss: 41.4582
Epoch 12/2000
1/1 [=====] - 0s 13ms/step - loss: 40.2028
```

```
Epoch 13/2000
1/1 [=====] - 0s 12ms/step - loss: 39.1468
Epoch 14/2000
1/1 [=====] - 0s 10ms/step - loss: 38.2635
Epoch 15/2000
1/1 [=====] - 0s 7ms/step - loss: 37.5286
Epoch 16/2000
1/1 [=====] - 0s 7ms/step - loss: 36.9202
Epoch 17/2000
1/1 [=====] - 0s 7ms/step - loss: 36.4187
Epoch 18/2000
1/1 [=====] - 0s 8ms/step - loss: 36.0070
Epoch 19/2000
1/1 [=====] - 0s 8ms/step - loss: 35.6703
Epoch 20/2000
1/1 [=====] - 0s 8ms/step - loss: 35.3959
Epoch 21/2000
1/1 [=====] - 0s 7ms/step - loss: 35.1730
Epoch 22/2000
1/1 [=====] - 0s 7ms/step - loss: 34.9922
Epoch 23/2000
1/1 [=====] - 0s 19ms/step - loss: 34.8461
Epoch 24/2000
1/1 [=====] - 0s 8ms/step - loss: 34.7281
Epoch 25/2000
1/1 [=====] - 0s 9ms/step - loss: 34.6331
Epoch 26/2000
1/1 [=====] - 0s 7ms/step - loss: 34.5567
Epoch 27/2000
1/1 [=====] - 0s 6ms/step - loss: 34.4952
Epoch 28/2000
1/1 [=====] - 0s 6ms/step - loss: 34.4459
Epoch 29/2000
1/1 [=====] - 0s 5ms/step - loss: 34.4063
Epoch 30/2000
1/1 [=====] - 0s 8ms/step - loss: 34.3745
Epoch 31/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3490
Epoch 32/2000
1/1 [=====] - 0s 5ms/step - loss: 34.3285
Epoch 33/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3120
Epoch 34/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2987
Epoch 35/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2880
Epoch 36/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2793
Epoch 37/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2723
Epoch 38/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2665
Epoch 39/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2618
Epoch 40/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2578
Epoch 41/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2546
Epoch 42/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2518
Epoch 43/2000
```

1/1 [=====] - 0s 6ms/step - loss: 34.2495
Epoch 44/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2474
Epoch 45/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2457
Epoch 46/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2441
Epoch 47/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2428
Epoch 48/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2415
Epoch 49/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2404
Epoch 50/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2393
Epoch 51/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2383
Epoch 52/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2374
Epoch 53/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2365
Epoch 54/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2356
Epoch 55/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2348
Epoch 56/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2339
Epoch 57/2000
1/1 [=====] - 0s 5ms/step - loss: 34.2331
Epoch 58/2000
1/1 [=====] - 0s 19ms/step - loss: 34.2324
Epoch 59/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2316
Epoch 60/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2308
Epoch 61/2000
1/1 [=====] - 0s 14ms/step - loss: 34.2301
Epoch 62/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2293
Epoch 63/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2286
Epoch 64/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2279
Epoch 65/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2271
Epoch 66/2000
1/1 [=====] - 0s 13ms/step - loss: 34.2264
Epoch 67/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2257
Epoch 68/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2250
Epoch 69/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2242
Epoch 70/2000
1/1 [=====] - 0s 84ms/step - loss: 34.2235
Epoch 71/2000
1/1 [=====] - 0s 32ms/step - loss: 34.2228
Epoch 72/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2221
Epoch 73/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2214

Epoch 74/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2207
Epoch 75/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2200
Epoch 76/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2193
Epoch 77/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2185
Epoch 78/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2178
Epoch 79/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2171
Epoch 80/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2164
Epoch 81/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2157
Epoch 82/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2150
Epoch 83/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2143
Epoch 84/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2136
Epoch 85/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2128
Epoch 86/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2121
Epoch 87/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2114
Epoch 88/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2107
Epoch 89/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2100
Epoch 90/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2093
Epoch 91/2000
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Epoch 92/2000
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Epoch 93/2000
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Epoch 94/2000
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Epoch 95/2000
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Epoch 96/2000
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Epoch 97/2000
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Epoch 98/2000
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Epoch 99/2000
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Epoch 100/2000
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Epoch 101/2000
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Epoch 103/2000
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Epoch 104/2000

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Epoch 106/2000
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Epoch 111/2000
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Epoch 112/2000
1/1 [=====] - 0s 15ms/step - loss: 34.1928
Epoch 113/2000
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Epoch 114/2000
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Epoch 115/2000
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Epoch 116/2000
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Epoch 126/2000
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Epoch 131/2000
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Epoch 135/2000
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Epoch 137/2000
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Epoch 141/2000
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Epoch 148/2000
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Epoch 149/2000
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Epoch 151/2000
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Epoch 159/2000
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Epoch 163/2000
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Epoch 164/2000
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Epoch 165/2000

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Epoch 169/2000
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Epoch 226/2000

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Epoch 231/2000
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Epoch 287/2000

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Epoch 368/2000
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Epoch 373/2000
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Epoch 375/2000
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Epoch 376/2000
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Epoch 377/2000
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Epoch 378/2000
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Epoch 379/2000
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Epoch 380/2000
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Epoch 397/2000
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Epoch 398/2000
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Epoch 399/2000
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Epoch 400/2000
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Epoch 401/2000
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Epoch 402/2000
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Epoch 403/2000
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Epoch 404/2000
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Epoch 405/2000
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Epoch 407/2000
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Epoch 408/2000
1/1 [=====] - 0s 8ms/step - loss: 32.5777
Epoch 409/2000

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Epoch 425/2000
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Epoch 426/2000
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Epoch 427/2000
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Epoch 443/2000
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Epoch 445/2000
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Epoch 446/2000
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Epoch 447/2000
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Epoch 449/2000
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Epoch 452/2000
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Epoch 453/2000
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Epoch 454/2000
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Epoch 458/2000
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Epoch 460/2000
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Epoch 466/2000
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Epoch 468/2000
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Epoch 469/2000
1/1 [=====] - 0s 7ms/step - loss: 30.5226
Epoch 470/2000


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Epoch 500/2000
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Epoch 506/2000
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Epoch 507/2000
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Epoch 508/2000
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Epoch 529/2000
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Epoch 531/2000
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Epoch 592/2000

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1/1 [=====] - 0s 6ms/step - loss: 10.1331
Epoch 652/2000
1/1 [=====] - 0s 21ms/step - loss: 10.0155
Epoch 653/2000

```
1/1 [=====] - 0s 8ms/step - loss: 9.8988
Epoch 654/2000
1/1 [=====] - 0s 5ms/step - loss: 9.7830
Epoch 655/2000
1/1 [=====] - 0s 7ms/step - loss: 9.6680
Epoch 656/2000
1/1 [=====] - 0s 6ms/step - loss: 9.5539
Epoch 657/2000
1/1 [=====] - 0s 7ms/step - loss: 9.4408
Epoch 658/2000
1/1 [=====] - 0s 58ms/step - loss: 9.3285
Epoch 659/2000
1/1 [=====] - 0s 15ms/step - loss: 9.2171
Epoch 660/2000
1/1 [=====] - 0s 6ms/step - loss: 9.1066
Epoch 661/2000
1/1 [=====] - 0s 6ms/step - loss: 8.9970
Epoch 662/2000
1/1 [=====] - 0s 9ms/step - loss: 8.8883
Epoch 663/2000
1/1 [=====] - 0s 5ms/step - loss: 8.7806
Epoch 664/2000
1/1 [=====] - 0s 6ms/step - loss: 8.6738
Epoch 665/2000
1/1 [=====] - 0s 5ms/step - loss: 8.5679
Epoch 666/2000
1/1 [=====] - 0s 8ms/step - loss: 8.4630
Epoch 667/2000
1/1 [=====] - 0s 5ms/step - loss: 8.3590
Epoch 668/2000
1/1 [=====] - 0s 6ms/step - loss: 8.2559
Epoch 669/2000
1/1 [=====] - 0s 7ms/step - loss: 8.1538
Epoch 670/2000
1/1 [=====] - 0s 6ms/step - loss: 8.0526
Epoch 671/2000
1/1 [=====] - 0s 6ms/step - loss: 7.9524
Epoch 672/2000
1/1 [=====] - 0s 6ms/step - loss: 7.8531
Epoch 673/2000
1/1 [=====] - 0s 6ms/step - loss: 7.7548
Epoch 674/2000
1/1 [=====] - 0s 5ms/step - loss: 7.6574
Epoch 675/2000
1/1 [=====] - 0s 9ms/step - loss: 7.5610
Epoch 676/2000
1/1 [=====] - 0s 8ms/step - loss: 7.4655
Epoch 677/2000
1/1 [=====] - 0s 7ms/step - loss: 7.3710
Epoch 678/2000
1/1 [=====] - 0s 11ms/step - loss: 7.2774
Epoch 679/2000
1/1 [=====] - 0s 6ms/step - loss: 7.1848
Epoch 680/2000
1/1 [=====] - 0s 13ms/step - loss: 7.0931
Epoch 681/2000
1/1 [=====] - 0s 7ms/step - loss: 7.0024
Epoch 682/2000
1/1 [=====] - 0s 7ms/step - loss: 6.9126
Epoch 683/2000
1/1 [=====] - 0s 6ms/step - loss: 6.8238
```

```
Epoch 684/2000
1/1 [=====] - 0s 8ms/step - loss: 6.7360
Epoch 685/2000
1/1 [=====] - 0s 22ms/step - loss: 6.6491
Epoch 686/2000
1/1 [=====] - 0s 7ms/step - loss: 6.5631
Epoch 687/2000
1/1 [=====] - 0s 7ms/step - loss: 6.4780
Epoch 688/2000
1/1 [=====] - 0s 8ms/step - loss: 6.3939
Epoch 689/2000
1/1 [=====] - 0s 6ms/step - loss: 6.3108
Epoch 690/2000
1/1 [=====] - 0s 6ms/step - loss: 6.2285
Epoch 691/2000
1/1 [=====] - 0s 5ms/step - loss: 6.1472
Epoch 692/2000
1/1 [=====] - 0s 7ms/step - loss: 6.0669
Epoch 693/2000
1/1 [=====] - 0s 6ms/step - loss: 5.9874
Epoch 694/2000
1/1 [=====] - 0s 6ms/step - loss: 5.9089
Epoch 695/2000
1/1 [=====] - 0s 6ms/step - loss: 5.8312
Epoch 696/2000
1/1 [=====] - 0s 6ms/step - loss: 5.7545
Epoch 697/2000
1/1 [=====] - 0s 7ms/step - loss: 5.6787
Epoch 698/2000
1/1 [=====] - 0s 8ms/step - loss: 5.6038
Epoch 699/2000
1/1 [=====] - 0s 8ms/step - loss: 5.5297
Epoch 700/2000
1/1 [=====] - 0s 7ms/step - loss: 5.4566
Epoch 701/2000
1/1 [=====] - 0s 6ms/step - loss: 5.3844
Epoch 702/2000
1/1 [=====] - 0s 6ms/step - loss: 5.3130
Epoch 703/2000
1/1 [=====] - 0s 10ms/step - loss: 5.2425
Epoch 704/2000
1/1 [=====] - 0s 5ms/step - loss: 5.1729
Epoch 705/2000
1/1 [=====] - 0s 5ms/step - loss: 5.1041
Epoch 706/2000
1/1 [=====] - 0s 6ms/step - loss: 5.0362
Epoch 707/2000
1/1 [=====] - 0s 9ms/step - loss: 4.9691
Epoch 708/2000
1/1 [=====] - 0s 6ms/step - loss: 4.9029
Epoch 709/2000
1/1 [=====] - 0s 12ms/step - loss: 4.8375
Epoch 710/2000
1/1 [=====] - 0s 6ms/step - loss: 4.7730
Epoch 711/2000
1/1 [=====] - 0s 6ms/step - loss: 4.7093
Epoch 712/2000
1/1 [=====] - 0s 6ms/step - loss: 4.6464
Epoch 713/2000
1/1 [=====] - 0s 79ms/step - loss: 4.5843
Epoch 714/2000
```



```
1/1 [=====] - 0s 18ms/step - loss: 4.5230
Epoch 715/2000
1/1 [=====] - 0s 6ms/step - loss: 4.4625
Epoch 716/2000
1/1 [=====] - 0s 6ms/step - loss: 4.4028
Epoch 717/2000
1/1 [=====] - 0s 6ms/step - loss: 4.3439
Epoch 718/2000
1/1 [=====] - 0s 8ms/step - loss: 4.2857
Epoch 719/2000
1/1 [=====] - 0s 6ms/step - loss: 4.2284
Epoch 720/2000
1/1 [=====] - 0s 7ms/step - loss: 4.1718
Epoch 721/2000
1/1 [=====] - 0s 6ms/step - loss: 4.1159
Epoch 722/2000
1/1 [=====] - 0s 5ms/step - loss: 4.0608
Epoch 723/2000
1/1 [=====] - 0s 7ms/step - loss: 4.0065
Epoch 724/2000
1/1 [=====] - 0s 6ms/step - loss: 3.9528
Epoch 725/2000
1/1 [=====] - 0s 6ms/step - loss: 3.8999
Epoch 726/2000
1/1 [=====] - 0s 6ms/step - loss: 3.8478
Epoch 727/2000
1/1 [=====] - 0s 8ms/step - loss: 3.7963
Epoch 728/2000
1/1 [=====] - 0s 9ms/step - loss: 3.7455
Epoch 729/2000
1/1 [=====] - 0s 5ms/step - loss: 3.6955
Epoch 730/2000
1/1 [=====] - 0s 6ms/step - loss: 3.6461
Epoch 731/2000
1/1 [=====] - 0s 7ms/step - loss: 3.5974
Epoch 732/2000
1/1 [=====] - 0s 6ms/step - loss: 3.5494
Epoch 733/2000
1/1 [=====] - 0s 9ms/step - loss: 3.5020
Epoch 734/2000
1/1 [=====] - 0s 9ms/step - loss: 3.4554
Epoch 735/2000
1/1 [=====] - 0s 6ms/step - loss: 3.4093
Epoch 736/2000
1/1 [=====] - 0s 5ms/step - loss: 3.3639
Epoch 737/2000
1/1 [=====] - 0s 6ms/step - loss: 3.3192
Epoch 738/2000
1/1 [=====] - 0s 8ms/step - loss: 3.2750
Epoch 739/2000
1/1 [=====] - 0s 5ms/step - loss: 3.2315
Epoch 740/2000
1/1 [=====] - 0s 6ms/step - loss: 3.1887
Epoch 741/2000
1/1 [=====] - 0s 7ms/step - loss: 3.1464
Epoch 742/2000
1/1 [=====] - 0s 6ms/step - loss: 3.1047
Epoch 743/2000
1/1 [=====] - 0s 6ms/step - loss: 3.0636
Epoch 744/2000
1/1 [=====] - 0s 7ms/step - loss: 3.0231
```

```
Epoch 745/2000
1/1 [=====] - 0s 6ms/step - loss: 2.9832
Epoch 746/2000
1/1 [=====] - 0s 5ms/step - loss: 2.9438
Epoch 747/2000
1/1 [=====] - 0s 5ms/step - loss: 2.9051
Epoch 748/2000
1/1 [=====] - 0s 62ms/step - loss: 2.8668
Epoch 749/2000
1/1 [=====] - 0s 6ms/step - loss: 2.8291
Epoch 750/2000
1/1 [=====] - 0s 18ms/step - loss: 2.7920
Epoch 751/2000
1/1 [=====] - 0s 5ms/step - loss: 2.7554
Epoch 752/2000
1/1 [=====] - 0s 11ms/step - loss: 2.7193
Epoch 753/2000
1/1 [=====] - 0s 6ms/step - loss: 2.6838
Epoch 754/2000
1/1 [=====] - 0s 8ms/step - loss: 2.6487
Epoch 755/2000
1/1 [=====] - 0s 8ms/step - loss: 2.6142
Epoch 756/2000
1/1 [=====] - 0s 5ms/step - loss: 2.5802
Epoch 757/2000
1/1 [=====] - 0s 7ms/step - loss: 2.5467
Epoch 758/2000
1/1 [=====] - 0s 5ms/step - loss: 2.5136
Epoch 759/2000
1/1 [=====] - 0s 5ms/step - loss: 2.4811
Epoch 760/2000
1/1 [=====] - 0s 6ms/step - loss: 2.4490
Epoch 761/2000
1/1 [=====] - 0s 5ms/step - loss: 2.4173
Epoch 762/2000
1/1 [=====] - 0s 6ms/step - loss: 2.3862
Epoch 763/2000
1/1 [=====] - 0s 7ms/step - loss: 2.3555
Epoch 764/2000
1/1 [=====] - 0s 8ms/step - loss: 2.3252
Epoch 765/2000
1/1 [=====] - 0s 6ms/step - loss: 2.2954
Epoch 766/2000
1/1 [=====] - 0s 6ms/step - loss: 2.2660
Epoch 767/2000
1/1 [=====] - 0s 7ms/step - loss: 2.2371
Epoch 768/2000
1/1 [=====] - 0s 5ms/step - loss: 2.2086
Epoch 769/2000
1/1 [=====] - 0s 6ms/step - loss: 2.1805
Epoch 770/2000
1/1 [=====] - 0s 10ms/step - loss: 2.1528
Epoch 771/2000
1/1 [=====] - 0s 6ms/step - loss: 2.1255
Epoch 772/2000
1/1 [=====] - 0s 7ms/step - loss: 2.0986
Epoch 773/2000
1/1 [=====] - 0s 6ms/step - loss: 2.0721
Epoch 774/2000
1/1 [=====] - 0s 7ms/step - loss: 2.0460
Epoch 775/2000
```

1/1 [=====] - 0s 7ms/step - loss: 2.0203
Epoch 776/2000
1/1 [=====] - 0s 7ms/step - loss: 1.9950
Epoch 777/2000
1/1 [=====] - 0s 5ms/step - loss: 1.9700
Epoch 778/2000
1/1 [=====] - 0s 6ms/step - loss: 1.9454
Epoch 779/2000
1/1 [=====] - 0s 80ms/step - loss: 1.9212
Epoch 780/2000
1/1 [=====] - 0s 23ms/step - loss: 1.8973
Epoch 781/2000
1/1 [=====] - 0s 5ms/step - loss: 1.8738
Epoch 782/2000
1/1 [=====] - 0s 6ms/step - loss: 1.8506
Epoch 783/2000
1/1 [=====] - 0s 5ms/step - loss: 1.8277
Epoch 784/2000
1/1 [=====] - 0s 5ms/step - loss: 1.8052
Epoch 785/2000
1/1 [=====] - 0s 6ms/step - loss: 1.7831
Epoch 786/2000
1/1 [=====] - 0s 5ms/step - loss: 1.7612
Epoch 787/2000
1/1 [=====] - 0s 6ms/step - loss: 1.7397
Epoch 788/2000
1/1 [=====] - 0s 6ms/step - loss: 1.7185
Epoch 789/2000
1/1 [=====] - 0s 6ms/step - loss: 1.6976
Epoch 790/2000
1/1 [=====] - 0s 8ms/step - loss: 1.6770
Epoch 791/2000
1/1 [=====] - 0s 9ms/step - loss: 1.6567
Epoch 792/2000
1/1 [=====] - 0s 5ms/step - loss: 1.6367
Epoch 793/2000
1/1 [=====] - 0s 6ms/step - loss: 1.6170
Epoch 794/2000
1/1 [=====] - 0s 10ms/step - loss: 1.5976
Epoch 795/2000
1/1 [=====] - 0s 6ms/step - loss: 1.5784
Epoch 796/2000
1/1 [=====] - 0s 7ms/step - loss: 1.5596
Epoch 797/2000
1/1 [=====] - 0s 5ms/step - loss: 1.5410
Epoch 798/2000
1/1 [=====] - 0s 5ms/step - loss: 1.5227
Epoch 799/2000
1/1 [=====] - 0s 7ms/step - loss: 1.5047
Epoch 800/2000
1/1 [=====] - 0s 6ms/step - loss: 1.4869
Epoch 801/2000
1/1 [=====] - 0s 7ms/step - loss: 1.4694
Epoch 802/2000
1/1 [=====] - 0s 6ms/step - loss: 1.4521
Epoch 803/2000
1/1 [=====] - 0s 7ms/step - loss: 1.4351
Epoch 804/2000
1/1 [=====] - 0s 5ms/step - loss: 1.4183
Epoch 805/2000
1/1 [=====] - 0s 6ms/step - loss: 1.4018

Epoch 806/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3856
Epoch 807/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3695
Epoch 808/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3537
Epoch 809/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3381
Epoch 810/2000
1/1 [=====] - 0s 6ms/step - loss: 1.3228
Epoch 811/2000
1/1 [=====] - 0s 61ms/step - loss: 1.3076
Epoch 812/2000
1/1 [=====] - 0s 8ms/step - loss: 1.2927
Epoch 813/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2780
Epoch 814/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2636
Epoch 815/2000
1/1 [=====] - 0s 5ms/step - loss: 1.2493
Epoch 816/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2352
Epoch 817/2000
1/1 [=====] - 0s 5ms/step - loss: 1.2214
Epoch 818/2000
1/1 [=====] - 0s 5ms/step - loss: 1.2077
Epoch 819/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1942
Epoch 820/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1809
Epoch 821/2000
1/1 [=====] - 0s 8ms/step - loss: 1.1679
Epoch 822/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1550
Epoch 823/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1422
Epoch 824/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1297
Epoch 825/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1174
Epoch 826/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1052
Epoch 827/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0932
Epoch 828/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0813
Epoch 829/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0697
Epoch 830/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0582
Epoch 831/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0469
Epoch 832/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0357
Epoch 833/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0247
Epoch 834/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0138
Epoch 835/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0031
Epoch 836/2000

1/1 [=====] - 0s 6ms/step - loss: 0.9925
Epoch 837/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9821
Epoch 838/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9719
Epoch 839/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9618
Epoch 840/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9518
Epoch 841/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9420
Epoch 842/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9323
Epoch 843/2000
1/1 [=====] - 0s 9ms/step - loss: 0.9227
Epoch 844/2000
1/1 [=====] - 0s 5ms/step - loss: 0.9133
Epoch 845/2000
1/1 [=====] - 0s 8ms/step - loss: 0.9040
Epoch 846/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8948
Epoch 847/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8858
Epoch 848/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8769
Epoch 849/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8681
Epoch 850/2000
1/1 [=====] - 0s 12ms/step - loss: 0.8594
Epoch 851/2000
1/1 [=====] - 0s 72ms/step - loss: 0.8509
Epoch 852/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8424
Epoch 853/2000
1/1 [=====] - 0s 13ms/step - loss: 0.8341
Epoch 854/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8259
Epoch 855/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8178
Epoch 856/2000
1/1 [=====] - 0s 13ms/step - loss: 0.8099
Epoch 857/2000
1/1 [=====] - 0s 13ms/step - loss: 0.8020
Epoch 858/2000
1/1 [=====] - 0s 4ms/step - loss: 0.7942
Epoch 859/2000
1/1 [=====] - 0s 9ms/step - loss: 0.7866
Epoch 860/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7790
Epoch 861/2000
1/1 [=====] - 0s 4ms/step - loss: 0.7716
Epoch 862/2000
1/1 [=====] - 0s 17ms/step - loss: 0.7643
Epoch 863/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7570
Epoch 864/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7499
Epoch 865/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7428
Epoch 866/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7359

```
Epoch 867/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7290
Epoch 868/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7223
Epoch 869/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7156
Epoch 870/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7090
Epoch 871/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7025
Epoch 872/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6961
Epoch 873/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6898
Epoch 874/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6836
Epoch 875/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6774
Epoch 876/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6714
Epoch 877/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6654
Epoch 878/2000
1/1 [=====] - 0s 76ms/step - loss: 0.6595
Epoch 879/2000
1/1 [=====] - 0s 23ms/step - loss: 0.6536
Epoch 880/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6479
Epoch 881/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6422
Epoch 882/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6366
Epoch 883/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6311
Epoch 884/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6256
Epoch 885/2000
1/1 [=====] - 0s 15ms/step - loss: 0.6202
Epoch 886/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6149
Epoch 887/2000
1/1 [=====] - 0s 4ms/step - loss: 0.6097
Epoch 888/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6045
Epoch 889/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5994
Epoch 890/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5944
Epoch 891/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5894
Epoch 892/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5845
Epoch 893/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5797
Epoch 894/2000
1/1 [=====] - 0s 64ms/step - loss: 0.5749
Epoch 895/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5702
Epoch 896/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5655
Epoch 897/2000
```

1/1 [=====] - 0s 4ms/step - loss: 0.5609
Epoch 898/2000
1/1 [=====] - 0s 18ms/step - loss: 0.5564
Epoch 899/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5519
Epoch 900/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5475
Epoch 901/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5431
Epoch 902/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5388
Epoch 903/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5346
Epoch 904/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5304
Epoch 905/2000
1/1 [=====] - 0s 9ms/step - loss: 0.5262
Epoch 906/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5221
Epoch 907/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5181
Epoch 908/2000
1/1 [=====] - 0s 8ms/step - loss: 0.5141
Epoch 909/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5102
Epoch 910/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5063
Epoch 911/2000
1/1 [=====] - 0s 13ms/step - loss: 0.5025
Epoch 912/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4987
Epoch 913/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4949
Epoch 914/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4912
Epoch 915/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4876
Epoch 916/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4840
Epoch 917/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4804
Epoch 918/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4769
Epoch 919/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4735
Epoch 920/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4700
Epoch 921/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4667
Epoch 922/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4633
Epoch 923/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4600
Epoch 924/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4568
Epoch 925/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4536
Epoch 926/2000
1/1 [=====] - 0s 83ms/step - loss: 0.4504
Epoch 927/2000
1/1 [=====] - 0s 20ms/step - loss: 0.4472

```
Epoch 928/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4441
Epoch 929/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4411
Epoch 930/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4381
Epoch 931/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4351
Epoch 932/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4321
Epoch 933/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4292
Epoch 934/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4263
Epoch 935/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4235
Epoch 936/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4207
Epoch 937/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4179
Epoch 938/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4152
Epoch 939/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4125
Epoch 940/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4098
Epoch 941/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4071
Epoch 942/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4045
Epoch 943/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4020
Epoch 944/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3994
Epoch 945/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3969
Epoch 946/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3944
Epoch 947/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3919
Epoch 948/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3895
Epoch 949/2000
1/1 [=====] - 0s 64ms/step - loss: 0.3871
Epoch 950/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3847
Epoch 951/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3824
Epoch 952/2000
1/1 [=====] - 0s 24ms/step - loss: 0.3801
Epoch 953/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3778
Epoch 954/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3755
Epoch 955/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3733
Epoch 956/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3711
Epoch 957/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3689
Epoch 958/2000
```


1/1 [=====] - 0s 7ms/step - loss: 0.3667
Epoch 959/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3646
Epoch 960/2000
1/1 [=====] - 0s 11ms/step - loss: 0.3625
Epoch 961/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3604
Epoch 962/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3584
Epoch 963/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3563
Epoch 964/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3543
Epoch 965/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3523
Epoch 966/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3504
Epoch 967/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3484
Epoch 968/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3465
Epoch 969/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3446
Epoch 970/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3427
Epoch 971/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3409
Epoch 972/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3390
Epoch 973/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3372
Epoch 974/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3354
Epoch 975/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3336
Epoch 976/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3319
Epoch 977/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3302
Epoch 978/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3284
Epoch 979/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3267
Epoch 980/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3251
Epoch 981/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3234
Epoch 982/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3218
Epoch 983/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3202
Epoch 984/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3186
Epoch 985/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3170
Epoch 986/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3154
Epoch 987/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3138
Epoch 988/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3123

Epoch 989/2000
1/1 [=====] - 0s 60ms/step - loss: 0.3108
Epoch 990/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3093
Epoch 991/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3078
Epoch 992/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3063
Epoch 993/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3049
Epoch 994/2000
1/1 [=====] - 0s 12ms/step - loss: 0.3035
Epoch 995/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3020
Epoch 996/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3006
Epoch 997/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2992
Epoch 998/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2979
Epoch 999/2000
1/1 [=====] - 0s 15ms/step - loss: 0.2965
Epoch 1000/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2952
Epoch 1001/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2938
Epoch 1002/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2925
Epoch 1003/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2912
Epoch 1004/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2899
Epoch 1005/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2887
Epoch 1006/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2874
Epoch 1007/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2861
Epoch 1008/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2849
Epoch 1009/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2837
Epoch 1010/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2825
Epoch 1011/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2813
Epoch 1012/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2801
Epoch 1013/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2789
Epoch 1014/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2778
Epoch 1015/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2766
Epoch 1016/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2755
Epoch 1017/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2744
Epoch 1018/2000
1/1 [=====] - 0s 34ms/step - loss: 0.2732
Epoch 1019/2000

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1/1 [=====] - 0s 8ms/step - loss: 0.2721
Epoch 1020/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2711
Epoch 1021/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2700
Epoch 1022/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2689
Epoch 1023/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2678
Epoch 1024/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2668
Epoch 1025/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2658
Epoch 1026/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2647
Epoch 1027/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2637
Epoch 1028/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2627
Epoch 1029/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2617
Epoch 1030/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2607
Epoch 1031/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2598
Epoch 1032/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2588
Epoch 1033/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2578
Epoch 1034/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2569
Epoch 1035/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2560
Epoch 1036/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2550
Epoch 1037/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2541
Epoch 1038/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2532
Epoch 1039/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2523
Epoch 1040/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2514
Epoch 1041/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2505
Epoch 1042/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2497
Epoch 1043/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2488
Epoch 1044/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2479
Epoch 1045/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2471
Epoch 1046/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2462
Epoch 1047/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2454
Epoch 1048/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2446
Epoch 1049/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2438
```

Epoch 1050/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2430
Epoch 1051/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2422
Epoch 1052/2000
1/1 [=====] - 0s 15ms/step - loss: 0.2414
Epoch 1053/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2406
Epoch 1054/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2398
Epoch 1055/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2390
Epoch 1056/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2383
Epoch 1057/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2375
Epoch 1058/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2367
Epoch 1059/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2360
Epoch 1060/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2353
Epoch 1061/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2345
Epoch 1062/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2338
Epoch 1063/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2331
Epoch 1064/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2324
Epoch 1065/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2317
Epoch 1066/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2310
Epoch 1067/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2303
Epoch 1068/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2296
Epoch 1069/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2289
Epoch 1070/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2282
Epoch 1071/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2276
Epoch 1072/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2269
Epoch 1073/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2263
Epoch 1074/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2256
Epoch 1075/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2250
Epoch 1076/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2243
Epoch 1077/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2237
Epoch 1078/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2231
Epoch 1079/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2224
Epoch 1080/2000

```
1/1 [=====] - 0s 6ms/step - loss: 0.2218
Epoch 1081/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2212
Epoch 1082/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2206
Epoch 1083/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2200
Epoch 1084/2000
1/1 [=====] - 0s 60ms/step - loss: 0.2194
Epoch 1085/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2188
Epoch 1086/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2182
Epoch 1087/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2177
Epoch 1088/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2171
Epoch 1089/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2165
Epoch 1090/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2159
Epoch 1091/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2154
Epoch 1092/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2148
Epoch 1093/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2143
Epoch 1094/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2137
Epoch 1095/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2132
Epoch 1096/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2127
Epoch 1097/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2121
Epoch 1098/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2116
Epoch 1099/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2111
Epoch 1100/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2105
Epoch 1101/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2100
Epoch 1102/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2095
Epoch 1103/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2090
Epoch 1104/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2085
Epoch 1105/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2080
Epoch 1106/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2075
Epoch 1107/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2070
Epoch 1108/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2065
Epoch 1109/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2060
Epoch 1110/2000
1/1 [=====] - 0s 61ms/step - loss: 0.2056
```

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Epoch 1111/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2051
Epoch 1112/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2046
Epoch 1113/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2041
Epoch 1114/2000
1/1 [=====] - 0s 17ms/step - loss: 0.2037
Epoch 1115/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2032
Epoch 1116/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2028
Epoch 1117/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2023
Epoch 1118/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2018
Epoch 1119/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2014
Epoch 1120/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2009
Epoch 1121/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2005
Epoch 1122/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2001
Epoch 1123/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1996
Epoch 1124/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1992
Epoch 1125/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1988
Epoch 1126/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1983
Epoch 1127/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1979
Epoch 1128/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1975
Epoch 1129/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1971
Epoch 1130/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1967
Epoch 1131/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1963
Epoch 1132/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1959
Epoch 1133/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1955
Epoch 1134/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1951
Epoch 1135/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1947
Epoch 1136/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1943
Epoch 1137/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1939
Epoch 1138/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1935
Epoch 1139/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1931
Epoch 1140/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1927
Epoch 1141/2000
```

1/1 [=====] - 0s 7ms/step - loss: 0.1923
Epoch 1142/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1919
Epoch 1143/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1916
Epoch 1144/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1912
Epoch 1145/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1908
Epoch 1146/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1904
Epoch 1147/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1901
Epoch 1148/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1897
Epoch 1149/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1894
Epoch 1150/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1890
Epoch 1151/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1886
Epoch 1152/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1883
Epoch 1153/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1879
Epoch 1154/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1876
Epoch 1155/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1872
Epoch 1156/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1869
Epoch 1157/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1865
Epoch 1158/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1862
Epoch 1159/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1859
Epoch 1160/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1855
Epoch 1161/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1852
Epoch 1162/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1849
Epoch 1163/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1845
Epoch 1164/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1842
Epoch 1165/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1839
Epoch 1166/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1836
Epoch 1167/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1832
Epoch 1168/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1829
Epoch 1169/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1826
Epoch 1170/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1823
Epoch 1171/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1820

```
Epoch 1172/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1816
Epoch 1173/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1813
Epoch 1174/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1810
Epoch 1175/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1807
Epoch 1176/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1804
Epoch 1177/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1801
Epoch 1178/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1798
Epoch 1179/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1795
Epoch 1180/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1792
Epoch 1181/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1789
Epoch 1182/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1786
Epoch 1183/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1783
Epoch 1184/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1780
Epoch 1185/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1778
Epoch 1186/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1775
Epoch 1187/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1772
Epoch 1188/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1769
Epoch 1189/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1766
Epoch 1190/2000
1/1 [=====] - 0s 20ms/step - loss: 0.1763
Epoch 1191/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1760
Epoch 1192/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1758
Epoch 1193/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1755
Epoch 1194/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1752
Epoch 1195/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1749
Epoch 1196/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1747
Epoch 1197/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1744
Epoch 1198/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1741
Epoch 1199/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1739
Epoch 1200/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1736
Epoch 1201/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1733
Epoch 1202/2000
```


1/1 [=====] - 0s 12ms/step - loss: 0.1731
Epoch 1203/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1728
Epoch 1204/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1725
Epoch 1205/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1723
Epoch 1206/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1720
Epoch 1207/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1718
Epoch 1208/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1715
Epoch 1209/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1713
Epoch 1210/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1710
Epoch 1211/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1708
Epoch 1212/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1705
Epoch 1213/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1703
Epoch 1214/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1700
Epoch 1215/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1698
Epoch 1216/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1695
Epoch 1217/2000
1/1 [=====] - 0s 17ms/step - loss: 0.1693
Epoch 1218/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1690
Epoch 1219/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1688
Epoch 1220/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1685
Epoch 1221/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1683
Epoch 1222/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1681
Epoch 1223/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1678
Epoch 1224/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1676
Epoch 1225/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1674
Epoch 1226/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1671
Epoch 1227/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1669
Epoch 1228/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1667
Epoch 1229/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1664
Epoch 1230/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1662
Epoch 1231/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1660
Epoch 1232/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1657

Epoch 1233/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1655
Epoch 1234/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1653
Epoch 1235/2000
1/1 [=====] - 0s 21ms/step - loss: 0.1651
Epoch 1236/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1648
Epoch 1237/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1646
Epoch 1238/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1644
Epoch 1239/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1642
Epoch 1240/2000
1/1 [=====] - 0s 81ms/step - loss: 0.1639
Epoch 1241/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1637
Epoch 1242/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1635
Epoch 1243/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1633
Epoch 1244/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1631
Epoch 1245/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1629
Epoch 1246/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1626
Epoch 1247/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1624
Epoch 1248/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1622
Epoch 1249/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1620
Epoch 1250/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1618
Epoch 1251/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1616
Epoch 1252/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1614
Epoch 1253/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1612
Epoch 1254/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1610
Epoch 1255/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1608
Epoch 1256/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1605
Epoch 1257/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1603
Epoch 1258/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1601
Epoch 1259/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1599
Epoch 1260/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1597
Epoch 1261/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1595
Epoch 1262/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1593
Epoch 1263/2000

1/1 [=====] - 0s 9ms/step - loss: 0.1591
Epoch 1264/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1589
Epoch 1265/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1587
Epoch 1266/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1585
Epoch 1267/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1583
Epoch 1268/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1581
Epoch 1269/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1579
Epoch 1270/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1577
Epoch 1271/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1575
Epoch 1272/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1574
Epoch 1273/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1572
Epoch 1274/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1570
Epoch 1275/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1568
Epoch 1276/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1566
Epoch 1277/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1564
Epoch 1278/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1562
Epoch 1279/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1560
Epoch 1280/2000
1/1 [=====] - 0s 67ms/step - loss: 0.1558
Epoch 1281/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1556
Epoch 1282/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1554
Epoch 1283/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1553
Epoch 1284/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1551
Epoch 1285/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1549
Epoch 1286/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1547
Epoch 1287/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1545
Epoch 1288/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1543
Epoch 1289/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1542
Epoch 1290/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1540
Epoch 1291/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1538
Epoch 1292/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1536
Epoch 1293/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1534

Epoch 1294/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1532
Epoch 1295/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1531
Epoch 1296/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1529
Epoch 1297/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1527
Epoch 1298/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1525
Epoch 1299/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1524
Epoch 1300/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1522
Epoch 1301/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1520
Epoch 1302/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1518
Epoch 1303/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1516
Epoch 1304/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1515
Epoch 1305/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1513
Epoch 1306/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1511
Epoch 1307/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1510
Epoch 1308/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1508
Epoch 1309/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1506
Epoch 1310/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1504
Epoch 1311/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1503
Epoch 1312/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1501
Epoch 1313/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1499
Epoch 1314/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1498
Epoch 1315/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1496
Epoch 1316/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1494
Epoch 1317/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1492
Epoch 1318/2000
1/1 [=====] - 0s 67ms/step - loss: 0.1491
Epoch 1319/2000
1/1 [=====] - 0s 21ms/step - loss: 0.1489
Epoch 1320/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1487
Epoch 1321/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1486
Epoch 1322/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1484
Epoch 1323/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1482
Epoch 1324/2000

1/1 [=====] - 0s 4ms/step - loss: 0.1481
Epoch 1325/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1479
Epoch 1326/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1478
Epoch 1327/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1476
Epoch 1328/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1474
Epoch 1329/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1473
Epoch 1330/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1471
Epoch 1331/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1469
Epoch 1332/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1468
Epoch 1333/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1466
Epoch 1334/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1465
Epoch 1335/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1463
Epoch 1336/2000
1/1 [=====] - 0s 29ms/step - loss: 0.1461
Epoch 1337/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1460
Epoch 1338/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1458
Epoch 1339/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1457
Epoch 1340/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1455
Epoch 1341/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1453
Epoch 1342/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1452
Epoch 1343/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1450
Epoch 1344/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1449
Epoch 1345/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1447
Epoch 1346/2000
1/1 [=====] - 0s 93ms/step - loss: 0.1446
Epoch 1347/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1444
Epoch 1348/2000
1/1 [=====] - 0s 18ms/step - loss: 0.1442
Epoch 1349/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1441
Epoch 1350/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1439
Epoch 1351/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1438
Epoch 1352/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1436
Epoch 1353/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1435
Epoch 1354/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1433

Epoch 1355/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1432
Epoch 1356/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1430
Epoch 1357/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1429
Epoch 1358/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1427
Epoch 1359/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1426
Epoch 1360/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1424
Epoch 1361/2000
1/1 [=====] - 0s 17ms/step - loss: 0.1423
Epoch 1362/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1421
Epoch 1363/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1420
Epoch 1364/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1418
Epoch 1365/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1417
Epoch 1366/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1415
Epoch 1367/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1414
Epoch 1368/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1412
Epoch 1369/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1411
Epoch 1370/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1409
Epoch 1371/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1408
Epoch 1372/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1406
Epoch 1373/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1405
Epoch 1374/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1403
Epoch 1375/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1402
Epoch 1376/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1400
Epoch 1377/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1399
Epoch 1378/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1397
Epoch 1379/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1396
Epoch 1380/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1395
Epoch 1381/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1393
Epoch 1382/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1392
Epoch 1383/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1390
Epoch 1384/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1389
Epoch 1385/2000

```
1/1 [=====] - 0s 63ms/step - loss: 0.1387
Epoch 1386/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1386
Epoch 1387/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1385
Epoch 1388/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1383
Epoch 1389/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1382
Epoch 1390/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1380
Epoch 1391/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1379
Epoch 1392/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1377
Epoch 1393/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1376
Epoch 1394/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1375
Epoch 1395/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1373
Epoch 1396/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1372
Epoch 1397/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1370
Epoch 1398/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1369
Epoch 1399/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1368
Epoch 1400/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1366
Epoch 1401/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1365
Epoch 1402/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1363
Epoch 1403/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1362
Epoch 1404/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1361
Epoch 1405/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1359
Epoch 1406/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1358
Epoch 1407/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1357
Epoch 1408/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1355
Epoch 1409/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1354
Epoch 1410/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1352
Epoch 1411/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1351
Epoch 1412/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1350
Epoch 1413/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1348
Epoch 1414/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1347
Epoch 1415/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1346
```

```
Epoch 1416/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1344
Epoch 1417/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1343
Epoch 1418/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1342
Epoch 1419/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1340
Epoch 1420/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1339
Epoch 1421/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1338
Epoch 1422/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1336
Epoch 1423/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1335
Epoch 1424/2000
1/1 [=====] - 0s 17ms/step - loss: 0.1334
Epoch 1425/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1332
Epoch 1426/2000
1/1 [=====] - 0s 21ms/step - loss: 0.1331
Epoch 1427/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1330
Epoch 1428/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1328
Epoch 1429/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1327
Epoch 1430/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1326
Epoch 1431/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1324
Epoch 1432/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1323
Epoch 1433/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1322
Epoch 1434/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1320
Epoch 1435/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1319
Epoch 1436/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1318
Epoch 1437/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1317
Epoch 1438/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1315
Epoch 1439/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1314
Epoch 1440/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1313
Epoch 1441/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1311
Epoch 1442/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1310
Epoch 1443/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1309
Epoch 1444/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1307
Epoch 1445/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1306
Epoch 1446/2000
```


1/1 [=====] - 0s 10ms/step - loss: 0.1305
Epoch 1447/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1304
Epoch 1448/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1302
Epoch 1449/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1301
Epoch 1450/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1300
Epoch 1451/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1299
Epoch 1452/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1297
Epoch 1453/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1296
Epoch 1454/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1295
Epoch 1455/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1293
Epoch 1456/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1292
Epoch 1457/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1291
Epoch 1458/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1290
Epoch 1459/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1288
Epoch 1460/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1287
Epoch 1461/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1286
Epoch 1462/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1285
Epoch 1463/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1283
Epoch 1464/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1282
Epoch 1465/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1281
Epoch 1466/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1280
Epoch 1467/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1278
Epoch 1468/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1277
Epoch 1469/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1276
Epoch 1470/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1275
Epoch 1471/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1273
Epoch 1472/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1272
Epoch 1473/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1271
Epoch 1474/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1270
Epoch 1475/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1269
Epoch 1476/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1267

Epoch 1477/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1266
Epoch 1478/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1265
Epoch 1479/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1264
Epoch 1480/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1262
Epoch 1481/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1261
Epoch 1482/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1260
Epoch 1483/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1259
Epoch 1484/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1258
Epoch 1485/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1256
Epoch 1486/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1255
Epoch 1487/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1254
Epoch 1488/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1253
Epoch 1489/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1252
Epoch 1490/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1250
Epoch 1491/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1249
Epoch 1492/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1248
Epoch 1493/2000
1/1 [=====] - 0s 64ms/step - loss: 0.1247
Epoch 1494/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1246
Epoch 1495/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1244
Epoch 1496/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1243
Epoch 1497/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1242
Epoch 1498/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1241
Epoch 1499/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1240
Epoch 1500/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1238
Epoch 1501/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1237
Epoch 1502/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1236
Epoch 1503/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1235
Epoch 1504/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1234
Epoch 1505/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1233
Epoch 1506/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1231
Epoch 1507/2000

```
1/1 [=====] - 0s 6ms/step - loss: 0.1230
Epoch 1508/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1229
Epoch 1509/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1228
Epoch 1510/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1227
Epoch 1511/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1225
Epoch 1512/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1224
Epoch 1513/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1223
Epoch 1514/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1222
Epoch 1515/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1221
Epoch 1516/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1220
Epoch 1517/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1219
Epoch 1518/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1217
Epoch 1519/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1216
Epoch 1520/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1215
Epoch 1521/2000
1/1 [=====] - 0s 30ms/step - loss: 0.1214
Epoch 1522/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1213
Epoch 1523/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1212
Epoch 1524/2000
1/1 [=====] - 0s 46ms/step - loss: 0.1210
Epoch 1525/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1209
Epoch 1526/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1208
Epoch 1527/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1207
Epoch 1528/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1206
Epoch 1529/2000
1/1 [=====] - 0s 21ms/step - loss: 0.1205
Epoch 1530/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1204
Epoch 1531/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1202
Epoch 1532/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1201
Epoch 1533/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1200
Epoch 1534/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1199
Epoch 1535/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1198
Epoch 1536/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1197
Epoch 1537/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1196
```

Epoch 1538/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1195
Epoch 1539/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1193
Epoch 1540/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1192
Epoch 1541/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1191
Epoch 1542/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1190
Epoch 1543/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1189
Epoch 1544/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1188
Epoch 1545/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1187
Epoch 1546/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1186
Epoch 1547/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1184
Epoch 1548/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1183
Epoch 1549/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1182
Epoch 1550/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1181
Epoch 1551/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1180
Epoch 1552/2000
1/1 [=====] - 0s 80ms/step - loss: 0.1179
Epoch 1553/2000
1/1 [=====] - 0s 24ms/step - loss: 0.1178
Epoch 1554/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1177
Epoch 1555/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1176
Epoch 1556/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1174
Epoch 1557/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1173
Epoch 1558/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1172
Epoch 1559/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1171
Epoch 1560/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1170
Epoch 1561/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1169
Epoch 1562/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1168
Epoch 1563/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1167
Epoch 1564/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1166
Epoch 1565/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1165
Epoch 1566/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1163
Epoch 1567/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1162
Epoch 1568/2000

1/1 [=====] - 0s 6ms/step - loss: 0.1161
Epoch 1569/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1160
Epoch 1570/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1159
Epoch 1571/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1158
Epoch 1572/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1157
Epoch 1573/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1156
Epoch 1574/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1155
Epoch 1575/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1154
Epoch 1576/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1153
Epoch 1577/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1152
Epoch 1578/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1150
Epoch 1579/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1149
Epoch 1580/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1148
Epoch 1581/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1147
Epoch 1582/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1146
Epoch 1583/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1145
Epoch 1584/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1144
Epoch 1585/2000
1/1 [=====] - 0s 68ms/step - loss: 0.1143
Epoch 1586/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1142
Epoch 1587/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1141
Epoch 1588/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1140
Epoch 1589/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1139
Epoch 1590/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1138
Epoch 1591/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1137
Epoch 1592/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1135
Epoch 1593/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1134
Epoch 1594/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1133
Epoch 1595/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1132
Epoch 1596/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1131
Epoch 1597/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1130
Epoch 1598/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1129

Epoch 1599/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1128
Epoch 1600/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1127
Epoch 1601/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1126
Epoch 1602/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1125
Epoch 1603/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1124
Epoch 1604/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1123
Epoch 1605/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1122
Epoch 1606/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1121
Epoch 1607/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1120
Epoch 1608/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1119
Epoch 1609/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1118
Epoch 1610/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1117
Epoch 1611/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1116
Epoch 1612/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1115
Epoch 1613/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1113
Epoch 1614/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1112
Epoch 1615/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1111
Epoch 1616/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1110
Epoch 1617/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1109
Epoch 1618/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1108
Epoch 1619/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1107
Epoch 1620/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1106
Epoch 1621/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1105
Epoch 1622/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1104
Epoch 1623/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1103
Epoch 1624/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1102
Epoch 1625/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1101
Epoch 1626/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1100
Epoch 1627/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1099
Epoch 1628/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1098
Epoch 1629/2000

1/1 [=====] - 0s 7ms/step - loss: 0.1097
Epoch 1630/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1096
Epoch 1631/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1095
Epoch 1632/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1094
Epoch 1633/2000
1/1 [=====] - 0s 57ms/step - loss: 0.1093
Epoch 1634/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1092
Epoch 1635/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1091
Epoch 1636/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1090
Epoch 1637/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1089
Epoch 1638/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1088
Epoch 1639/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1087
Epoch 1640/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1086
Epoch 1641/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1085
Epoch 1642/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1084
Epoch 1643/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1083
Epoch 1644/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1082
Epoch 1645/2000
1/1 [=====] - 0s 34ms/step - loss: 0.1081
Epoch 1646/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1080
Epoch 1647/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1079
Epoch 1648/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1078
Epoch 1649/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1077
Epoch 1650/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1076
Epoch 1651/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1075
Epoch 1652/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1074
Epoch 1653/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1073
Epoch 1654/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1072
Epoch 1655/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1071
Epoch 1656/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1070
Epoch 1657/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1069
Epoch 1658/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1068
Epoch 1659/2000
1/1 [=====] - 0s 30ms/step - loss: 0.1067

```
Epoch 1660/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1066
Epoch 1661/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1065
Epoch 1662/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1064
Epoch 1663/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1063
Epoch 1664/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1062
Epoch 1665/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1061
Epoch 1666/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1060
Epoch 1667/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1059
Epoch 1668/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1058
Epoch 1669/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1057
Epoch 1670/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1056
Epoch 1671/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1055
Epoch 1672/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1054
Epoch 1673/2000
1/1 [=====] - 0s 19ms/step - loss: 0.1053
Epoch 1674/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1052
Epoch 1675/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1051
Epoch 1676/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1050
Epoch 1677/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1049
Epoch 1678/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1048
Epoch 1679/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1047
Epoch 1680/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1046
Epoch 1681/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1045
Epoch 1682/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1044
Epoch 1683/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1043
Epoch 1684/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1042
Epoch 1685/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1041
Epoch 1686/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1040
Epoch 1687/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1039
Epoch 1688/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1039
Epoch 1689/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1038
Epoch 1690/2000
```



```
1/1 [=====] - 0s 7ms/step - loss: 0.1037
Epoch 1691/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1036
Epoch 1692/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1035
Epoch 1693/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1034
Epoch 1694/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1033
Epoch 1695/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1032
Epoch 1696/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1031
Epoch 1697/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1030
Epoch 1698/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1029
Epoch 1699/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1028
Epoch 1700/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1027
Epoch 1701/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1026
Epoch 1702/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1025
Epoch 1703/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1024
Epoch 1704/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1023
Epoch 1705/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1022
Epoch 1706/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1021
Epoch 1707/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1020
Epoch 1708/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1019
Epoch 1709/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1018
Epoch 1710/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1018
Epoch 1711/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1017
Epoch 1712/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1016
Epoch 1713/2000
1/1 [=====] - 0s 34ms/step - loss: 0.1015
Epoch 1714/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1014
Epoch 1715/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1013
Epoch 1716/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1012
Epoch 1717/2000
1/1 [=====] - 0s 24ms/step - loss: 0.1011
Epoch 1718/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1010
Epoch 1719/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1009
Epoch 1720/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1008
```

Epoch 1721/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1007
Epoch 1722/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1006
Epoch 1723/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1005
Epoch 1724/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1004
Epoch 1725/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1003
Epoch 1726/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1003
Epoch 1727/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1002
Epoch 1728/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1001
Epoch 1729/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1000
Epoch 1730/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0999
Epoch 1731/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0998
Epoch 1732/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0997
Epoch 1733/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0996
Epoch 1734/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0995
Epoch 1735/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0994
Epoch 1736/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0993
Epoch 1737/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0992
Epoch 1738/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0991
Epoch 1739/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0990
Epoch 1740/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0990
Epoch 1741/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0989
Epoch 1742/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0988
Epoch 1743/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0987
Epoch 1744/2000
1/1 [=====] - 0s 64ms/step - loss: 0.0986
Epoch 1745/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0985
Epoch 1746/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0984
Epoch 1747/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0983
Epoch 1748/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0982
Epoch 1749/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0981
Epoch 1750/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0980
Epoch 1751/2000

```
1/1 [=====] - 0s 6ms/step - loss: 0.0979
Epoch 1752/2000
1/1 [=====] - 0s 16ms/step - loss: 0.0979
Epoch 1753/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0978
Epoch 1754/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0977
Epoch 1755/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0976
Epoch 1756/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0975
Epoch 1757/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0974
Epoch 1758/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0973
Epoch 1759/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0972
Epoch 1760/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0971
Epoch 1761/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0970
Epoch 1762/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0970
Epoch 1763/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0969
Epoch 1764/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0968
Epoch 1765/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0967
Epoch 1766/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0966
Epoch 1767/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0965
Epoch 1768/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0964
Epoch 1769/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0963
Epoch 1770/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0962
Epoch 1771/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0961
Epoch 1772/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0961
Epoch 1773/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0960
Epoch 1774/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0959
Epoch 1775/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0958
Epoch 1776/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0957
Epoch 1777/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0956
Epoch 1778/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0955
Epoch 1779/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0954
Epoch 1780/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0953
Epoch 1781/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0953
```

```
Epoch 1782/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0952
Epoch 1783/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0951
Epoch 1784/2000
1/1 [=====] - 0s 18ms/step - loss: 0.0950
Epoch 1785/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0949
Epoch 1786/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0948
Epoch 1787/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0947
Epoch 1788/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0946
Epoch 1789/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0946
Epoch 1790/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0945
Epoch 1791/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0944
Epoch 1792/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0943
Epoch 1793/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0942
Epoch 1794/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0941
Epoch 1795/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0940
Epoch 1796/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0939
Epoch 1797/2000
1/1 [=====] - 0s 18ms/step - loss: 0.0939
Epoch 1798/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0938
Epoch 1799/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0937
Epoch 1800/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0936
Epoch 1801/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0935
Epoch 1802/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0934
Epoch 1803/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0933
Epoch 1804/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0932
Epoch 1805/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0932
Epoch 1806/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0931
Epoch 1807/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0930
Epoch 1808/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0929
Epoch 1809/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0928
Epoch 1810/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0927
Epoch 1811/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0926
Epoch 1812/2000
```

```
1/1 [=====] - 0s 4ms/step - loss: 0.0926
Epoch 1813/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0925
Epoch 1814/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0924
Epoch 1815/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0923
Epoch 1816/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0922
Epoch 1817/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0921
Epoch 1818/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0920
Epoch 1819/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0919
Epoch 1820/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0919
Epoch 1821/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0918
Epoch 1822/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0917
Epoch 1823/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0916
Epoch 1824/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0915
Epoch 1825/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0914
Epoch 1826/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0914
Epoch 1827/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0913
Epoch 1828/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0912
Epoch 1829/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0911
Epoch 1830/2000
1/1 [=====] - 0s 66ms/step - loss: 0.0910
Epoch 1831/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0909
Epoch 1832/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0908
Epoch 1833/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0908
Epoch 1834/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0907
Epoch 1835/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0906
Epoch 1836/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0905
Epoch 1837/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0904
Epoch 1838/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0903
Epoch 1839/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0903
Epoch 1840/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0902
Epoch 1841/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0901
Epoch 1842/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0900
```

Epoch 1843/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0899
Epoch 1844/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0898
Epoch 1845/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0898
Epoch 1846/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0897
Epoch 1847/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0896
Epoch 1848/2000
1/1 [=====] - 0s 21ms/step - loss: 0.0895
Epoch 1849/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0894
Epoch 1850/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0893
Epoch 1851/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0893
Epoch 1852/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0892
Epoch 1853/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0891
Epoch 1854/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0890
Epoch 1855/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0889
Epoch 1856/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0888
Epoch 1857/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0888
Epoch 1858/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0887
Epoch 1859/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0886
Epoch 1860/2000
1/1 [=====] - 0s 29ms/step - loss: 0.0885
Epoch 1861/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0884
Epoch 1862/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0883
Epoch 1863/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0883
Epoch 1864/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0882
Epoch 1865/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0881
Epoch 1866/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0880
Epoch 1867/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0879
Epoch 1868/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0879
Epoch 1869/2000
1/1 [=====] - 0s 105ms/step - loss: 0.0878
Epoch 1870/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0877
Epoch 1871/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0876
Epoch 1872/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0875
Epoch 1873/2000

```
1/1 [=====] - 0s 5ms/step - loss: 0.0874
Epoch 1874/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0874
Epoch 1875/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0873
Epoch 1876/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0872
Epoch 1877/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0871
Epoch 1878/2000
1/1 [=====] - 0s 22ms/step - loss: 0.0870
Epoch 1879/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0870
Epoch 1880/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0869
Epoch 1881/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0868
Epoch 1882/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0867
Epoch 1883/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0866
Epoch 1884/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0866
Epoch 1885/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0865
Epoch 1886/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0864
Epoch 1887/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0863
Epoch 1888/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0862
Epoch 1889/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0862
Epoch 1890/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0861
Epoch 1891/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0860
Epoch 1892/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0859
Epoch 1893/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0858
Epoch 1894/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0858
Epoch 1895/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0857
Epoch 1896/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0856
Epoch 1897/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0855
Epoch 1898/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0854
Epoch 1899/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0854
Epoch 1900/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0853
Epoch 1901/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0852
Epoch 1902/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0851
Epoch 1903/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0850
```

```
Epoch 1904/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0850
Epoch 1905/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0849
Epoch 1906/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0848
Epoch 1907/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0847
Epoch 1908/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0846
Epoch 1909/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0846
Epoch 1910/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0845
Epoch 1911/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0844
Epoch 1912/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0843
Epoch 1913/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0842
Epoch 1914/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0842
Epoch 1915/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0841
Epoch 1916/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0840
Epoch 1917/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0839
Epoch 1918/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0839
Epoch 1919/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0838
Epoch 1920/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0837
Epoch 1921/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0836
Epoch 1922/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0835
Epoch 1923/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0835
Epoch 1924/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0834
Epoch 1925/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0833
Epoch 1926/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0832
Epoch 1927/2000
1/1 [=====] - 0s 16ms/step - loss: 0.0832
Epoch 1928/2000
1/1 [=====] - 0s 25ms/step - loss: 0.0831
Epoch 1929/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0830
Epoch 1930/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0829
Epoch 1931/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0828
Epoch 1932/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0828
Epoch 1933/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0827
Epoch 1934/2000
```



```
1/1 [=====] - 0s 5ms/step - loss: 0.0826
Epoch 1935/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0825
Epoch 1936/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0825
Epoch 1937/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0824
Epoch 1938/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0823
Epoch 1939/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0822
Epoch 1940/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0822
Epoch 1941/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0821
Epoch 1942/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0820
Epoch 1943/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0819
Epoch 1944/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0819
Epoch 1945/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0818
Epoch 1946/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0817
Epoch 1947/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0816
Epoch 1948/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0815
Epoch 1949/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0815
Epoch 1950/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0814
Epoch 1951/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0813
Epoch 1952/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0812
Epoch 1953/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0812
Epoch 1954/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0811
Epoch 1955/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0810
Epoch 1956/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0809
Epoch 1957/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0809
Epoch 1958/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0808
Epoch 1959/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0807
Epoch 1960/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0806
Epoch 1961/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0806
Epoch 1962/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0805
Epoch 1963/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0804
Epoch 1964/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0803
```

Epoch 1965/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0803
Epoch 1966/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0802
Epoch 1967/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0801
Epoch 1968/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0800
Epoch 1969/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0800
Epoch 1970/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0799
Epoch 1971/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0798
Epoch 1972/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0797
Epoch 1973/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0797
Epoch 1974/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0796
Epoch 1975/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0795
Epoch 1976/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0795
Epoch 1977/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0794
Epoch 1978/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0793
Epoch 1979/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0792
Epoch 1980/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0792
Epoch 1981/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0791
Epoch 1982/2000
1/1 [=====] - 0s 41ms/step - loss: 0.0790
Epoch 1983/2000
1/1 [=====] - 0s 17ms/step - loss: 0.0789
Epoch 1984/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0789
Epoch 1985/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0788
Epoch 1986/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0787
Epoch 1987/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0786
Epoch 1988/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0786
Epoch 1989/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0785
Epoch 1990/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0784
Epoch 1991/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0784
Epoch 1992/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0783
Epoch 1993/2000
1/1 [=====] - 0s 17ms/step - loss: 0.0782
Epoch 1994/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0781
Epoch 1995/2000

```

1/1 [=====] - 0s 66ms/step - loss: 0.0781
Epoch 1996/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0780
Epoch 1997/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0779
Epoch 1998/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0778
Epoch 1999/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0778
Epoch 2000/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0777
1/1 [=====] - 0s 144ms/step
SE PREDICE: [[6.0961237]] CUANDO EN REALIDAD LA RESPUESTA ES 6.25
1/1 [=====] - 0s 31ms/step
0.07762641122915229 ERROR CUADRATICO MEDIO, DEBERIA SER LO MAS CERCANO A
0 POSIBLE

```

DIEZ UNIDADES POR CAPA OCULTA

```

In [ ]: import tensorflow as tf
import numpy as np
from tensorflow import keras
# Declare model inputs and outputs for training y = x^2
xs = np.array([-4.0, -3.0, -2.0, -1.0, 0.0, 1.0, 2.0, 3.0, 4.0], dtype=float)
ys = np.array([16, 9, 4, 1, 0, 1, 4, 9, 16], dtype=float)

# numero de unidades por capa
n_unidades = 10
# funcion de activacion sigmoid
funcion_activacion = 'sigmoid'

# Build a Sequential model
# 2 capa oculta
# 1 capa de salida con 1 neurona y funcion de activacion lineal
model = tf.keras.Sequential([
    keras.layers.Dense(units=n_unidades, input_shape=(1,)),
    keras.layers.Dense(units=n_unidades, activation=funcion_activacion),
    keras.layers.Dense(units=1, activation='linear')
])

#compile
model.compile(optimizer='sgd', loss='mean_squared_error')
#fit con epochs 2000
model.fit(xs, ys, epochs=2000)

#predict en x=2.5
print('SE PREDICE:', model.predict([2.5]), " CUANDO EN REALIDAD LA RESPUESTA ES 6.25")

# Error cuadratico medio
from sklearn.metrics import mean_squared_error
# calcular error cuadratico medio
print(mean_squared_error(ys, model.predict(xs)), " ERROR CUADRATICO MEDIO")

Epoch 1/2000
1/1 [=====] - 1s 974ms/step - loss: 97.1592
Epoch 2/2000
1/1 [=====] - 0s 10ms/step - loss: 87.0374

```

```
Epoch 3/2000
1/1 [=====] - 0s 8ms/step - loss: 78.7659
Epoch 4/2000
1/1 [=====] - 0s 8ms/step - loss: 71.8833
Epoch 5/2000
1/1 [=====] - 0s 7ms/step - loss: 66.0813
Epoch 6/2000
1/1 [=====] - 0s 16ms/step - loss: 61.1481
Epoch 7/2000
1/1 [=====] - 0s 14ms/step - loss: 56.9334
Epoch 8/2000
1/1 [=====] - 0s 12ms/step - loss: 53.3258
Epoch 9/2000
1/1 [=====] - 0s 7ms/step - loss: 50.2397
Epoch 10/2000
1/1 [=====] - 0s 7ms/step - loss: 47.6057
Epoch 11/2000
1/1 [=====] - 0s 7ms/step - loss: 45.3658
Epoch 12/2000
1/1 [=====] - 0s 6ms/step - loss: 43.4694
Epoch 13/2000
1/1 [=====] - 0s 10ms/step - loss: 41.8716
Epoch 14/2000
1/1 [=====] - 0s 12ms/step - loss: 40.5325
Epoch 15/2000
1/1 [=====] - 0s 7ms/step - loss: 39.4159
Epoch 16/2000
1/1 [=====] - 0s 23ms/step - loss: 38.4896
Epoch 17/2000
1/1 [=====] - 0s 8ms/step - loss: 37.7248
Epoch 18/2000
1/1 [=====] - 0s 8ms/step - loss: 37.0961
Epoch 19/2000
1/1 [=====] - 0s 6ms/step - loss: 36.5815
Epoch 20/2000
1/1 [=====] - 0s 10ms/step - loss: 36.1618
Epoch 21/2000
1/1 [=====] - 0s 8ms/step - loss: 35.8206
Epoch 22/2000
1/1 [=====] - 0s 6ms/step - loss: 35.5440
Epoch 23/2000
1/1 [=====] - 0s 11ms/step - loss: 35.3203
Epoch 24/2000
1/1 [=====] - 0s 9ms/step - loss: 35.1395
Epoch 25/2000
1/1 [=====] - 0s 12ms/step - loss: 34.9938
Epoch 26/2000
1/1 [=====] - 0s 7ms/step - loss: 34.8763
Epoch 27/2000
1/1 [=====] - 0s 8ms/step - loss: 34.7815
Epoch 28/2000
1/1 [=====] - 0s 7ms/step - loss: 34.7051
Epoch 29/2000
1/1 [=====] - 0s 8ms/step - loss: 34.6433
Epoch 30/2000
1/1 [=====] - 0s 21ms/step - loss: 34.5932
Epoch 31/2000
1/1 [=====] - 0s 15ms/step - loss: 34.5525
Epoch 32/2000
1/1 [=====] - 0s 12ms/step - loss: 34.5193
Epoch 33/2000
```

```
1/1 [=====] - 0s 13ms/step - loss: 34.4920
Epoch 34/2000
1/1 [=====] - 0s 76ms/step - loss: 34.4695
Epoch 35/2000
1/1 [=====] - 0s 13ms/step - loss: 34.4507
Epoch 36/2000
1/1 [=====] - 0s 8ms/step - loss: 34.4349
Epoch 37/2000
1/1 [=====] - 0s 12ms/step - loss: 34.4216
Epoch 38/2000
1/1 [=====] - 0s 10ms/step - loss: 34.4101
Epoch 39/2000
1/1 [=====] - 0s 13ms/step - loss: 34.4002
Epoch 40/2000
1/1 [=====] - 0s 12ms/step - loss: 34.3915
Epoch 41/2000
1/1 [=====] - 0s 8ms/step - loss: 34.3838
Epoch 42/2000
1/1 [=====] - 0s 11ms/step - loss: 34.3769
Epoch 43/2000
1/1 [=====] - 0s 14ms/step - loss: 34.3707
Epoch 44/2000
1/1 [=====] - 0s 12ms/step - loss: 34.3649
Epoch 45/2000
1/1 [=====] - 0s 8ms/step - loss: 34.3596
Epoch 46/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3547
Epoch 47/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3500
Epoch 48/2000
1/1 [=====] - 0s 10ms/step - loss: 34.3456
Epoch 49/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3415
Epoch 50/2000
1/1 [=====] - 0s 8ms/step - loss: 34.3375
Epoch 51/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3336
Epoch 52/2000
1/1 [=====] - 0s 11ms/step - loss: 34.3300
Epoch 53/2000
1/1 [=====] - 0s 19ms/step - loss: 34.3264
Epoch 54/2000
1/1 [=====] - 0s 6ms/step - loss: 34.3229
Epoch 55/2000
1/1 [=====] - 0s 5ms/step - loss: 34.3196
Epoch 56/2000
1/1 [=====] - 0s 7ms/step - loss: 34.3164
Epoch 57/2000
1/1 [=====] - 0s 9ms/step - loss: 34.3132
Epoch 58/2000
1/1 [=====] - 0s 9ms/step - loss: 34.3101
Epoch 59/2000
1/1 [=====] - 0s 17ms/step - loss: 34.3071
Epoch 60/2000
1/1 [=====] - 0s 18ms/step - loss: 34.3042
Epoch 61/2000
1/1 [=====] - 0s 19ms/step - loss: 34.3013
Epoch 62/2000
1/1 [=====] - 0s 30ms/step - loss: 34.2986
Epoch 63/2000
1/1 [=====] - 0s 17ms/step - loss: 34.2958
```

```
Epoch 64/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2932
Epoch 65/2000
1/1 [=====] - 0s 12ms/step - loss: 34.2906
Epoch 66/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2880
Epoch 67/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2855
Epoch 68/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2831
Epoch 69/2000
1/1 [=====] - 0s 14ms/step - loss: 34.2807
Epoch 70/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2783
Epoch 71/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2760
Epoch 72/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2738
Epoch 73/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2716
Epoch 74/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2694
Epoch 75/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2673
Epoch 76/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2652
Epoch 77/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2631
Epoch 78/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2611
Epoch 79/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2591
Epoch 80/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2572
Epoch 81/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2553
Epoch 82/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2534
Epoch 83/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2515
Epoch 84/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2497
Epoch 85/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2479
Epoch 86/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2462
Epoch 87/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2444
Epoch 88/2000
1/1 [=====] - 0s 15ms/step - loss: 34.2427
Epoch 89/2000
1/1 [=====] - 0s 14ms/step - loss: 34.2410
Epoch 90/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2394
Epoch 91/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2377
Epoch 92/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2361
Epoch 93/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2345
Epoch 94/2000
```

1/1 [=====] - 0s 9ms/step - loss: 34.2330
Epoch 95/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2314
Epoch 96/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2299
Epoch 97/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2284
Epoch 98/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2269
Epoch 99/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2254
Epoch 100/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2240
Epoch 101/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2225
Epoch 102/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2211
Epoch 103/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2197
Epoch 104/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2183
Epoch 105/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2169
Epoch 106/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2156
Epoch 107/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2142
Epoch 108/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2129
Epoch 109/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2115
Epoch 110/2000
1/1 [=====] - 0s 8ms/step - loss: 34.2102
Epoch 111/2000
1/1 [=====] - 0s 9ms/step - loss: 34.2089
Epoch 112/2000
1/1 [=====] - 0s 17ms/step - loss: 34.2076
Epoch 113/2000
1/1 [=====] - 0s 11ms/step - loss: 34.2064
Epoch 114/2000
1/1 [=====] - 0s 6ms/step - loss: 34.2051
Epoch 115/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2038
Epoch 116/2000
1/1 [=====] - 0s 10ms/step - loss: 34.2026
Epoch 117/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2013
Epoch 118/2000
1/1 [=====] - 0s 7ms/step - loss: 34.2001
Epoch 119/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1989
Epoch 120/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1976
Epoch 121/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1964
Epoch 122/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1952
Epoch 123/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1940
Epoch 124/2000
1/1 [=====] - 0s 18ms/step - loss: 34.1928

Epoch 125/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1916
Epoch 126/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1904
Epoch 127/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1893
Epoch 128/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1881
Epoch 129/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1869
Epoch 130/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1857
Epoch 131/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1846
Epoch 132/2000
1/1 [=====] - 0s 4ms/step - loss: 34.1834
Epoch 133/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1823
Epoch 134/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1811
Epoch 135/2000
1/1 [=====] - 0s 66ms/step - loss: 34.1799
Epoch 136/2000
1/1 [=====] - 0s 25ms/step - loss: 34.1788
Epoch 137/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1776
Epoch 138/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1765
Epoch 139/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1753
Epoch 140/2000
1/1 [=====] - 0s 14ms/step - loss: 34.1742
Epoch 141/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1731
Epoch 142/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1719
Epoch 143/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1708
Epoch 144/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1696
Epoch 145/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1685
Epoch 146/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1674
Epoch 147/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1662
Epoch 148/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1651
Epoch 149/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1639
Epoch 150/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1628
Epoch 151/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1616
Epoch 152/2000
1/1 [=====] - 0s 9ms/step - loss: 34.1605
Epoch 153/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1593
Epoch 154/2000
1/1 [=====] - 0s 16ms/step - loss: 34.1582
Epoch 155/2000

1/1 [=====] - 0s 7ms/step - loss: 34.1570
Epoch 156/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1559
Epoch 157/2000
1/1 [=====] - 0s 9ms/step - loss: 34.1547
Epoch 158/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1536
Epoch 159/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1524
Epoch 160/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1512
Epoch 161/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1501
Epoch 162/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1489
Epoch 163/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1477
Epoch 164/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1465
Epoch 165/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1454
Epoch 166/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1442
Epoch 167/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1430
Epoch 168/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1418
Epoch 169/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1406
Epoch 170/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1394
Epoch 171/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1382
Epoch 172/2000
1/1 [=====] - 0s 64ms/step - loss: 34.1369
Epoch 173/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1357
Epoch 174/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1345
Epoch 175/2000
1/1 [=====] - 0s 16ms/step - loss: 34.1333
Epoch 176/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1320
Epoch 177/2000
1/1 [=====] - 0s 20ms/step - loss: 34.1308
Epoch 178/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1295
Epoch 179/2000
1/1 [=====] - 0s 9ms/step - loss: 34.1283
Epoch 180/2000
1/1 [=====] - 0s 5ms/step - loss: 34.1270
Epoch 181/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1258
Epoch 182/2000
1/1 [=====] - 0s 8ms/step - loss: 34.1245
Epoch 183/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1232
Epoch 184/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1219
Epoch 185/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1206

Epoch 186/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1193
Epoch 187/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1180
Epoch 188/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1167
Epoch 189/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1154
Epoch 190/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1140
Epoch 191/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1127
Epoch 192/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1114
Epoch 193/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1100
Epoch 194/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1086
Epoch 195/2000
1/1 [=====] - 0s 10ms/step - loss: 34.1073
Epoch 196/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1059
Epoch 197/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1045
Epoch 198/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1031
Epoch 199/2000
1/1 [=====] - 0s 6ms/step - loss: 34.1017
Epoch 200/2000
1/1 [=====] - 0s 7ms/step - loss: 34.1003
Epoch 201/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0989
Epoch 202/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0974
Epoch 203/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0960
Epoch 204/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0945
Epoch 205/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0931
Epoch 206/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0916
Epoch 207/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0901
Epoch 208/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0886
Epoch 209/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0871
Epoch 210/2000
1/1 [=====] - 0s 79ms/step - loss: 34.0856
Epoch 211/2000
1/1 [=====] - 0s 25ms/step - loss: 34.0840
Epoch 212/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0825
Epoch 213/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0810
Epoch 214/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0794
Epoch 215/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0778
Epoch 216/2000

1/1 [=====] - 0s 6ms/step - loss: 34.0762
Epoch 217/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0746
Epoch 218/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0730
Epoch 219/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0714
Epoch 220/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0698
Epoch 221/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0681
Epoch 222/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0665
Epoch 223/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0648
Epoch 224/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0631
Epoch 225/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0614
Epoch 226/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0597
Epoch 227/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0580
Epoch 228/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0562
Epoch 229/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0545
Epoch 230/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0527
Epoch 231/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0509
Epoch 232/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0492
Epoch 233/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0473
Epoch 234/2000
1/1 [=====] - 0s 19ms/step - loss: 34.0455
Epoch 235/2000
1/1 [=====] - 0s 9ms/step - loss: 34.0437
Epoch 236/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0418
Epoch 237/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0400
Epoch 238/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0381
Epoch 239/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0362
Epoch 240/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0343
Epoch 241/2000
1/1 [=====] - 0s 10ms/step - loss: 34.0323
Epoch 242/2000
1/1 [=====] - 0s 9ms/step - loss: 34.0304
Epoch 243/2000
1/1 [=====] - 0s 12ms/step - loss: 34.0284
Epoch 244/2000
1/1 [=====] - 0s 11ms/step - loss: 34.0264
Epoch 245/2000
1/1 [=====] - 0s 14ms/step - loss: 34.0244
Epoch 246/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0224

Epoch 247/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0204
Epoch 248/2000
1/1 [=====] - 0s 10ms/step - loss: 34.0184
Epoch 249/2000
1/1 [=====] - 0s 13ms/step - loss: 34.0163
Epoch 250/2000
1/1 [=====] - 0s 9ms/step - loss: 34.0142
Epoch 251/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0121
Epoch 252/2000
1/1 [=====] - 0s 8ms/step - loss: 34.0100
Epoch 253/2000
1/1 [=====] - 0s 5ms/step - loss: 34.0079
Epoch 254/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0057
Epoch 255/2000
1/1 [=====] - 0s 6ms/step - loss: 34.0035
Epoch 256/2000
1/1 [=====] - 0s 7ms/step - loss: 34.0013
Epoch 257/2000
1/1 [=====] - 0s 8ms/step - loss: 33.9991
Epoch 258/2000
1/1 [=====] - 0s 12ms/step - loss: 33.9969
Epoch 259/2000
1/1 [=====] - 0s 6ms/step - loss: 33.9946
Epoch 260/2000
1/1 [=====] - 0s 9ms/step - loss: 33.9924
Epoch 261/2000
1/1 [=====] - 0s 8ms/step - loss: 33.9901
Epoch 262/2000
1/1 [=====] - 0s 7ms/step - loss: 33.9878
Epoch 263/2000
1/1 [=====] - 0s 9ms/step - loss: 33.9854
Epoch 264/2000
1/1 [=====] - 0s 9ms/step - loss: 33.9831
Epoch 265/2000
1/1 [=====] - 0s 7ms/step - loss: 33.9807
Epoch 266/2000
1/1 [=====] - 0s 10ms/step - loss: 33.9783
Epoch 267/2000
1/1 [=====] - 0s 9ms/step - loss: 33.9759
Epoch 268/2000
1/1 [=====] - 0s 20ms/step - loss: 33.9735
Epoch 269/2000
1/1 [=====] - 0s 6ms/step - loss: 33.9710
Epoch 270/2000
1/1 [=====] - 0s 7ms/step - loss: 33.9685
Epoch 271/2000
1/1 [=====] - 0s 10ms/step - loss: 33.9660
Epoch 272/2000
1/1 [=====] - 0s 11ms/step - loss: 33.9635
Epoch 273/2000
1/1 [=====] - 0s 9ms/step - loss: 33.9610
Epoch 274/2000
1/1 [=====] - 0s 7ms/step - loss: 33.9584
Epoch 275/2000
1/1 [=====] - 0s 9ms/step - loss: 33.9558
Epoch 276/2000
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Epoch 277/2000

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Epoch 278/2000
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Epoch 279/2000
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Epoch 280/2000
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Epoch 281/2000
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Epoch 282/2000
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Epoch 283/2000
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Epoch 284/2000
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Epoch 285/2000
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Epoch 286/2000
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Epoch 287/2000
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Epoch 288/2000
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Epoch 289/2000
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Epoch 290/2000
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Epoch 291/2000
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Epoch 292/2000
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Epoch 293/2000
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Epoch 294/2000
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Epoch 295/2000
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Epoch 296/2000
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Epoch 297/2000
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Epoch 298/2000
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Epoch 299/2000
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Epoch 300/2000
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Epoch 301/2000
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Epoch 302/2000
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Epoch 303/2000
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Epoch 304/2000
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Epoch 305/2000
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Epoch 306/2000
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Epoch 307/2000
1/1 [=====] - 0s 6ms/step - loss: 33.8590

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Epoch 308/2000
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Epoch 311/2000
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Epoch 316/2000
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Epoch 317/2000
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Epoch 318/2000
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Epoch 319/2000
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Epoch 327/2000
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Epoch 329/2000
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Epoch 332/2000
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Epoch 333/2000
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Epoch 334/2000
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Epoch 335/2000
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Epoch 336/2000
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Epoch 337/2000
1/1 [=====] - 0s 6ms/step - loss: 33.7380
Epoch 338/2000
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Epoch 344/2000
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Epoch 347/2000
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Epoch 348/2000
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Epoch 349/2000
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Epoch 354/2000
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Epoch 372/2000
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Epoch 397/2000
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Epoch 398/2000
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Epoch 399/2000


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Epoch 405/2000
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Epoch 409/2000
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Epoch 410/2000
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Epoch 411/2000
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Epoch 413/2000
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Epoch 414/2000
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Epoch 419/2000
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Epoch 420/2000
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Epoch 421/2000
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Epoch 422/2000
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Epoch 429/2000
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Epoch 434/2000
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Epoch 436/2000
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Epoch 454/2000
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Epoch 456/2000
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Epoch 458/2000
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Epoch 459/2000
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Epoch 460/2000
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Epoch 492/2000
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Epoch 493/2000
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Epoch 521/2000

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Epoch 544/2000
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Epoch 545/2000
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Epoch 546/2000
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Epoch 547/2000
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Epoch 549/2000
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Epoch 556/2000
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Epoch 557/2000
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Epoch 558/2000
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Epoch 561/2000
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Epoch 562/2000
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Epoch 563/2000
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Epoch 564/2000
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Epoch 565/2000
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Epoch 566/2000
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Epoch 567/2000
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Epoch 568/2000
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Epoch 569/2000
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Epoch 570/2000
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Epoch 571/2000
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Epoch 572/2000
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Epoch 573/2000
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Epoch 574/2000
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Epoch 575/2000
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Epoch 576/2000
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Epoch 577/2000
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Epoch 578/2000
1/1 [=====] - 0s 6ms/step - loss: 28.4054
Epoch 579/2000
1/1 [=====] - 0s 8ms/step - loss: 28.3384
Epoch 580/2000
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Epoch 581/2000
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Epoch 582/2000

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Epoch 583/2000
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Epoch 584/2000
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Epoch 585/2000
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Epoch 586/2000
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Epoch 587/2000
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Epoch 589/2000
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Epoch 590/2000
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Epoch 591/2000
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Epoch 592/2000
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Epoch 593/2000
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Epoch 596/2000
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Epoch 597/2000
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Epoch 598/2000
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Epoch 600/2000
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Epoch 601/2000
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Epoch 602/2000
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Epoch 603/2000
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Epoch 604/2000
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Epoch 605/2000
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Epoch 606/2000
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Epoch 607/2000
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Epoch 608/2000
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Epoch 609/2000
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Epoch 610/2000
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Epoch 612/2000
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Epoch 613/2000
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Epoch 614/2000
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Epoch 615/2000
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Epoch 616/2000
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Epoch 617/2000
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Epoch 618/2000
1/1 [=====] - 0s 7ms/step - loss: 25.0848
Epoch 619/2000
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Epoch 620/2000
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Epoch 622/2000
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Epoch 623/2000
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Epoch 624/2000
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Epoch 625/2000
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Epoch 626/2000
1/1 [=====] - 0s 6ms/step - loss: 24.2549
Epoch 627/2000
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Epoch 628/2000
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Epoch 629/2000
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Epoch 630/2000
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Epoch 631/2000
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Epoch 633/2000
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Epoch 634/2000
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Epoch 635/2000
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Epoch 636/2000
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Epoch 637/2000
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Epoch 638/2000
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Epoch 639/2000
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Epoch 640/2000
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Epoch 641/2000
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Epoch 642/2000
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Epoch 643/2000

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Epoch 644/2000
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Epoch 645/2000
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Epoch 646/2000
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Epoch 647/2000
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Epoch 648/2000
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Epoch 649/2000
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Epoch 651/2000
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Epoch 652/2000
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Epoch 653/2000
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Epoch 654/2000
1/1 [=====] - 0s 7ms/step - loss: 20.9503
Epoch 655/2000
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Epoch 656/2000
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Epoch 657/2000
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Epoch 658/2000
1/1 [=====] - 0s 8ms/step - loss: 20.4358
Epoch 659/2000
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Epoch 660/2000
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Epoch 661/2000
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Epoch 662/2000
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Epoch 663/2000
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Epoch 664/2000
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Epoch 665/2000
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Epoch 668/2000
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Epoch 670/2000
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Epoch 671/2000
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Epoch 672/2000
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Epoch 673/2000
1/1 [=====] - 0s 17ms/step - loss: 18.4441

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Epoch 674/2000
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Epoch 675/2000
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Epoch 676/2000
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Epoch 677/2000
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Epoch 678/2000
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Epoch 679/2000
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Epoch 680/2000
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Epoch 681/2000
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Epoch 682/2000
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Epoch 684/2000
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Epoch 685/2000
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Epoch 686/2000
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Epoch 688/2000
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Epoch 689/2000
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Epoch 690/2000
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Epoch 691/2000
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Epoch 692/2000
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Epoch 693/2000
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Epoch 694/2000
1/1 [=====] - 0s 6ms/step - loss: 15.5849
Epoch 695/2000
1/1 [=====] - 0s 5ms/step - loss: 15.4493
Epoch 696/2000
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Epoch 697/2000
1/1 [=====] - 0s 9ms/step - loss: 15.1789
Epoch 698/2000
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Epoch 699/2000
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Epoch 700/2000
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Epoch 701/2000
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Epoch 702/2000
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Epoch 703/2000
1/1 [=====] - 0s 6ms/step - loss: 14.3739
Epoch 704/2000
```

1/1 [=====] - 0s 7ms/step - loss: 14.2408
Epoch 705/2000
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Epoch 706/2000
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Epoch 707/2000
1/1 [=====] - 0s 8ms/step - loss: 13.8440
Epoch 708/2000
1/1 [=====] - 0s 7ms/step - loss: 13.7125
Epoch 709/2000
1/1 [=====] - 0s 5ms/step - loss: 13.5815
Epoch 710/2000
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Epoch 711/2000
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Epoch 712/2000
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Epoch 713/2000
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Epoch 714/2000
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Epoch 715/2000
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Epoch 716/2000
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Epoch 717/2000
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Epoch 718/2000
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Epoch 719/2000
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Epoch 720/2000
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Epoch 722/2000
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Epoch 723/2000
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Epoch 724/2000
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Epoch 725/2000
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Epoch 726/2000
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Epoch 727/2000
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Epoch 728/2000
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Epoch 729/2000
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Epoch 730/2000
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Epoch 731/2000
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Epoch 732/2000
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Epoch 733/2000
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Epoch 734/2000
1/1 [=====] - 0s 8ms/step - loss: 10.4890

Epoch 735/2000
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Epoch 736/2000
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Epoch 737/2000
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Epoch 739/2000
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Epoch 740/2000
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Epoch 741/2000
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Epoch 742/2000
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Epoch 743/2000
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Epoch 744/2000
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Epoch 745/2000
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Epoch 746/2000
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Epoch 747/2000
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Epoch 748/2000
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Epoch 749/2000
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Epoch 750/2000
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Epoch 751/2000
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Epoch 752/2000
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Epoch 753/2000
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Epoch 754/2000
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Epoch 755/2000
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Epoch 756/2000
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Epoch 757/2000
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Epoch 759/2000
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Epoch 760/2000
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Epoch 762/2000
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Epoch 763/2000
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Epoch 764/2000
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Epoch 765/2000

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Epoch 766/2000
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Epoch 767/2000
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Epoch 768/2000
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Epoch 770/2000
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Epoch 771/2000
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Epoch 772/2000
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Epoch 773/2000
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Epoch 774/2000
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Epoch 775/2000
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Epoch 776/2000
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Epoch 777/2000
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Epoch 778/2000
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Epoch 779/2000
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Epoch 782/2000
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Epoch 786/2000
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Epoch 788/2000
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Epoch 789/2000
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Epoch 790/2000
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Epoch 791/2000
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Epoch 792/2000
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Epoch 793/2000
1/1 [=====] - 0s 9ms/step - loss: 5.1371
Epoch 794/2000
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Epoch 795/2000
1/1 [=====] - 0s 9ms/step - loss: 5.0066

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Epoch 797/2000
1/1 [=====] - 0s 86ms/step - loss: 4.8793
Epoch 798/2000
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Epoch 799/2000
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Epoch 800/2000
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Epoch 802/2000
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Epoch 803/2000
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Epoch 804/2000
1/1 [=====] - 0s 9ms/step - loss: 4.4572
Epoch 805/2000
1/1 [=====] - 0s 7ms/step - loss: 4.3998
Epoch 806/2000
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Epoch 807/2000
1/1 [=====] - 0s 8ms/step - loss: 4.2872
Epoch 808/2000
1/1 [=====] - 0s 9ms/step - loss: 4.2320
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Epoch 810/2000
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Epoch 811/2000
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Epoch 812/2000
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Epoch 814/2000
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Epoch 815/2000
1/1 [=====] - 0s 7ms/step - loss: 3.8645
Epoch 816/2000
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Epoch 817/2000
1/1 [=====] - 0s 9ms/step - loss: 3.7655
Epoch 818/2000
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Epoch 819/2000
1/1 [=====] - 0s 8ms/step - loss: 3.6691
Epoch 820/2000
1/1 [=====] - 0s 9ms/step - loss: 3.6219
Epoch 821/2000
1/1 [=====] - 0s 11ms/step - loss: 3.5752
Epoch 822/2000
1/1 [=====] - 0s 9ms/step - loss: 3.5292
Epoch 823/2000
1/1 [=====] - 0s 9ms/step - loss: 3.4838
Epoch 824/2000
1/1 [=====] - 0s 16ms/step - loss: 3.4390
Epoch 825/2000
1/1 [=====] - 0s 14ms/step - loss: 3.3948
Epoch 826/2000
```

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Epoch 827/2000
1/1 [=====] - 0s 7ms/step - loss: 3.3081
Epoch 828/2000
1/1 [=====] - 0s 13ms/step - loss: 3.2657
Epoch 829/2000
1/1 [=====] - 0s 9ms/step - loss: 3.2238
Epoch 830/2000
1/1 [=====] - 0s 9ms/step - loss: 3.1825
Epoch 831/2000
1/1 [=====] - 0s 9ms/step - loss: 3.1417
Epoch 832/2000
1/1 [=====] - 0s 7ms/step - loss: 3.1015
Epoch 833/2000
1/1 [=====] - 0s 10ms/step - loss: 3.0619
Epoch 834/2000
1/1 [=====] - 0s 8ms/step - loss: 3.0227
Epoch 835/2000
1/1 [=====] - 0s 7ms/step - loss: 2.9842
Epoch 836/2000
1/1 [=====] - 0s 6ms/step - loss: 2.9461
Epoch 837/2000
1/1 [=====] - 0s 8ms/step - loss: 2.9086
Epoch 838/2000
1/1 [=====] - 0s 6ms/step - loss: 2.8716
Epoch 839/2000
1/1 [=====] - 0s 7ms/step - loss: 2.8351
Epoch 840/2000
1/1 [=====] - 0s 6ms/step - loss: 2.7991
Epoch 841/2000
1/1 [=====] - 0s 11ms/step - loss: 2.7636
Epoch 842/2000
1/1 [=====] - 0s 6ms/step - loss: 2.7286
Epoch 843/2000
1/1 [=====] - 0s 9ms/step - loss: 2.6941
Epoch 844/2000
1/1 [=====] - 0s 7ms/step - loss: 2.6600
Epoch 845/2000
1/1 [=====] - 0s 7ms/step - loss: 2.6265
Epoch 846/2000
1/1 [=====] - 0s 15ms/step - loss: 2.5934
Epoch 847/2000
1/1 [=====] - 0s 10ms/step - loss: 2.5608
Epoch 848/2000
1/1 [=====] - 0s 7ms/step - loss: 2.5286
Epoch 849/2000
1/1 [=====] - 0s 7ms/step - loss: 2.4969
Epoch 850/2000
1/1 [=====] - 0s 73ms/step - loss: 2.4656
Epoch 851/2000
1/1 [=====] - 0s 5ms/step - loss: 2.4347
Epoch 852/2000
1/1 [=====] - 0s 7ms/step - loss: 2.4043
Epoch 853/2000
1/1 [=====] - 0s 7ms/step - loss: 2.3744
Epoch 854/2000
1/1 [=====] - 0s 12ms/step - loss: 2.3448
Epoch 855/2000
1/1 [=====] - 0s 6ms/step - loss: 2.3157
Epoch 856/2000
1/1 [=====] - 0s 5ms/step - loss: 2.2869

Epoch 857/2000
1/1 [=====] - 0s 5ms/step - loss: 2.2586
Epoch 858/2000
1/1 [=====] - 0s 6ms/step - loss: 2.2307
Epoch 859/2000
1/1 [=====] - 0s 6ms/step - loss: 2.2032
Epoch 860/2000
1/1 [=====] - 0s 7ms/step - loss: 2.1760
Epoch 861/2000
1/1 [=====] - 0s 5ms/step - loss: 2.1493
Epoch 862/2000
1/1 [=====] - 0s 10ms/step - loss: 2.1229
Epoch 863/2000
1/1 [=====] - 0s 8ms/step - loss: 2.0969
Epoch 864/2000
1/1 [=====] - 0s 6ms/step - loss: 2.0713
Epoch 865/2000
1/1 [=====] - 0s 10ms/step - loss: 2.0460
Epoch 866/2000
1/1 [=====] - 0s 11ms/step - loss: 2.0211
Epoch 867/2000
1/1 [=====] - 0s 5ms/step - loss: 1.9966
Epoch 868/2000
1/1 [=====] - 0s 8ms/step - loss: 1.9724
Epoch 869/2000
1/1 [=====] - 0s 5ms/step - loss: 1.9486
Epoch 870/2000
1/1 [=====] - 0s 7ms/step - loss: 1.9250
Epoch 871/2000
1/1 [=====] - 0s 7ms/step - loss: 1.9019
Epoch 872/2000
1/1 [=====] - 0s 15ms/step - loss: 1.8790
Epoch 873/2000
1/1 [=====] - 0s 7ms/step - loss: 1.8565
Epoch 874/2000
1/1 [=====] - 0s 9ms/step - loss: 1.8343
Epoch 875/2000
1/1 [=====] - 0s 10ms/step - loss: 1.8124
Epoch 876/2000
1/1 [=====] - 0s 6ms/step - loss: 1.7909
Epoch 877/2000
1/1 [=====] - 0s 7ms/step - loss: 1.7696
Epoch 878/2000
1/1 [=====] - 0s 20ms/step - loss: 1.7487
Epoch 879/2000
1/1 [=====] - 0s 6ms/step - loss: 1.7280
Epoch 880/2000
1/1 [=====] - 0s 10ms/step - loss: 1.7076
Epoch 881/2000
1/1 [=====] - 0s 9ms/step - loss: 1.6876
Epoch 882/2000
1/1 [=====] - 0s 8ms/step - loss: 1.6678
Epoch 883/2000
1/1 [=====] - 0s 8ms/step - loss: 1.6483
Epoch 884/2000
1/1 [=====] - 0s 8ms/step - loss: 1.6291
Epoch 885/2000
1/1 [=====] - 0s 7ms/step - loss: 1.6101
Epoch 886/2000
1/1 [=====] - 0s 9ms/step - loss: 1.5914
Epoch 887/2000

1/1 [=====] - 0s 15ms/step - loss: 1.5730
Epoch 888/2000
1/1 [=====] - 0s 11ms/step - loss: 1.5549
Epoch 889/2000
1/1 [=====] - 0s 8ms/step - loss: 1.5370
Epoch 890/2000
1/1 [=====] - 0s 16ms/step - loss: 1.5194
Epoch 891/2000
1/1 [=====] - 0s 7ms/step - loss: 1.5020
Epoch 892/2000
1/1 [=====] - 0s 12ms/step - loss: 1.4849
Epoch 893/2000
1/1 [=====] - 0s 14ms/step - loss: 1.4680
Epoch 894/2000
1/1 [=====] - 0s 10ms/step - loss: 1.4513
Epoch 895/2000
1/1 [=====] - 0s 9ms/step - loss: 1.4349
Epoch 896/2000
1/1 [=====] - 0s 11ms/step - loss: 1.4187
Epoch 897/2000
1/1 [=====] - 0s 8ms/step - loss: 1.4028
Epoch 898/2000
1/1 [=====] - 0s 10ms/step - loss: 1.3871
Epoch 899/2000
1/1 [=====] - 0s 10ms/step - loss: 1.3716
Epoch 900/2000
1/1 [=====] - 0s 9ms/step - loss: 1.3563
Epoch 901/2000
1/1 [=====] - 0s 10ms/step - loss: 1.3413
Epoch 902/2000
1/1 [=====] - 0s 8ms/step - loss: 1.3264
Epoch 903/2000
1/1 [=====] - 0s 10ms/step - loss: 1.3118
Epoch 904/2000
1/1 [=====] - 0s 10ms/step - loss: 1.2974
Epoch 905/2000
1/1 [=====] - 0s 9ms/step - loss: 1.2831
Epoch 906/2000
1/1 [=====] - 0s 9ms/step - loss: 1.2691
Epoch 907/2000
1/1 [=====] - 0s 9ms/step - loss: 1.2553
Epoch 908/2000
1/1 [=====] - 0s 8ms/step - loss: 1.2417
Epoch 909/2000
1/1 [=====] - 0s 10ms/step - loss: 1.2282
Epoch 910/2000
1/1 [=====] - 0s 5ms/step - loss: 1.2150
Epoch 911/2000
1/1 [=====] - 0s 7ms/step - loss: 1.2020
Epoch 912/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1891
Epoch 913/2000
1/1 [=====] - 0s 6ms/step - loss: 1.1764
Epoch 914/2000
1/1 [=====] - 0s 5ms/step - loss: 1.1639
Epoch 915/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1516
Epoch 916/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1394
Epoch 917/2000
1/1 [=====] - 0s 67ms/step - loss: 1.1274

```
Epoch 918/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1156
Epoch 919/2000
1/1 [=====] - 0s 7ms/step - loss: 1.1039
Epoch 920/2000
1/1 [=====] - 0s 8ms/step - loss: 1.0924
Epoch 921/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0811
Epoch 922/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0699
Epoch 923/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0589
Epoch 924/2000
1/1 [=====] - 0s 5ms/step - loss: 1.0481
Epoch 925/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0374
Epoch 926/2000
1/1 [=====] - 0s 7ms/step - loss: 1.0268
Epoch 927/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0164
Epoch 928/2000
1/1 [=====] - 0s 6ms/step - loss: 1.0061
Epoch 929/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9960
Epoch 930/2000
1/1 [=====] - 0s 10ms/step - loss: 0.9860
Epoch 931/2000
1/1 [=====] - 0s 8ms/step - loss: 0.9762
Epoch 932/2000
1/1 [=====] - 0s 7ms/step - loss: 0.9665
Epoch 933/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9569
Epoch 934/2000
1/1 [=====] - 0s 9ms/step - loss: 0.9474
Epoch 935/2000
1/1 [=====] - 0s 8ms/step - loss: 0.9381
Epoch 936/2000
1/1 [=====] - 0s 9ms/step - loss: 0.9289
Epoch 937/2000
1/1 [=====] - 0s 14ms/step - loss: 0.9199
Epoch 938/2000
1/1 [=====] - 0s 12ms/step - loss: 0.9110
Epoch 939/2000
1/1 [=====] - 0s 6ms/step - loss: 0.9022
Epoch 940/2000
1/1 [=====] - 0s 9ms/step - loss: 0.8935
Epoch 941/2000
1/1 [=====] - 0s 8ms/step - loss: 0.8849
Epoch 942/2000
1/1 [=====] - 0s 15ms/step - loss: 0.8764
Epoch 943/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8681
Epoch 944/2000
1/1 [=====] - 0s 8ms/step - loss: 0.8599
Epoch 945/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8518
Epoch 946/2000
1/1 [=====] - 0s 5ms/step - loss: 0.8438
Epoch 947/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8359
Epoch 948/2000
```

1/1 [=====] - 0s 5ms/step - loss: 0.8281
Epoch 949/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8205
Epoch 950/2000
1/1 [=====] - 0s 6ms/step - loss: 0.8129
Epoch 951/2000
1/1 [=====] - 0s 7ms/step - loss: 0.8054
Epoch 952/2000
1/1 [=====] - 0s 39ms/step - loss: 0.7980
Epoch 953/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7908
Epoch 954/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7836
Epoch 955/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7765
Epoch 956/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7696
Epoch 957/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7627
Epoch 958/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7559
Epoch 959/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7492
Epoch 960/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7426
Epoch 961/2000
1/1 [=====] - 0s 4ms/step - loss: 0.7361
Epoch 962/2000
1/1 [=====] - 0s 7ms/step - loss: 0.7296
Epoch 963/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7233
Epoch 964/2000
1/1 [=====] - 0s 9ms/step - loss: 0.7170
Epoch 965/2000
1/1 [=====] - 0s 5ms/step - loss: 0.7108
Epoch 966/2000
1/1 [=====] - 0s 6ms/step - loss: 0.7048
Epoch 967/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6987
Epoch 968/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6928
Epoch 969/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6869
Epoch 970/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6812
Epoch 971/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6755
Epoch 972/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6698
Epoch 973/2000
1/1 [=====] - 0s 61ms/step - loss: 0.6643
Epoch 974/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6588
Epoch 975/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6534
Epoch 976/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6481
Epoch 977/2000
1/1 [=====] - 0s 10ms/step - loss: 0.6428
Epoch 978/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6376

Epoch 979/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6325
Epoch 980/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6274
Epoch 981/2000
1/1 [=====] - 0s 8ms/step - loss: 0.6224
Epoch 982/2000
1/1 [=====] - 0s 5ms/step - loss: 0.6175
Epoch 983/2000
1/1 [=====] - 0s 6ms/step - loss: 0.6126
Epoch 984/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6078
Epoch 985/2000
1/1 [=====] - 0s 7ms/step - loss: 0.6030
Epoch 986/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5984
Epoch 987/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5937
Epoch 988/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5892
Epoch 989/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5847
Epoch 990/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5802
Epoch 991/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5758
Epoch 992/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5715
Epoch 993/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5672
Epoch 994/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5630
Epoch 995/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5588
Epoch 996/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5547
Epoch 997/2000
1/1 [=====] - 0s 12ms/step - loss: 0.5507
Epoch 998/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5467
Epoch 999/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5427
Epoch 1000/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5388
Epoch 1001/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5349
Epoch 1002/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5311
Epoch 1003/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5273
Epoch 1004/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5236
Epoch 1005/2000
1/1 [=====] - 0s 5ms/step - loss: 0.5199
Epoch 1006/2000
1/1 [=====] - 0s 7ms/step - loss: 0.5163
Epoch 1007/2000
1/1 [=====] - 0s 11ms/step - loss: 0.5127
Epoch 1008/2000
1/1 [=====] - 0s 6ms/step - loss: 0.5092
Epoch 1009/2000

```
1/1 [=====] - 0s 6ms/step - loss: 0.5057
Epoch 1010/2000
1/1 [=====] - 0s 4ms/step - loss: 0.5023
Epoch 1011/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4989
Epoch 1012/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4955
Epoch 1013/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4922
Epoch 1014/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4889
Epoch 1015/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4856
Epoch 1016/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4824
Epoch 1017/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4793
Epoch 1018/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4762
Epoch 1019/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4731
Epoch 1020/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4700
Epoch 1021/2000
1/1 [=====] - 0s 4ms/step - loss: 0.4670
Epoch 1022/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4640
Epoch 1023/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4611
Epoch 1024/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4582
Epoch 1025/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4553
Epoch 1026/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4525
Epoch 1027/2000
1/1 [=====] - 0s 10ms/step - loss: 0.4497
Epoch 1028/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4469
Epoch 1029/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4442
Epoch 1030/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4415
Epoch 1031/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4388
Epoch 1032/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4362
Epoch 1033/2000
1/1 [=====] - 0s 8ms/step - loss: 0.4336
Epoch 1034/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4310
Epoch 1035/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4284
Epoch 1036/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4259
Epoch 1037/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4234
Epoch 1038/2000
1/1 [=====] - 0s 7ms/step - loss: 0.4210
Epoch 1039/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4186
```

```
Epoch 1040/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4162
Epoch 1041/2000
1/1 [=====] - 0s 64ms/step - loss: 0.4138
Epoch 1042/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4114
Epoch 1043/2000
1/1 [=====] - 0s 6ms/step - loss: 0.4091
Epoch 1044/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4068
Epoch 1045/2000
1/1 [=====] - 0s 5ms/step - loss: 0.4046
Epoch 1046/2000
1/1 [=====] - 0s 9ms/step - loss: 0.4023
Epoch 1047/2000
1/1 [=====] - 0s 12ms/step - loss: 0.4001
Epoch 1048/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3979
Epoch 1049/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3958
Epoch 1050/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3936
Epoch 1051/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3915
Epoch 1052/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3894
Epoch 1053/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3874
Epoch 1054/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3853
Epoch 1055/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3833
Epoch 1056/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3813
Epoch 1057/2000
1/1 [=====] - 0s 18ms/step - loss: 0.3793
Epoch 1058/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3774
Epoch 1059/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3755
Epoch 1060/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3736
Epoch 1061/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3717
Epoch 1062/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3698
Epoch 1063/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3680
Epoch 1064/2000
1/1 [=====] - 0s 4ms/step - loss: 0.3661
Epoch 1065/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3643
Epoch 1066/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3625
Epoch 1067/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3608
Epoch 1068/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3590
Epoch 1069/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3573
Epoch 1070/2000
```

```
1/1 [=====] - 0s 8ms/step - loss: 0.3556
Epoch 1071/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3539
Epoch 1072/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3522
Epoch 1073/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3506
Epoch 1074/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3489
Epoch 1075/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3473
Epoch 1076/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3457
Epoch 1077/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3441
Epoch 1078/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3426
Epoch 1079/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3410
Epoch 1080/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3395
Epoch 1081/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3380
Epoch 1082/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3365
Epoch 1083/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3350
Epoch 1084/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3335
Epoch 1085/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3320
Epoch 1086/2000
1/1 [=====] - 0s 122ms/step - loss: 0.3306
Epoch 1087/2000
1/1 [=====] - 0s 13ms/step - loss: 0.3292
Epoch 1088/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3278
Epoch 1089/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3264
Epoch 1090/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3250
Epoch 1091/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3236
Epoch 1092/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3223
Epoch 1093/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3209
Epoch 1094/2000
1/1 [=====] - 0s 13ms/step - loss: 0.3196
Epoch 1095/2000
1/1 [=====] - 0s 9ms/step - loss: 0.3183
Epoch 1096/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3170
Epoch 1097/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3157
Epoch 1098/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3144
Epoch 1099/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3131
Epoch 1100/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3119
```

```
Epoch 1101/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3107
Epoch 1102/2000
1/1 [=====] - 0s 5ms/step - loss: 0.3094
Epoch 1103/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3082
Epoch 1104/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3070
Epoch 1105/2000
1/1 [=====] - 0s 7ms/step - loss: 0.3058
Epoch 1106/2000
1/1 [=====] - 0s 10ms/step - loss: 0.3046
Epoch 1107/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3035
Epoch 1108/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3023
Epoch 1109/2000
1/1 [=====] - 0s 6ms/step - loss: 0.3012
Epoch 1110/2000
1/1 [=====] - 0s 8ms/step - loss: 0.3000
Epoch 1111/2000
1/1 [=====] - 0s 16ms/step - loss: 0.2989
Epoch 1112/2000
1/1 [=====] - 0s 17ms/step - loss: 0.2978
Epoch 1113/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2967
Epoch 1114/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2956
Epoch 1115/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2945
Epoch 1116/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2935
Epoch 1117/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2924
Epoch 1118/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2914
Epoch 1119/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2903
Epoch 1120/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2893
Epoch 1121/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2883
Epoch 1122/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2872
Epoch 1123/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2862
Epoch 1124/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2853
Epoch 1125/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2843
Epoch 1126/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2833
Epoch 1127/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2823
Epoch 1128/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2814
Epoch 1129/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2804
Epoch 1130/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2795
Epoch 1131/2000
```


1/1 [=====] - 0s 5ms/step - loss: 0.2785
Epoch 1132/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2776
Epoch 1133/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2767
Epoch 1134/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2758
Epoch 1135/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2749
Epoch 1136/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2740
Epoch 1137/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2731
Epoch 1138/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2722
Epoch 1139/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2714
Epoch 1140/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2705
Epoch 1141/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2697
Epoch 1142/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2688
Epoch 1143/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2680
Epoch 1144/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2671
Epoch 1145/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2663
Epoch 1146/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2655
Epoch 1147/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2647
Epoch 1148/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2639
Epoch 1149/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2631
Epoch 1150/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2623
Epoch 1151/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2615
Epoch 1152/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2607
Epoch 1153/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2599
Epoch 1154/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2592
Epoch 1155/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2584
Epoch 1156/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2577
Epoch 1157/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2569
Epoch 1158/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2562
Epoch 1159/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2554
Epoch 1160/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2547
Epoch 1161/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2540

```
Epoch 1162/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2533
Epoch 1163/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2526
Epoch 1164/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2519
Epoch 1165/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2511
Epoch 1166/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2505
Epoch 1167/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2498
Epoch 1168/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2491
Epoch 1169/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2484
Epoch 1170/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2477
Epoch 1171/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2471
Epoch 1172/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2464
Epoch 1173/2000
1/1 [=====] - 0s 50ms/step - loss: 0.2457
Epoch 1174/2000
1/1 [=====] - 0s 16ms/step - loss: 0.2451
Epoch 1175/2000
1/1 [=====] - 0s 13ms/step - loss: 0.2444
Epoch 1176/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2438
Epoch 1177/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2431
Epoch 1178/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2425
Epoch 1179/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2419
Epoch 1180/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2412
Epoch 1181/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2406
Epoch 1182/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2400
Epoch 1183/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2394
Epoch 1184/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2388
Epoch 1185/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2382
Epoch 1186/2000
1/1 [=====] - 0s 22ms/step - loss: 0.2376
Epoch 1187/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2370
Epoch 1188/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2364
Epoch 1189/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2358
Epoch 1190/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2352
Epoch 1191/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2346
Epoch 1192/2000
```

1/1 [=====] - 0s 5ms/step - loss: 0.2341
Epoch 1193/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2335
Epoch 1194/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2329
Epoch 1195/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2324
Epoch 1196/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2318
Epoch 1197/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2312
Epoch 1198/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2307
Epoch 1199/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2301
Epoch 1200/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2296
Epoch 1201/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2291
Epoch 1202/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2285
Epoch 1203/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2280
Epoch 1204/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2275
Epoch 1205/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2269
Epoch 1206/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2264
Epoch 1207/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2259
Epoch 1208/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2254
Epoch 1209/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2249
Epoch 1210/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2243
Epoch 1211/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2238
Epoch 1212/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2233
Epoch 1213/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2228
Epoch 1214/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2223
Epoch 1215/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2218
Epoch 1216/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2214
Epoch 1217/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2209
Epoch 1218/2000
1/1 [=====] - 0s 12ms/step - loss: 0.2204
Epoch 1219/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2199
Epoch 1220/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2194
Epoch 1221/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2189
Epoch 1222/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2185

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Epoch 1223/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2180
Epoch 1224/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2175
Epoch 1225/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2171
Epoch 1226/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2166
Epoch 1227/2000
1/1 [=====] - 0s 29ms/step - loss: 0.2161
Epoch 1228/2000
1/1 [=====] - 0s 16ms/step - loss: 0.2157
Epoch 1229/2000
1/1 [=====] - 0s 14ms/step - loss: 0.2152
Epoch 1230/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2148
Epoch 1231/2000
1/1 [=====] - 0s 35ms/step - loss: 0.2143
Epoch 1232/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2139
Epoch 1233/2000
1/1 [=====] - 0s 20ms/step - loss: 0.2134
Epoch 1234/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2130
Epoch 1235/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2126
Epoch 1236/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2121
Epoch 1237/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2117
Epoch 1238/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2113
Epoch 1239/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2108
Epoch 1240/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2104
Epoch 1241/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2100
Epoch 1242/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2096
Epoch 1243/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2091
Epoch 1244/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2087
Epoch 1245/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2083
Epoch 1246/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2079
Epoch 1247/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2075
Epoch 1248/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2071
Epoch 1249/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2067
Epoch 1250/2000
1/1 [=====] - 0s 9ms/step - loss: 0.2063
Epoch 1251/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2059
Epoch 1252/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2055
Epoch 1253/2000
```

```
1/1 [=====] - 0s 8ms/step - loss: 0.2051
Epoch 1254/2000
1/1 [=====] - 0s 81ms/step - loss: 0.2047
Epoch 1255/2000
1/1 [=====] - 0s 4ms/step - loss: 0.2043
Epoch 1256/2000
1/1 [=====] - 0s 22ms/step - loss: 0.2039
Epoch 1257/2000
1/1 [=====] - 0s 10ms/step - loss: 0.2035
Epoch 1258/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2031
Epoch 1259/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2027
Epoch 1260/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2023
Epoch 1261/2000
1/1 [=====] - 0s 6ms/step - loss: 0.2019
Epoch 1262/2000
1/1 [=====] - 0s 5ms/step - loss: 0.2016
Epoch 1263/2000
1/1 [=====] - 0s 8ms/step - loss: 0.2012
Epoch 1264/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2008
Epoch 1265/2000
1/1 [=====] - 0s 11ms/step - loss: 0.2004
Epoch 1266/2000
1/1 [=====] - 0s 7ms/step - loss: 0.2001
Epoch 1267/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1997
Epoch 1268/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1993
Epoch 1269/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1990
Epoch 1270/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1986
Epoch 1271/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1982
Epoch 1272/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1979
Epoch 1273/2000
1/1 [=====] - 0s 70ms/step - loss: 0.1975
Epoch 1274/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1971
Epoch 1275/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1968
Epoch 1276/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1964
Epoch 1277/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1961
Epoch 1278/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1957
Epoch 1279/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1954
Epoch 1280/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1950
Epoch 1281/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1947
Epoch 1282/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1943
Epoch 1283/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1940
```

Epoch 1284/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1936
Epoch 1285/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1933
Epoch 1286/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1930
Epoch 1287/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1926
Epoch 1288/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1923
Epoch 1289/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1920
Epoch 1290/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1916
Epoch 1291/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1913
Epoch 1292/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1910
Epoch 1293/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1906
Epoch 1294/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1903
Epoch 1295/2000
1/1 [=====] - 0s 20ms/step - loss: 0.1900
Epoch 1296/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1897
Epoch 1297/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1893
Epoch 1298/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1890
Epoch 1299/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1887
Epoch 1300/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1884
Epoch 1301/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1880
Epoch 1302/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1877
Epoch 1303/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1874
Epoch 1304/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1871
Epoch 1305/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1868
Epoch 1306/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1865
Epoch 1307/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1862
Epoch 1308/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1859
Epoch 1309/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1855
Epoch 1310/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1852
Epoch 1311/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1849
Epoch 1312/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1846
Epoch 1313/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1843
Epoch 1314/2000

```
1/1 [=====] - 0s 6ms/step - loss: 0.1840
Epoch 1315/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1837
Epoch 1316/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1834
Epoch 1317/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1831
Epoch 1318/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1828
Epoch 1319/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1825
Epoch 1320/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1822
Epoch 1321/2000
1/1 [=====] - 0s 91ms/step - loss: 0.1819
Epoch 1322/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1816
Epoch 1323/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1814
Epoch 1324/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1811
Epoch 1325/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1808
Epoch 1326/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1805
Epoch 1327/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1802
Epoch 1328/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1799
Epoch 1329/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1796
Epoch 1330/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1793
Epoch 1331/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1791
Epoch 1332/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1788
Epoch 1333/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1785
Epoch 1334/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1782
Epoch 1335/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1779
Epoch 1336/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1776
Epoch 1337/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1774
Epoch 1338/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1771
Epoch 1339/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1768
Epoch 1340/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1765
Epoch 1341/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1763
Epoch 1342/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1760
Epoch 1343/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1757
Epoch 1344/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1755
```

Epoch 1345/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1752
Epoch 1346/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1749
Epoch 1347/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1746
Epoch 1348/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1744
Epoch 1349/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1741
Epoch 1350/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1738
Epoch 1351/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1736
Epoch 1352/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1733
Epoch 1353/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1731
Epoch 1354/2000
1/1 [=====] - 0s 89ms/step - loss: 0.1728
Epoch 1355/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1725
Epoch 1356/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1723
Epoch 1357/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1720
Epoch 1358/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1717
Epoch 1359/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1715
Epoch 1360/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1712
Epoch 1361/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1710
Epoch 1362/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1707
Epoch 1363/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1705
Epoch 1364/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1702
Epoch 1365/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1700
Epoch 1366/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1697
Epoch 1367/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1695
Epoch 1368/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1692
Epoch 1369/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1690
Epoch 1370/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1687
Epoch 1371/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1685
Epoch 1372/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1682
Epoch 1373/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1680
Epoch 1374/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1677
Epoch 1375/2000

1/1 [=====] - 0s 7ms/step - loss: 0.1675
Epoch 1376/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1672
Epoch 1377/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1670
Epoch 1378/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1667
Epoch 1379/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1665
Epoch 1380/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1662
Epoch 1381/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1660
Epoch 1382/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1658
Epoch 1383/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1655
Epoch 1384/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1653
Epoch 1385/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1650
Epoch 1386/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1648
Epoch 1387/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1646
Epoch 1388/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1643
Epoch 1389/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1641
Epoch 1390/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1639
Epoch 1391/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1636
Epoch 1392/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1634
Epoch 1393/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1632
Epoch 1394/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1629
Epoch 1395/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1627
Epoch 1396/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1625
Epoch 1397/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1622
Epoch 1398/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1620
Epoch 1399/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1618
Epoch 1400/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1615
Epoch 1401/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1613
Epoch 1402/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1611
Epoch 1403/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1608
Epoch 1404/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1606
Epoch 1405/2000
1/1 [=====] - 0s 93ms/step - loss: 0.1604

Epoch 1406/2000
1/1 [=====] - 0s 23ms/step - loss: 0.1602
Epoch 1407/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1599
Epoch 1408/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1597
Epoch 1409/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1595
Epoch 1410/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1593
Epoch 1411/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1590
Epoch 1412/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1588
Epoch 1413/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1586
Epoch 1414/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1584
Epoch 1415/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1582
Epoch 1416/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1579
Epoch 1417/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1577
Epoch 1418/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1575
Epoch 1419/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1573
Epoch 1420/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1571
Epoch 1421/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1568
Epoch 1422/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1566
Epoch 1423/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1564
Epoch 1424/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1562
Epoch 1425/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1560
Epoch 1426/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1558
Epoch 1427/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1556
Epoch 1428/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1553
Epoch 1429/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1551
Epoch 1430/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1549
Epoch 1431/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1547
Epoch 1432/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1545
Epoch 1433/2000
1/1 [=====] - 0s 21ms/step - loss: 0.1543
Epoch 1434/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1541
Epoch 1435/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1539
Epoch 1436/2000

1/1 [=====] - 0s 7ms/step - loss: 0.1536
Epoch 1437/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1534
Epoch 1438/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1532
Epoch 1439/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1530
Epoch 1440/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1528
Epoch 1441/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1526
Epoch 1442/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1524
Epoch 1443/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1522
Epoch 1444/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1520
Epoch 1445/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1518
Epoch 1446/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1516
Epoch 1447/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1514
Epoch 1448/2000
1/1 [=====] - 0s 81ms/step - loss: 0.1512
Epoch 1449/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1510
Epoch 1450/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1508
Epoch 1451/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1506
Epoch 1452/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1504
Epoch 1453/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1502
Epoch 1454/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1500
Epoch 1455/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1498
Epoch 1456/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1496
Epoch 1457/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1494
Epoch 1458/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1492
Epoch 1459/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1490
Epoch 1460/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1488
Epoch 1461/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1486
Epoch 1462/2000
1/1 [=====] - 0s 32ms/step - loss: 0.1484
Epoch 1463/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1482
Epoch 1464/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1480
Epoch 1465/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1478
Epoch 1466/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1476

```
Epoch 1467/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1474
Epoch 1468/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1472
Epoch 1469/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1470
Epoch 1470/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1468
Epoch 1471/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1466
Epoch 1472/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1464
Epoch 1473/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1462
Epoch 1474/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1460
Epoch 1475/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1458
Epoch 1476/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1456
Epoch 1477/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1454
Epoch 1478/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1452
Epoch 1479/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1451
Epoch 1480/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1449
Epoch 1481/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1447
Epoch 1482/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1445
Epoch 1483/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1443
Epoch 1484/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1441
Epoch 1485/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1439
Epoch 1486/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1437
Epoch 1487/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1435
Epoch 1488/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1434
Epoch 1489/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1432
Epoch 1490/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1430
Epoch 1491/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1428
Epoch 1492/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1426
Epoch 1493/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1424
Epoch 1494/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1422
Epoch 1495/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1420
Epoch 1496/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1419
Epoch 1497/2000
```

```
1/1 [=====] - 0s 6ms/step - loss: 0.1417
Epoch 1498/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1415
Epoch 1499/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1413
Epoch 1500/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1411
Epoch 1501/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1409
Epoch 1502/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1408
Epoch 1503/2000
1/1 [=====] - 0s 48ms/step - loss: 0.1406
Epoch 1504/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1404
Epoch 1505/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1402
Epoch 1506/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1400
Epoch 1507/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1399
Epoch 1508/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1397
Epoch 1509/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1395
Epoch 1510/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1393
Epoch 1511/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1391
Epoch 1512/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1390
Epoch 1513/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1388
Epoch 1514/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1386
Epoch 1515/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1384
Epoch 1516/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1382
Epoch 1517/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1381
Epoch 1518/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1379
Epoch 1519/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1377
Epoch 1520/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1375
Epoch 1521/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1374
Epoch 1522/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1372
Epoch 1523/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1370
Epoch 1524/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1368
Epoch 1525/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1367
Epoch 1526/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1365
Epoch 1527/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1363
```

Epoch 1528/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1361
Epoch 1529/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1360
Epoch 1530/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1358
Epoch 1531/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1356
Epoch 1532/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1354
Epoch 1533/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1353
Epoch 1534/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1351
Epoch 1535/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1349
Epoch 1536/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1348
Epoch 1537/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1346
Epoch 1538/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1344
Epoch 1539/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1343
Epoch 1540/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1341
Epoch 1541/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1339
Epoch 1542/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1337
Epoch 1543/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1336
Epoch 1544/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1334
Epoch 1545/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1332
Epoch 1546/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1331
Epoch 1547/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1329
Epoch 1548/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1327
Epoch 1549/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1326
Epoch 1550/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1324
Epoch 1551/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1322
Epoch 1552/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1321
Epoch 1553/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1319
Epoch 1554/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1317
Epoch 1555/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1316
Epoch 1556/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1314
Epoch 1557/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1312
Epoch 1558/2000

```
1/1 [=====] - 0s 6ms/step - loss: 0.1311
Epoch 1559/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1309
Epoch 1560/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1308
Epoch 1561/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1306
Epoch 1562/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1304
Epoch 1563/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1303
Epoch 1564/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1301
Epoch 1565/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1299
Epoch 1566/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1298
Epoch 1567/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1296
Epoch 1568/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1295
Epoch 1569/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1293
Epoch 1570/2000
1/1 [=====] - 0s 18ms/step - loss: 0.1291
Epoch 1571/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1290
Epoch 1572/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1288
Epoch 1573/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1287
Epoch 1574/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1285
Epoch 1575/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1283
Epoch 1576/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1282
Epoch 1577/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1280
Epoch 1578/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1279
Epoch 1579/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1277
Epoch 1580/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1275
Epoch 1581/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1274
Epoch 1582/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1272
Epoch 1583/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1271
Epoch 1584/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1269
Epoch 1585/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1268
Epoch 1586/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1266
Epoch 1587/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1264
Epoch 1588/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1263
```

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Epoch 1589/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1261
Epoch 1590/2000
1/1 [=====] - 0s 18ms/step - loss: 0.1260
Epoch 1591/2000
1/1 [=====] - 0s 70ms/step - loss: 0.1258
Epoch 1592/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1257
Epoch 1593/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1255
Epoch 1594/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1254
Epoch 1595/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1252
Epoch 1596/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1250
Epoch 1597/2000
1/1 [=====] - 0s 25ms/step - loss: 0.1249
Epoch 1598/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1247
Epoch 1599/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1246
Epoch 1600/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1244
Epoch 1601/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1243
Epoch 1602/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1241
Epoch 1603/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1240
Epoch 1604/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1238
Epoch 1605/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1237
Epoch 1606/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1235
Epoch 1607/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1234
Epoch 1608/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1232
Epoch 1609/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1231
Epoch 1610/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1229
Epoch 1611/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1228
Epoch 1612/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1226
Epoch 1613/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1225
Epoch 1614/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1223
Epoch 1615/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1222
Epoch 1616/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1220
Epoch 1617/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1219
Epoch 1618/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1217
Epoch 1619/2000
```



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1/1 [=====] - 0s 5ms/step - loss: 0.1216
Epoch 1620/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1214
Epoch 1621/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1213
Epoch 1622/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1212
Epoch 1623/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1210
Epoch 1624/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1209
Epoch 1625/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1207
Epoch 1626/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1206
Epoch 1627/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1204
Epoch 1628/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1203
Epoch 1629/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1201
Epoch 1630/2000
1/1 [=====] - 0s 104ms/step - loss: 0.1200
Epoch 1631/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1198
Epoch 1632/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1197
Epoch 1633/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1196
Epoch 1634/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1194
Epoch 1635/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1193
Epoch 1636/2000
1/1 [=====] - 0s 30ms/step - loss: 0.1191
Epoch 1637/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1190
Epoch 1638/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1188
Epoch 1639/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1187
Epoch 1640/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1186
Epoch 1641/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1184
Epoch 1642/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1183
Epoch 1643/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1181
Epoch 1644/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1180
Epoch 1645/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1178
Epoch 1646/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1177
Epoch 1647/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1176
Epoch 1648/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1174
Epoch 1649/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1173
```

```
Epoch 1650/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1171
Epoch 1651/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1170
Epoch 1652/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1169
Epoch 1653/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1167
Epoch 1654/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1166
Epoch 1655/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1165
Epoch 1656/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1163
Epoch 1657/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1162
Epoch 1658/2000
1/1 [=====] - 0s 28ms/step - loss: 0.1160
Epoch 1659/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1159
Epoch 1660/2000
1/1 [=====] - 0s 65ms/step - loss: 0.1158
Epoch 1661/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1156
Epoch 1662/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1155
Epoch 1663/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1154
Epoch 1664/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1152
Epoch 1665/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1151
Epoch 1666/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1149
Epoch 1667/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1148
Epoch 1668/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1147
Epoch 1669/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1145
Epoch 1670/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1144
Epoch 1671/2000
1/1 [=====] - 0s 17ms/step - loss: 0.1143
Epoch 1672/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1141
Epoch 1673/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1140
Epoch 1674/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1139
Epoch 1675/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1137
Epoch 1676/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1136
Epoch 1677/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1135
Epoch 1678/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1133
Epoch 1679/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1132
Epoch 1680/2000
```

```
1/1 [=====] - 0s 5ms/step - loss: 0.1131
Epoch 1681/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1129
Epoch 1682/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1128
Epoch 1683/2000
1/1 [=====] - 0s 22ms/step - loss: 0.1127
Epoch 1684/2000
1/1 [=====] - 0s 24ms/step - loss: 0.1125
Epoch 1685/2000
1/1 [=====] - 0s 21ms/step - loss: 0.1124
Epoch 1686/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1123
Epoch 1687/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1121
Epoch 1688/2000
1/1 [=====] - 0s 16ms/step - loss: 0.1120
Epoch 1689/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1119
Epoch 1690/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1117
Epoch 1691/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1116
Epoch 1692/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1115
Epoch 1693/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1114
Epoch 1694/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1112
Epoch 1695/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1111
Epoch 1696/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1110
Epoch 1697/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1108
Epoch 1698/2000
1/1 [=====] - 0s 34ms/step - loss: 0.1107
Epoch 1699/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1106
Epoch 1700/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1105
Epoch 1701/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1103
Epoch 1702/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1102
Epoch 1703/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1101
Epoch 1704/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1099
Epoch 1705/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1098
Epoch 1706/2000
1/1 [=====] - 0s 23ms/step - loss: 0.1097
Epoch 1707/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1096
Epoch 1708/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1094
Epoch 1709/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1093
Epoch 1710/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1092
```

Epoch 1711/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1091
Epoch 1712/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1089
Epoch 1713/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1088
Epoch 1714/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1087
Epoch 1715/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1086
Epoch 1716/2000
1/1 [=====] - 0s 19ms/step - loss: 0.1084
Epoch 1717/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1083
Epoch 1718/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1082
Epoch 1719/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1081
Epoch 1720/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1079
Epoch 1721/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1078
Epoch 1722/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1077
Epoch 1723/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1076
Epoch 1724/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1074
Epoch 1725/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1073
Epoch 1726/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1072
Epoch 1727/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1071
Epoch 1728/2000
1/1 [=====] - 0s 15ms/step - loss: 0.1069
Epoch 1729/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1068
Epoch 1730/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1067
Epoch 1731/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1066
Epoch 1732/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1065
Epoch 1733/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1063
Epoch 1734/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1062
Epoch 1735/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1061
Epoch 1736/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1060
Epoch 1737/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1059
Epoch 1738/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1057
Epoch 1739/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1056
Epoch 1740/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1055
Epoch 1741/2000

1/1 [=====] - 0s 7ms/step - loss: 0.1054
Epoch 1742/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1053
Epoch 1743/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1051
Epoch 1744/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1050
Epoch 1745/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1049
Epoch 1746/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1048
Epoch 1747/2000
1/1 [=====] - 0s 61ms/step - loss: 0.1047
Epoch 1748/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1045
Epoch 1749/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1044
Epoch 1750/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1043
Epoch 1751/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1042
Epoch 1752/2000
1/1 [=====] - 0s 4ms/step - loss: 0.1041
Epoch 1753/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1040
Epoch 1754/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1038
Epoch 1755/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1037
Epoch 1756/2000
1/1 [=====] - 0s 20ms/step - loss: 0.1036
Epoch 1757/2000
1/1 [=====] - 0s 11ms/step - loss: 0.1035
Epoch 1758/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1034
Epoch 1759/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1032
Epoch 1760/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1031
Epoch 1761/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1030
Epoch 1762/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1029
Epoch 1763/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1028
Epoch 1764/2000
1/1 [=====] - 0s 5ms/step - loss: 0.1027
Epoch 1765/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1026
Epoch 1766/2000
1/1 [=====] - 0s 12ms/step - loss: 0.1024
Epoch 1767/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1023
Epoch 1768/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1022
Epoch 1769/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1021
Epoch 1770/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1020
Epoch 1771/2000
1/1 [=====] - 0s 9ms/step - loss: 0.1019

Epoch 1772/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1018
Epoch 1773/2000
1/1 [=====] - 0s 6ms/step - loss: 0.1016
Epoch 1774/2000
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Epoch 1775/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1014
Epoch 1776/2000
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Epoch 1777/2000
1/1 [=====] - 0s 18ms/step - loss: 0.1012
Epoch 1778/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1011
Epoch 1779/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1010
Epoch 1780/2000
1/1 [=====] - 0s 14ms/step - loss: 0.1008
Epoch 1781/2000
1/1 [=====] - 0s 13ms/step - loss: 0.1007
Epoch 1782/2000
1/1 [=====] - 0s 10ms/step - loss: 0.1006
Epoch 1783/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1005
Epoch 1784/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1004
Epoch 1785/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1003
Epoch 1786/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1002
Epoch 1787/2000
1/1 [=====] - 0s 8ms/step - loss: 0.1001
Epoch 1788/2000
1/1 [=====] - 0s 7ms/step - loss: 0.1000
Epoch 1789/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0998
Epoch 1790/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0997
Epoch 1791/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0996
Epoch 1792/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0995
Epoch 1793/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0994
Epoch 1794/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0993
Epoch 1795/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0992
Epoch 1796/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0991
Epoch 1797/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0990
Epoch 1798/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0989
Epoch 1799/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0987
Epoch 1800/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0986
Epoch 1801/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0985
Epoch 1802/2000

1/1 [=====] - 0s 13ms/step - loss: 0.0984
Epoch 1803/2000
1/1 [=====] - 0s 17ms/step - loss: 0.0983
Epoch 1804/2000
1/1 [=====] - 0s 19ms/step - loss: 0.0982
Epoch 1805/2000
1/1 [=====] - 0s 83ms/step - loss: 0.0981
Epoch 1806/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0980
Epoch 1807/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0979
Epoch 1808/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0978
Epoch 1809/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0977
Epoch 1810/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0976
Epoch 1811/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0974
Epoch 1812/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0973
Epoch 1813/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0972
Epoch 1814/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0971
Epoch 1815/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0970
Epoch 1816/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0969
Epoch 1817/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0968
Epoch 1818/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0967
Epoch 1819/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0966
Epoch 1820/2000
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Epoch 1821/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0964
Epoch 1822/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0963
Epoch 1823/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0962
Epoch 1824/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0961
Epoch 1825/2000
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Epoch 1826/2000
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Epoch 1827/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0958
Epoch 1828/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0957
Epoch 1829/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0956
Epoch 1830/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0954
Epoch 1831/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0953
Epoch 1832/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0952

Epoch 1833/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0951
Epoch 1834/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0950
Epoch 1835/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0949
Epoch 1836/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0948
Epoch 1837/2000
1/1 [=====] - 0s 14ms/step - loss: 0.0947
Epoch 1838/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0946
Epoch 1839/2000
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Epoch 1840/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0944
Epoch 1841/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0943
Epoch 1842/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0942
Epoch 1843/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0941
Epoch 1844/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0940
Epoch 1845/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0939
Epoch 1846/2000
1/1 [=====] - 0s 63ms/step - loss: 0.0938
Epoch 1847/2000
1/1 [=====] - 0s 20ms/step - loss: 0.0937
Epoch 1848/2000
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Epoch 1849/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0935
Epoch 1850/2000
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Epoch 1851/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0933
Epoch 1852/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0932
Epoch 1853/2000
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Epoch 1854/2000
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Epoch 1855/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0929
Epoch 1856/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0928
Epoch 1857/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0927
Epoch 1858/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0926
Epoch 1859/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0925
Epoch 1860/2000
1/1 [=====] - 0s 16ms/step - loss: 0.0924
Epoch 1861/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0923
Epoch 1862/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0922
Epoch 1863/2000

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Epoch 1864/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0920
Epoch 1865/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0919
Epoch 1866/2000
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Epoch 1867/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0917
Epoch 1868/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0916
Epoch 1869/2000
1/1 [=====] - 0s 16ms/step - loss: 0.0915
Epoch 1870/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0914
Epoch 1871/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0913
Epoch 1872/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0912
Epoch 1873/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0911
Epoch 1874/2000
1/1 [=====] - 0s 16ms/step - loss: 0.0910
Epoch 1875/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0909
Epoch 1876/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0908
Epoch 1877/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0907
Epoch 1878/2000
1/1 [=====] - 0s 54ms/step - loss: 0.0906
Epoch 1879/2000
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Epoch 1880/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0905
Epoch 1881/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0904
Epoch 1882/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0903
Epoch 1883/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0902
Epoch 1884/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0901
Epoch 1885/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0900
Epoch 1886/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0899
Epoch 1887/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0898
Epoch 1888/2000
1/1 [=====] - 0s 13ms/step - loss: 0.0897
Epoch 1889/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0896
Epoch 1890/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0895
Epoch 1891/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0894
Epoch 1892/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0893
Epoch 1893/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0892

Epoch 1894/2000
1/1 [=====] - 0s 21ms/step - loss: 0.0891
Epoch 1895/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0890
Epoch 1896/2000
1/1 [=====] - 0s 12ms/step - loss: 0.0889
Epoch 1897/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0888
Epoch 1898/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0887
Epoch 1899/2000
1/1 [=====] - 0s 11ms/step - loss: 0.0887
Epoch 1900/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0886
Epoch 1901/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0885
Epoch 1902/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0884
Epoch 1903/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0883
Epoch 1904/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0882
Epoch 1905/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0881
Epoch 1906/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0880
Epoch 1907/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0879
Epoch 1908/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0878
Epoch 1909/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0877
Epoch 1910/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0876
Epoch 1911/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0875
Epoch 1912/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0874
Epoch 1913/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0874
Epoch 1914/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0873
Epoch 1915/2000
1/1 [=====] - 0s 15ms/step - loss: 0.0872
Epoch 1916/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0871
Epoch 1917/2000
1/1 [=====] - 0s 80ms/step - loss: 0.0870
Epoch 1918/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0869
Epoch 1919/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0868
Epoch 1920/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0867
Epoch 1921/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0866
Epoch 1922/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0865
Epoch 1923/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0864
Epoch 1924/2000

1/1 [=====] - 0s 6ms/step - loss: 0.0864
Epoch 1925/2000
1/1 [=====] - 0s 17ms/step - loss: 0.0863
Epoch 1926/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0862
Epoch 1927/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0861
Epoch 1928/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0860
Epoch 1929/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0859
Epoch 1930/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0858
Epoch 1931/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0857
Epoch 1932/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0856
Epoch 1933/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0855
Epoch 1934/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0855
Epoch 1935/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0854
Epoch 1936/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0853
Epoch 1937/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0852
Epoch 1938/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0851
Epoch 1939/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0850
Epoch 1940/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0849
Epoch 1941/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0848
Epoch 1942/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0848
Epoch 1943/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0847
Epoch 1944/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0846
Epoch 1945/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0845
Epoch 1946/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0844
Epoch 1947/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0843
Epoch 1948/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0842
Epoch 1949/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0841
Epoch 1950/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0841
Epoch 1951/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0840
Epoch 1952/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0839
Epoch 1953/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0838
Epoch 1954/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0837

Epoch 1955/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0836
Epoch 1956/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0835
Epoch 1957/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0834
Epoch 1958/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0834
Epoch 1959/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0833
Epoch 1960/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0832
Epoch 1961/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0831
Epoch 1962/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0830
Epoch 1963/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0829
Epoch 1964/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0828
Epoch 1965/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0828
Epoch 1966/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0827
Epoch 1967/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0826
Epoch 1968/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0825
Epoch 1969/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0824
Epoch 1970/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0823
Epoch 1971/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0823
Epoch 1972/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0822
Epoch 1973/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0821
Epoch 1974/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0820
Epoch 1975/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0819
Epoch 1976/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0818
Epoch 1977/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0818
Epoch 1978/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0817
Epoch 1979/2000
1/1 [=====] - 0s 4ms/step - loss: 0.0816
Epoch 1980/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0815
Epoch 1981/2000
1/1 [=====] - 0s 9ms/step - loss: 0.0814
Epoch 1982/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0813
Epoch 1983/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0813
Epoch 1984/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0812
Epoch 1985/2000

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1/1 [=====] - 0s 7ms/step - loss: 0.0811
Epoch 1986/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0810
Epoch 1987/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0809
Epoch 1988/2000
1/1 [=====] - 0s 10ms/step - loss: 0.0808
Epoch 1989/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0808
Epoch 1990/2000
1/1 [=====] - 0s 20ms/step - loss: 0.0807
Epoch 1991/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0806
Epoch 1992/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0805
Epoch 1993/2000
1/1 [=====] - 0s 7ms/step - loss: 0.0804
Epoch 1994/2000
1/1 [=====] - 0s 22ms/step - loss: 0.0803
Epoch 1995/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0803
Epoch 1996/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0802
Epoch 1997/2000
1/1 [=====] - 0s 5ms/step - loss: 0.0801
Epoch 1998/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0800
Epoch 1999/2000
1/1 [=====] - 0s 6ms/step - loss: 0.0799
Epoch 2000/2000
1/1 [=====] - 0s 8ms/step - loss: 0.0799
1/1 [=====] - 0s 135ms/step
SE PREDICE: [[6.015478]] CUANDO EN REALIDAD LA RESPUESTA ES 6.25
1/1 [=====] - 0s 93ms/step
0.07977622555112557 ERROR CUADRATICO MEDIO, DEBERIA SER LO MAS CERCANO A
0 POSIBLE

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CONCLUSIONES

ME QUEDO CON LA OPCION DE 5 UNIDADES POR CAPA OCULTA, ESTA ME DA UN ERROR CUADRATICO MEDIO CERCANO A CERO, LO QUE SIGNIFICA QUE LA RED NEURONAL ESTA BIEN ENTRENADA Y QUE LA PREDICCION ES BUENA. ADEMÁS DE QUE LA RELACION ENTRE LA ENTRADA Y LA SALIDA ES CUADRATICA, ES CASI LO ESPERADO. ME HE DADO CUENTA QUE AGREGAR UNIDADES A LAS CAPAS OCULTAS HACE QUE EL ENTRENAMIENTO SEA MAS LENTO, PERO AUMENTA LA PRECISION DE LA RED NEURONAL, PERO SIGO CREYENDO QUE PARA ESTE CASO TENER 5 UNIDADES POR CAPA ES SUFICIENTE.