

```
In [113]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import tensorflow
import keras
```

```
In [114]: df = pd.read_csv('BreastCancerData (4).csv')
```

```
In [115]: df.head()
```

Out[115]:

	Age	BMI	BreastFeeding	Marital Status	Alcohol	Smoking	BreastCancerHistory	Age at firstPeriod	M
0	48	8.543723	1	1	0	0	0	15	
1	31	10.204207	1	1	0	0	0	12	
2	31	13.807133	1	1	0	0	0	14	
3	33	14.088867	1	1	1	0	0	12	
4	49	14.494061	1	1	0	0	0	15	

```
In [116]: df.describe().transpose()
```

Out[116]:

	count	mean	std	min	25%	50%	75%	max
Age	2388.0	41.029313	7.694522	21.000000	35.000000	41.000000	48.000000	54.0
BMI	2388.0	24.723056	4.939623	8.543723	21.168699	24.453841	27.657793	69.5
BreastFeeding	2388.0	0.891122	0.311551	0.000000	1.000000	1.000000	1.000000	1.0
Marital Status	2388.0	1.126466	0.455754	1.000000	1.000000	1.000000	1.000000	3.0
Alcohol	2388.0	0.351340	0.477489	0.000000	0.000000	0.000000	1.000000	1.0

	count	mean	std	min	25%	50%	75%	max
Smoking	2388.0	0.154941	0.361925	0.000000	0.000000	0.000000	0.000000	1.0
BreastCancerHistory	2388.0	0.029313	0.168718	0.000000	0.000000	0.000000	0.000000	1.0
Age at firstPeriod	2388.0	13.104690	1.684577	8.000000	12.000000	13.000000	14.000000	21.0
MenstrualCycle	2388.0	0.781826	0.413093	0.000000	1.000000	1.000000	1.000000	1.0
Cancer Positive	2388.0	0.404523	0.490902	0.000000	0.000000	0.000000	1.000000	1.0

In [117]:

```
df.info()
```

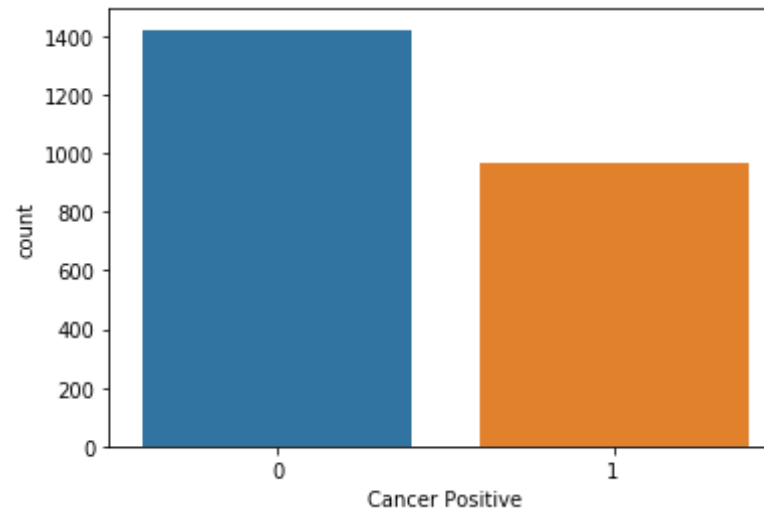
```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2388 entries, 0 to 2387
Data columns (total 10 columns):
Age                2388 non-null int64
BMI                2388 non-null float64
BreastFeeding      2388 non-null int64
Marital Status     2388 non-null int64
Alcohol            2388 non-null int64
Smoking            2388 non-null int64
BreastCancerHistory 2388 non-null int64
Age at firstPeriod 2388 non-null int64
MenstrualCycle     2388 non-null int64
Cancer Positive    2388 non-null int64
dtypes: float64(1), int64(9)
memory usage: 186.7 KB
```

In [118]:

```
sns.countplot(x='Cancer Positive',data=df)
```

Out[118]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x1de55bbeb08>
```



```
In [119]: df.corr()['Cancer Positive'][: -1].sort_values()
```

```
Out[119]: MenstrualCycle      -0.527303
Age at firstPeriod      -0.143939
BreastFeeding          -0.125521
Alcohol                 0.040402
Smoking                 0.047929
BreastCancerHistory     0.145085
Marital Status          0.230007
BMI                     0.360163
Age                     0.387485
Name: Cancer Positive, dtype: float64
```

```
In [120]: X = df.drop('Cancer Positive',axis=1).values
y = df['Cancer Positive'].values
```

```
In [121]: X
```

```
Out[121]: array([[48.      ,  8.5437225,  1.      , ...,  0.      ,
                15.      ,  1.      ],
                [31.      , 10.20420723,  1.      , ...,  0.      ,
                12.      ,  1.      ],
```

```

[31.      , 13.80713296, 1.      , ..., 0.      ,
 14.      , 1.          ],
...,
[51.      , 44.17113007, 0.      , ..., 1.      ,
 14.      , 0.          ],
[41.      , 57.76097459, 1.      , ..., 0.      ,
 13.      , 1.          ],
[35.      , 69.5        , 1.      , ..., 1.      ,
 15.      , 1.          ]])

```

```
In [122]: X.shape
```

```
Out[122]: (2388, 9)
```

```
In [123]: y
```

```
Out[123]: array([0, 0, 0, ..., 1, 1, 1], dtype=int64)
```

```
In [124]: y.shape
```

```
Out[124]: (2388,)
```

```
In [125]: from sklearn.model_selection import train_test_split
```

```
In [126]: X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2
5, random_state=101)
```

```
In [127]: from sklearn.preprocessing import MinMaxScaler
```

```
In [128]: scaler = MinMaxScaler()
```

```
In [129]: X_train = scaler.fit_transform(X_train)
```

```
In [130]: X_test = scaler.transform(X_test)
```

```
In [131]: X_train.shape
```

```
Out[131]: (1791, 9)
```

```
In [132]: from tensorflow.keras.models import Sequential
          from tensorflow.keras.layers import Dense
```

```
In [133]: model = Sequential()

          model.add(Dense(9,activation='relu',input_shape=(9, )))
          model.add(Dense(9,activation='relu'))
          model.add(Dense(1,activation='sigmoid'))

          model.compile(loss='binary_crossentropy',optimizer='adam')
```

```
In [134]: model.fit(x=X_train,y=y_train,epochs=1000,validation_data=(X_test,y_test),batch_size=128)
```

Train on 1791 samples, validate on 597 samples

Epoch 1/1000

1791/1791 [=====] - 0s 204us/sample - loss: 0.6853 - val\_loss: 0.6796

Epoch 2/1000

1791/1791 [=====] - 0s 14us/sample - loss: 0.6694 - val\_loss: 0.6635

Epoch 3/1000

1791/1791 [=====] - 0s 14us/sample - loss: 0.6553 - val\_loss: 0.6501

Epoch 4/1000

1791/1791 [=====] - 0s 14us/sample - loss: 0.6437 - val\_loss: 0.6381

Epoch 5/1000

1791/1791 [=====] - 0s 14us/sample - loss: 0.6330 - val\_loss: 0.6275

Epoch 6/1000

1791/1791 [=====] - 0s 13us/sample - loss: 0.6238 - val\_loss: 0.6170

Epoch 7/1000

1791/1791 [=====] - 0s 13us/sample - loss: 0.6

```
148 - val_loss: 0.6067
Epoch 8/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.6
052 - val_loss: 0.5965
Epoch 9/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.5
959 - val_loss: 0.5855
Epoch 10/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.5
860 - val_loss: 0.5743
Epoch 11/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.5
760 - val_loss: 0.5625
Epoch 12/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.5
656 - val_loss: 0.5507
Epoch 13/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.5
554 - val_loss: 0.5378
Epoch 14/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.5
445 - val_loss: 0.5255
Epoch 15/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.5
347 - val_loss: 0.5140
Epoch 16/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.5
253 - val_loss: 0.5038
Epoch 17/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.5
169 - val_loss: 0.4949
Epoch 18/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.5
099 - val_loss: 0.4874
Epoch 19/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.5
033 - val_loss: 0.4814
Epoch 20/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
```

```
981 - val_loss: 0.4761
Epoch 21/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
935 - val_loss: 0.4717
Epoch 22/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
891 - val_loss: 0.4677
Epoch 23/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
855 - val_loss: 0.4644
Epoch 24/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
818 - val_loss: 0.4609
Epoch 25/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.4
785 - val_loss: 0.4579
Epoch 26/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.4
754 - val_loss: 0.4549
Epoch 27/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.4
720 - val_loss: 0.4519
Epoch 28/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
690 - val_loss: 0.4489
Epoch 29/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
653 - val_loss: 0.4458
Epoch 30/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
621 - val_loss: 0.4427
Epoch 31/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
585 - val_loss: 0.4397
Epoch 32/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
551 - val_loss: 0.4363
Epoch 33/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.4
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515 - val_loss: 0.4327
Epoch 34/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.4
476 - val_loss: 0.4284
Epoch 35/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.4
435 - val_loss: 0.4248
Epoch 36/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.4
390 - val_loss: 0.4203
Epoch 37/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
346 - val_loss: 0.4151
Epoch 38/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.4
300 - val_loss: 0.4106
Epoch 39/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
246 - val_loss: 0.4050
Epoch 40/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
194 - val_loss: 0.4000
Epoch 41/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
143 - val_loss: 0.3952
Epoch 42/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.4
089 - val_loss: 0.3909
Epoch 43/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
043 - val_loss: 0.3853
Epoch 44/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
988 - val_loss: 0.3821
Epoch 45/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
944 - val_loss: 0.3772
Epoch 46/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
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903 - val_loss: 0.3735
Epoch 47/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
861 - val_loss: 0.3690
Epoch 48/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
818 - val_loss: 0.3652
Epoch 49/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
766 - val_loss: 0.3625
Epoch 50/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
732 - val_loss: 0.3578
Epoch 51/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
692 - val_loss: 0.3553
Epoch 52/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
659 - val_loss: 0.3506
Epoch 53/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
617 - val_loss: 0.3506
Epoch 54/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
591 - val_loss: 0.3456
Epoch 55/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
558 - val_loss: 0.3427
Epoch 56/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
536 - val_loss: 0.3410
Epoch 57/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
503 - val_loss: 0.3371
Epoch 58/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.3
484 - val_loss: 0.3344
Epoch 59/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
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449 - val_loss: 0.3328
Epoch 60/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
420 - val_loss: 0.3307
Epoch 61/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
398 - val_loss: 0.3285
Epoch 62/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
377 - val_loss: 0.3275
Epoch 63/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
367 - val_loss: 0.3247
Epoch 64/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
347 - val_loss: 0.3235
Epoch 65/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
324 - val_loss: 0.3219
Epoch 66/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
313 - val_loss: 0.3201
Epoch 67/1000
1791/1791 [=====] - 0s 17us/sample - loss: 0.3
286 - val_loss: 0.3179
Epoch 68/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.3
273 - val_loss: 0.3172
Epoch 69/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
245 - val_loss: 0.3152
Epoch 70/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
233 - val_loss: 0.3152
Epoch 71/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
229 - val_loss: 0.3127
Epoch 72/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
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222 - val_loss: 0.3149
Epoch 73/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
209 - val_loss: 0.3101
Epoch 74/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
189 - val_loss: 0.3108
Epoch 75/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
167 - val_loss: 0.3082
Epoch 76/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
170 - val_loss: 0.3072
Epoch 77/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
152 - val_loss: 0.3086
Epoch 78/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
135 - val_loss: 0.3091
Epoch 79/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
123 - val_loss: 0.3055
Epoch 80/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
112 - val_loss: 0.3059
Epoch 81/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
107 - val_loss: 0.3058
Epoch 82/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
097 - val_loss: 0.3050
Epoch 83/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
089 - val_loss: 0.3025
Epoch 84/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
077 - val_loss: 0.3040
Epoch 85/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
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068 - val_loss: 0.3008
Epoch 86/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
073 - val_loss: 0.3002
Epoch 87/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
065 - val_loss: 0.3010
Epoch 88/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
046 - val_loss: 0.2999
Epoch 89/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
041 - val_loss: 0.3001
Epoch 90/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
034 - val_loss: 0.2988
Epoch 91/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
032 - val_loss: 0.2986
Epoch 92/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
030 - val_loss: 0.2982
Epoch 93/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
017 - val_loss: 0.2980
Epoch 94/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
013 - val_loss: 0.2980
Epoch 95/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
013 - val_loss: 0.2990
Epoch 96/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
001 - val_loss: 0.2968
Epoch 97/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
998 - val_loss: 0.2972
Epoch 98/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
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988 - val_loss: 0.2956
Epoch 99/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
989 - val_loss: 0.2944
Epoch 100/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
980 - val_loss: 0.2944
Epoch 101/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
978 - val_loss: 0.2947
Epoch 102/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
980 - val_loss: 0.2941
Epoch 103/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
964 - val_loss: 0.2947
Epoch 104/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
963 - val_loss: 0.2952
Epoch 105/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
955 - val_loss: 0.2950
Epoch 106/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
961 - val_loss: 0.2955
Epoch 107/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
950 - val_loss: 0.2934
Epoch 108/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
946 - val_loss: 0.2927
Epoch 109/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
942 - val_loss: 0.2935
Epoch 110/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
935 - val_loss: 0.2916
Epoch 111/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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935 - val_loss: 0.2917
Epoch 112/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
931 - val_loss: 0.2920
Epoch 113/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
927 - val_loss: 0.2905
Epoch 114/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
927 - val_loss: 0.2941
Epoch 115/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
931 - val_loss: 0.2893
Epoch 116/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
923 - val_loss: 0.2935
Epoch 117/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
916 - val_loss: 0.2912
Epoch 118/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
918 - val_loss: 0.2901
Epoch 119/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
907 - val_loss: 0.2896
Epoch 120/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
906 - val_loss: 0.2913
Epoch 121/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
911 - val_loss: 0.2920
Epoch 122/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
895 - val_loss: 0.2893
Epoch 123/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
894 - val_loss: 0.2898
Epoch 124/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
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889 - val_loss: 0.2900
Epoch 125/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
889 - val_loss: 0.2881
Epoch 126/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
889 - val_loss: 0.2914
Epoch 127/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
883 - val_loss: 0.2890
Epoch 128/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
877 - val_loss: 0.2876
Epoch 129/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
885 - val_loss: 0.2896
Epoch 130/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
889 - val_loss: 0.2891
Epoch 131/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
871 - val_loss: 0.2915
Epoch 132/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
866 - val_loss: 0.2874
Epoch 133/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
864 - val_loss: 0.2859
Epoch 134/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
856 - val_loss: 0.2901
Epoch 135/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
858 - val_loss: 0.2874
Epoch 136/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
858 - val_loss: 0.2888
Epoch 137/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
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855 - val_loss: 0.2871
Epoch 138/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
856 - val_loss: 0.2870
Epoch 139/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
847 - val_loss: 0.2880
Epoch 140/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
845 - val_loss: 0.2872
Epoch 141/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
845 - val_loss: 0.2855
Epoch 142/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
843 - val_loss: 0.2875
Epoch 143/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
848 - val_loss: 0.2876
Epoch 144/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
837 - val_loss: 0.2853
Epoch 145/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
830 - val_loss: 0.2873
Epoch 146/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
835 - val_loss: 0.2878
Epoch 147/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
835 - val_loss: 0.2869
Epoch 148/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
839 - val_loss: 0.2845
Epoch 149/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
829 - val_loss: 0.2886
Epoch 150/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```



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828 - val_loss: 0.2857
Epoch 151/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
830 - val_loss: 0.2854
Epoch 152/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
825 - val_loss: 0.2846
Epoch 153/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
836 - val_loss: 0.2856
Epoch 154/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
843 - val_loss: 0.2877
Epoch 155/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
824 - val_loss: 0.2854
Epoch 156/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
807 - val_loss: 0.2845
Epoch 157/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
802 - val_loss: 0.2849
Epoch 158/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
800 - val_loss: 0.2858
Epoch 159/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
798 - val_loss: 0.2852
Epoch 160/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
808 - val_loss: 0.2863
Epoch 161/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
798 - val_loss: 0.2851
Epoch 162/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
791 - val_loss: 0.2843
Epoch 163/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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793 - val_loss: 0.2833
Epoch 164/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
800 - val_loss: 0.2854
Epoch 165/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
796 - val_loss: 0.2825
Epoch 166/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
795 - val_loss: 0.2852
Epoch 167/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
798 - val_loss: 0.2815
Epoch 168/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
775 - val_loss: 0.2862
Epoch 169/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
781 - val_loss: 0.2822
Epoch 170/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
783 - val_loss: 0.2849
Epoch 171/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
777 - val_loss: 0.2819
Epoch 172/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
765 - val_loss: 0.2834
Epoch 173/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
769 - val_loss: 0.2830
Epoch 174/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
769 - val_loss: 0.2826
Epoch 175/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
768 - val_loss: 0.2836
Epoch 176/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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759 - val_loss: 0.2815
Epoch 177/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
756 - val_loss: 0.2815
Epoch 178/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
759 - val_loss: 0.2828
Epoch 179/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
749 - val_loss: 0.2815
Epoch 180/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
747 - val_loss: 0.2815
Epoch 181/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
747 - val_loss: 0.2815
Epoch 182/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
762 - val_loss: 0.2802
Epoch 183/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
742 - val_loss: 0.2799
Epoch 184/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
740 - val_loss: 0.2810
Epoch 185/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
742 - val_loss: 0.2808
Epoch 186/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
733 - val_loss: 0.2787
Epoch 187/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
738 - val_loss: 0.2791
Epoch 188/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
726 - val_loss: 0.2810
Epoch 189/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
```

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730 - val_loss: 0.2802
Epoch 190/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
718 - val_loss: 0.2783
Epoch 191/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
719 - val_loss: 0.2782
Epoch 192/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
720 - val_loss: 0.2789
Epoch 193/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
717 - val_loss: 0.2776
Epoch 194/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
723 - val_loss: 0.2798
Epoch 195/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
709 - val_loss: 0.2768
Epoch 196/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
717 - val_loss: 0.2793
Epoch 197/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
701 - val_loss: 0.2757
Epoch 198/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
699 - val_loss: 0.2770
Epoch 199/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
700 - val_loss: 0.2761
Epoch 200/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
698 - val_loss: 0.2754
Epoch 201/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
697 - val_loss: 0.2762
Epoch 202/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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706 - val_loss: 0.2745
Epoch 203/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
698 - val_loss: 0.2751
Epoch 204/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
685 - val_loss: 0.2758
Epoch 205/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
685 - val_loss: 0.2741
Epoch 206/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
676 - val_loss: 0.2731
Epoch 207/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
683 - val_loss: 0.2763
Epoch 208/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
674 - val_loss: 0.2715
Epoch 209/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
671 - val_loss: 0.2735
Epoch 210/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
673 - val_loss: 0.2721
Epoch 211/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
677 - val_loss: 0.2715
Epoch 212/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
670 - val_loss: 0.2706
Epoch 213/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
662 - val_loss: 0.2728
Epoch 214/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
653 - val_loss: 0.2683
Epoch 215/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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651 - val_loss: 0.2713
Epoch 216/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
652 - val_loss: 0.2699
Epoch 217/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
649 - val_loss: 0.2690
Epoch 218/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
644 - val_loss: 0.2676
Epoch 219/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
646 - val_loss: 0.2685
Epoch 220/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
648 - val_loss: 0.2689
Epoch 221/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
633 - val_loss: 0.2673
Epoch 222/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
639 - val_loss: 0.2668
Epoch 223/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
631 - val_loss: 0.2676
Epoch 224/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
624 - val_loss: 0.2653
Epoch 225/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
625 - val_loss: 0.2682
Epoch 226/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
629 - val_loss: 0.2657
Epoch 227/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
623 - val_loss: 0.2642
Epoch 228/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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633 - val_loss: 0.2657
Epoch 229/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
628 - val_loss: 0.2656
Epoch 230/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
621 - val_loss: 0.2642
Epoch 231/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
602 - val_loss: 0.2647
Epoch 232/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
611 - val_loss: 0.2626
Epoch 233/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
601 - val_loss: 0.2622
Epoch 234/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
602 - val_loss: 0.2613
Epoch 235/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
596 - val_loss: 0.2621
Epoch 236/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
591 - val_loss: 0.2620
Epoch 237/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
586 - val_loss: 0.2613
Epoch 238/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
587 - val_loss: 0.2604
Epoch 239/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
601 - val_loss: 0.2622
Epoch 240/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
589 - val_loss: 0.2602
Epoch 241/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
```

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585 - val_loss: 0.2595
Epoch 242/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
568 - val_loss: 0.2597
Epoch 243/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
565 - val_loss: 0.2587
Epoch 244/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
563 - val_loss: 0.2572
Epoch 245/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
558 - val_loss: 0.2578
Epoch 246/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
556 - val_loss: 0.2573
Epoch 247/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
557 - val_loss: 0.2582
Epoch 248/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
548 - val_loss: 0.2548
Epoch 249/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
548 - val_loss: 0.2570
Epoch 250/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
541 - val_loss: 0.2556
Epoch 251/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
545 - val_loss: 0.2560
Epoch 252/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
548 - val_loss: 0.2564
Epoch 253/1000
1791/1791 [=====] - 0s 17us/sample - loss: 0.2
541 - val_loss: 0.2566
Epoch 254/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
```



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533 - val_loss: 0.2531
Epoch 255/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
531 - val_loss: 0.2533
Epoch 256/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
528 - val_loss: 0.2550
Epoch 257/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
520 - val_loss: 0.2517
Epoch 258/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
526 - val_loss: 0.2556
Epoch 259/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
521 - val_loss: 0.2526
Epoch 260/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
519 - val_loss: 0.2530
Epoch 261/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
512 - val_loss: 0.2516
Epoch 262/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
507 - val_loss: 0.2514
Epoch 263/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
501 - val_loss: 0.2514
Epoch 264/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
510 - val_loss: 0.2502
Epoch 265/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
514 - val_loss: 0.2497
Epoch 266/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
495 - val_loss: 0.2492
Epoch 267/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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498 - val_loss: 0.2489
Epoch 268/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
501 - val_loss: 0.2508
Epoch 269/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
487 - val_loss: 0.2481
Epoch 270/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
485 - val_loss: 0.2475
Epoch 271/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
481 - val_loss: 0.2496
Epoch 272/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
478 - val_loss: 0.2472
Epoch 273/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
471 - val_loss: 0.2471
Epoch 274/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
471 - val_loss: 0.2480
Epoch 275/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
468 - val_loss: 0.2467
Epoch 276/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
465 - val_loss: 0.2470
Epoch 277/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
458 - val_loss: 0.2462
Epoch 278/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
457 - val_loss: 0.2455
Epoch 279/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
455 - val_loss: 0.2455
Epoch 280/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
```

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452 - val_loss: 0.2432
Epoch 281/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
464 - val_loss: 0.2449
Epoch 282/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
457 - val_loss: 0.2444
Epoch 283/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
449 - val_loss: 0.2438
Epoch 284/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
450 - val_loss: 0.2457
Epoch 285/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
441 - val_loss: 0.2413
Epoch 286/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
441 - val_loss: 0.2435
Epoch 287/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
436 - val_loss: 0.2428
Epoch 288/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
427 - val_loss: 0.2413
Epoch 289/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
427 - val_loss: 0.2425
Epoch 290/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
430 - val_loss: 0.2402
Epoch 291/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
427 - val_loss: 0.2410
Epoch 292/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
424 - val_loss: 0.2412
Epoch 293/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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418 - val_loss: 0.2396
Epoch 294/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
413 - val_loss: 0.2423
Epoch 295/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
408 - val_loss: 0.2388
Epoch 296/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
411 - val_loss: 0.2379
Epoch 297/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
410 - val_loss: 0.2409
Epoch 298/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
410 - val_loss: 0.2374
Epoch 299/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
414 - val_loss: 0.2370
Epoch 300/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
402 - val_loss: 0.2391
Epoch 301/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
399 - val_loss: 0.2372
Epoch 302/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
392 - val_loss: 0.2368
Epoch 303/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
389 - val_loss: 0.2373
Epoch 304/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
396 - val_loss: 0.2346
Epoch 305/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
390 - val_loss: 0.2369
Epoch 306/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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383 - val_loss: 0.2366
Epoch 307/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
377 - val_loss: 0.2353
Epoch 308/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
377 - val_loss: 0.2352
Epoch 309/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
380 - val_loss: 0.2335
Epoch 310/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
385 - val_loss: 0.2338
Epoch 311/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
362 - val_loss: 0.2359
Epoch 312/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
362 - val_loss: 0.2314
Epoch 313/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
367 - val_loss: 0.2310
Epoch 314/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
352 - val_loss: 0.2324
Epoch 315/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
351 - val_loss: 0.2304
Epoch 316/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
345 - val_loss: 0.2342
Epoch 317/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
354 - val_loss: 0.2323
Epoch 318/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
338 - val_loss: 0.2288
Epoch 319/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
```

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335 - val_loss: 0.2299
Epoch 320/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
338 - val_loss: 0.2279
Epoch 321/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
331 - val_loss: 0.2291
Epoch 322/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
336 - val_loss: 0.2301
Epoch 323/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
328 - val_loss: 0.2264
Epoch 324/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
328 - val_loss: 0.2270
Epoch 325/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
319 - val_loss: 0.2264
Epoch 326/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
319 - val_loss: 0.2264
Epoch 327/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
315 - val_loss: 0.2236
Epoch 328/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
311 - val_loss: 0.2268
Epoch 329/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
304 - val_loss: 0.2245
Epoch 330/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
299 - val_loss: 0.2243
Epoch 331/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
300 - val_loss: 0.2244
Epoch 332/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
```

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295 - val_loss: 0.2236
Epoch 333/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
293 - val_loss: 0.2219
Epoch 334/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
290 - val_loss: 0.2230
Epoch 335/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
296 - val_loss: 0.2223
Epoch 336/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
293 - val_loss: 0.2229
Epoch 337/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
283 - val_loss: 0.2201
Epoch 338/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
282 - val_loss: 0.2200
Epoch 339/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
274 - val_loss: 0.2220
Epoch 340/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
269 - val_loss: 0.2200
Epoch 341/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
272 - val_loss: 0.2212
Epoch 342/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
263 - val_loss: 0.2178
Epoch 343/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
268 - val_loss: 0.2186
Epoch 344/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
269 - val_loss: 0.2188
Epoch 345/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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263 - val_loss: 0.2200
Epoch 346/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
260 - val_loss: 0.2172
Epoch 347/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
253 - val_loss: 0.2188
Epoch 348/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
248 - val_loss: 0.2162
Epoch 349/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
254 - val_loss: 0.2204
Epoch 350/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
248 - val_loss: 0.2152
Epoch 351/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
241 - val_loss: 0.2166
Epoch 352/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
247 - val_loss: 0.2157
Epoch 353/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
239 - val_loss: 0.2138
Epoch 354/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
249 - val_loss: 0.2154
Epoch 355/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
240 - val_loss: 0.2140
Epoch 356/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
234 - val_loss: 0.2162
Epoch 357/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
231 - val_loss: 0.2126
Epoch 358/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```



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233 - val_loss: 0.2137
Epoch 359/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
229 - val_loss: 0.2140
Epoch 360/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
227 - val_loss: 0.2121
Epoch 361/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
223 - val_loss: 0.2127
Epoch 362/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
219 - val_loss: 0.2126
Epoch 363/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
219 - val_loss: 0.2104
Epoch 364/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
224 - val_loss: 0.2136
Epoch 365/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
222 - val_loss: 0.2102
Epoch 366/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
217 - val_loss: 0.2122
Epoch 367/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
208 - val_loss: 0.2098
Epoch 368/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
210 - val_loss: 0.2105
Epoch 369/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
214 - val_loss: 0.2084
Epoch 370/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
207 - val_loss: 0.2103
Epoch 371/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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205 - val_loss: 0.2093
Epoch 372/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
210 - val_loss: 0.2106
Epoch 373/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
203 - val_loss: 0.2099
Epoch 374/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
195 - val_loss: 0.2078
Epoch 375/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
202 - val_loss: 0.2074
Epoch 376/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
206 - val_loss: 0.2077
Epoch 377/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
189 - val_loss: 0.2093
Epoch 378/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
190 - val_loss: 0.2071
Epoch 379/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
189 - val_loss: 0.2081
Epoch 380/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
186 - val_loss: 0.2066
Epoch 381/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
180 - val_loss: 0.2080
Epoch 382/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
182 - val_loss: 0.2066
Epoch 383/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
183 - val_loss: 0.2076
Epoch 384/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
```

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180 - val_loss: 0.2075
Epoch 385/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
176 - val_loss: 0.2059
Epoch 386/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
176 - val_loss: 0.2059
Epoch 387/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
179 - val_loss: 0.2075
Epoch 388/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
172 - val_loss: 0.2058
Epoch 389/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
171 - val_loss: 0.2060
Epoch 390/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
180 - val_loss: 0.2050
Epoch 391/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
178 - val_loss: 0.2061
Epoch 392/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
168 - val_loss: 0.2037
Epoch 393/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
163 - val_loss: 0.2058
Epoch 394/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
158 - val_loss: 0.2046
Epoch 395/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
156 - val_loss: 0.2040
Epoch 396/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
155 - val_loss: 0.2037
Epoch 397/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
```

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162 - val_loss: 0.2029
Epoch 398/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
173 - val_loss: 0.2081
Epoch 399/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
151 - val_loss: 0.2026
Epoch 400/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
142 - val_loss: 0.2029
Epoch 401/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
142 - val_loss: 0.2027
Epoch 402/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
139 - val_loss: 0.2044
Epoch 403/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
140 - val_loss: 0.2013
Epoch 404/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
144 - val_loss: 0.2028
Epoch 405/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
135 - val_loss: 0.2012
Epoch 406/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
131 - val_loss: 0.2014
Epoch 407/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
133 - val_loss: 0.2062
Epoch 408/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
137 - val_loss: 0.2009
Epoch 409/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
134 - val_loss: 0.2029
Epoch 410/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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133 - val_loss: 0.2014
Epoch 411/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
141 - val_loss: 0.2007
Epoch 412/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
129 - val_loss: 0.2002
Epoch 413/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
148 - val_loss: 0.1995
Epoch 414/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
130 - val_loss: 0.2023
Epoch 415/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
128 - val_loss: 0.2004
Epoch 416/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
118 - val_loss: 0.2009
Epoch 417/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
117 - val_loss: 0.1990
Epoch 418/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
115 - val_loss: 0.2006
Epoch 419/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
124 - val_loss: 0.1989
Epoch 420/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
112 - val_loss: 0.2022
Epoch 421/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
106 - val_loss: 0.1972
Epoch 422/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
114 - val_loss: 0.2013
Epoch 423/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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117 - val_loss: 0.1973
Epoch 424/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
105 - val_loss: 0.1995
Epoch 425/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
108 - val_loss: 0.1977
Epoch 426/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
108 - val_loss: 0.1969
Epoch 427/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
099 - val_loss: 0.1994
Epoch 428/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
104 - val_loss: 0.1968
Epoch 429/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
106 - val_loss: 0.1991
Epoch 430/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
099 - val_loss: 0.1967
Epoch 431/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
100 - val_loss: 0.1991
Epoch 432/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
099 - val_loss: 0.1960
Epoch 433/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
094 - val_loss: 0.1980
Epoch 434/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
090 - val_loss: 0.1956
Epoch 435/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
097 - val_loss: 0.1988
Epoch 436/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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106 - val_loss: 0.1957
Epoch 437/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
095 - val_loss: 0.1976
Epoch 438/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
109 - val_loss: 0.1986
Epoch 439/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
102 - val_loss: 0.1951
Epoch 440/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
084 - val_loss: 0.1974
Epoch 441/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
087 - val_loss: 0.1948
Epoch 442/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
087 - val_loss: 0.1997
Epoch 443/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
079 - val_loss: 0.1946
Epoch 444/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
087 - val_loss: 0.1988
Epoch 445/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
097 - val_loss: 0.1936
Epoch 446/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
082 - val_loss: 0.1970
Epoch 447/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
074 - val_loss: 0.1942
Epoch 448/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
076 - val_loss: 0.1951
Epoch 449/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
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068 - val_loss: 0.1944
Epoch 450/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
071 - val_loss: 0.1933
Epoch 451/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
075 - val_loss: 0.1943
Epoch 452/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
067 - val_loss: 0.1938
Epoch 453/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
080 - val_loss: 0.1933
Epoch 454/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
090 - val_loss: 0.1931
Epoch 455/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
070 - val_loss: 0.1942
Epoch 456/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
073 - val_loss: 0.1958
Epoch 457/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
077 - val_loss: 0.1941
Epoch 458/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
096 - val_loss: 0.1961
Epoch 459/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
065 - val_loss: 0.1927
Epoch 460/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
067 - val_loss: 0.1930
Epoch 461/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
072 - val_loss: 0.1938
Epoch 462/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```



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065 - val_loss: 0.1921
Epoch 463/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
060 - val_loss: 0.1949
Epoch 464/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
059 - val_loss: 0.1917
Epoch 465/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
065 - val_loss: 0.1931
Epoch 466/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
089 - val_loss: 0.1969
Epoch 467/1000
1791/1791 [=====] - 0s 21us/sample - loss: 0.2
068 - val_loss: 0.1911
Epoch 468/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
059 - val_loss: 0.1926
Epoch 469/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
054 - val_loss: 0.1930
Epoch 470/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
059 - val_loss: 0.1930
Epoch 471/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
051 - val_loss: 0.1921
Epoch 472/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
055 - val_loss: 0.1948
Epoch 473/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
044 - val_loss: 0.1914
Epoch 474/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
047 - val_loss: 0.1926
Epoch 475/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
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053 - val_loss: 0.1916
Epoch 476/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
053 - val_loss: 0.1931
Epoch 477/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
045 - val_loss: 0.1929
Epoch 478/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
045 - val_loss: 0.1909
Epoch 479/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
049 - val_loss: 0.1923
Epoch 480/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
047 - val_loss: 0.1912
Epoch 481/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
061 - val_loss: 0.1941
Epoch 482/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
059 - val_loss: 0.1899
Epoch 483/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
041 - val_loss: 0.1913
Epoch 484/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
034 - val_loss: 0.1911
Epoch 485/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
059 - val_loss: 0.1954
Epoch 486/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
041 - val_loss: 0.1891
Epoch 487/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
037 - val_loss: 0.1935
Epoch 488/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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034 - val_loss: 0.1894
Epoch 489/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
038 - val_loss: 0.1932
Epoch 490/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
041 - val_loss: 0.1903
Epoch 491/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
030 - val_loss: 0.1904
Epoch 492/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
038 - val_loss: 0.1903
Epoch 493/1000
1791/1791 [=====] - 0s 17us/sample - loss: 0.2
048 - val_loss: 0.1930
Epoch 494/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
031 - val_loss: 0.1896
Epoch 495/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
044 - val_loss: 0.1922
Epoch 496/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
045 - val_loss: 0.1884
Epoch 497/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
054 - val_loss: 0.1894
Epoch 498/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
032 - val_loss: 0.1904
Epoch 499/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
025 - val_loss: 0.1896
Epoch 500/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
024 - val_loss: 0.1912
Epoch 501/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
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029 - val_loss: 0.1905
Epoch 502/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
029 - val_loss: 0.1883
Epoch 503/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
027 - val_loss: 0.1936
Epoch 504/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
027 - val_loss: 0.1882
Epoch 505/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
028 - val_loss: 0.1918
Epoch 506/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
045 - val_loss: 0.1888
Epoch 507/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
036 - val_loss: 0.1903
Epoch 508/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
018 - val_loss: 0.1882
Epoch 509/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
014 - val_loss: 0.1887
Epoch 510/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
021 - val_loss: 0.1891
Epoch 511/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
016 - val_loss: 0.1896
Epoch 512/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
017 - val_loss: 0.1909
Epoch 513/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
016 - val_loss: 0.1881
Epoch 514/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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015 - val_loss: 0.1878
Epoch 515/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
015 - val_loss: 0.1890
Epoch 516/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
013 - val_loss: 0.1891
Epoch 517/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
007 - val_loss: 0.1888
Epoch 518/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
009 - val_loss: 0.1881
Epoch 519/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.2
008 - val_loss: 0.1877
Epoch 520/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
006 - val_loss: 0.1908
Epoch 521/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
013 - val_loss: 0.1871
Epoch 522/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
012 - val_loss: 0.1875
Epoch 523/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
004 - val_loss: 0.1866
Epoch 524/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
006 - val_loss: 0.1878
Epoch 525/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
008 - val_loss: 0.1894
Epoch 526/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
001 - val_loss: 0.1870
Epoch 527/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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006 - val_loss: 0.1870
Epoch 528/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
000 - val_loss: 0.1877
Epoch 529/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
003 - val_loss: 0.1863
Epoch 530/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
994 - val_loss: 0.1906
Epoch 531/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
013 - val_loss: 0.1865
Epoch 532/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
999 - val_loss: 0.1883
Epoch 533/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
004 - val_loss: 0.1853
Epoch 534/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
995 - val_loss: 0.1888
Epoch 535/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
992 - val_loss: 0.1868
Epoch 536/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
997 - val_loss: 0.1890
Epoch 537/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
996 - val_loss: 0.1857
Epoch 538/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
995 - val_loss: 0.1887
Epoch 539/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
003 - val_loss: 0.1853
Epoch 540/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
```

```
000 - val_loss: 0.1884
Epoch 541/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
023 - val_loss: 0.1855
Epoch 542/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
999 - val_loss: 0.1900
Epoch 543/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
989 - val_loss: 0.1856
Epoch 544/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
985 - val_loss: 0.1863
Epoch 545/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
984 - val_loss: 0.1879
Epoch 546/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
985 - val_loss: 0.1881
Epoch 547/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
981 - val_loss: 0.1857
Epoch 548/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
980 - val_loss: 0.1857
Epoch 549/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
979 - val_loss: 0.1857
Epoch 550/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
980 - val_loss: 0.1867
Epoch 551/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
983 - val_loss: 0.1858
Epoch 552/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
983 - val_loss: 0.1845
Epoch 553/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
```

```
979 - val_loss: 0.1861
Epoch 554/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
974 - val_loss: 0.1875
Epoch 555/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
974 - val_loss: 0.1845
Epoch 556/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
975 - val_loss: 0.1863
Epoch 557/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
971 - val_loss: 0.1850
Epoch 558/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
978 - val_loss: 0.1871
Epoch 559/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
977 - val_loss: 0.1849
Epoch 560/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
971 - val_loss: 0.1845
Epoch 561/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
984 - val_loss: 0.1873
Epoch 562/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
974 - val_loss: 0.1834
Epoch 563/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
977 - val_loss: 0.1845
Epoch 564/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
967 - val_loss: 0.1855
Epoch 565/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
969 - val_loss: 0.1832
Epoch 566/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```



```
962 - val_loss: 0.1853
Epoch 567/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
959 - val_loss: 0.1831
Epoch 568/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
961 - val_loss: 0.1835
Epoch 569/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
960 - val_loss: 0.1846
Epoch 570/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
961 - val_loss: 0.1846
Epoch 571/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
956 - val_loss: 0.1835
Epoch 572/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
968 - val_loss: 0.1853
Epoch 573/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
973 - val_loss: 0.1837
Epoch 574/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
957 - val_loss: 0.1843
Epoch 575/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
960 - val_loss: 0.1845
Epoch 576/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
965 - val_loss: 0.1817
Epoch 577/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
954 - val_loss: 0.1831
Epoch 578/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
950 - val_loss: 0.1838
Epoch 579/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
```

```
954 - val_loss: 0.1829
Epoch 580/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
952 - val_loss: 0.1844
Epoch 581/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
944 - val_loss: 0.1819
Epoch 582/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
946 - val_loss: 0.1839
Epoch 583/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
948 - val_loss: 0.1823
Epoch 584/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
948 - val_loss: 0.1824
Epoch 585/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
951 - val_loss: 0.1817
Epoch 586/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
946 - val_loss: 0.1842
Epoch 587/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
952 - val_loss: 0.1816
Epoch 588/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
948 - val_loss: 0.1817
Epoch 589/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
948 - val_loss: 0.1840
Epoch 590/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
949 - val_loss: 0.1805
Epoch 591/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
939 - val_loss: 0.1843
Epoch 592/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

```
944 - val_loss: 0.1810
Epoch 593/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
942 - val_loss: 0.1821
Epoch 594/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
937 - val_loss: 0.1805
Epoch 595/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
940 - val_loss: 0.1818
Epoch 596/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
934 - val_loss: 0.1816
Epoch 597/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.1
935 - val_loss: 0.1819
Epoch 598/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
934 - val_loss: 0.1816
Epoch 599/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
939 - val_loss: 0.1802
Epoch 600/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
952 - val_loss: 0.1865
Epoch 601/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
957 - val_loss: 0.1798
Epoch 602/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
943 - val_loss: 0.1807
Epoch 603/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
939 - val_loss: 0.1810
Epoch 604/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
923 - val_loss: 0.1808
Epoch 605/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```

```
928 - val_loss: 0.1800
Epoch 606/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
929 - val_loss: 0.1794
Epoch 607/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
924 - val_loss: 0.1814
Epoch 608/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
921 - val_loss: 0.1811
Epoch 609/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
928 - val_loss: 0.1790
Epoch 610/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
930 - val_loss: 0.1830
Epoch 611/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
915 - val_loss: 0.1792
Epoch 612/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
918 - val_loss: 0.1803
Epoch 613/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
921 - val_loss: 0.1794
Epoch 614/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
917 - val_loss: 0.1797
Epoch 615/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
914 - val_loss: 0.1793
Epoch 616/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
914 - val_loss: 0.1807
Epoch 617/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
918 - val_loss: 0.1797
Epoch 618/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

```
911 - val_loss: 0.1793
Epoch 619/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
910 - val_loss: 0.1821
Epoch 620/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
913 - val_loss: 0.1800
Epoch 621/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
909 - val_loss: 0.1788
Epoch 622/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
922 - val_loss: 0.1785
Epoch 623/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
918 - val_loss: 0.1806
Epoch 624/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
921 - val_loss: 0.1783
Epoch 625/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
909 - val_loss: 0.1811
Epoch 626/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
912 - val_loss: 0.1783
Epoch 627/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
907 - val_loss: 0.1798
Epoch 628/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
903 - val_loss: 0.1778
Epoch 629/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
901 - val_loss: 0.1795
Epoch 630/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
901 - val_loss: 0.1788
Epoch 631/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

```
898 - val_loss: 0.1785
Epoch 632/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
904 - val_loss: 0.1806
Epoch 633/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
900 - val_loss: 0.1773
Epoch 634/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
908 - val_loss: 0.1773
Epoch 635/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
906 - val_loss: 0.1782
Epoch 636/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
897 - val_loss: 0.1788
Epoch 637/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
897 - val_loss: 0.1776
Epoch 638/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
895 - val_loss: 0.1779
Epoch 639/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
892 - val_loss: 0.1773
Epoch 640/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
896 - val_loss: 0.1771
Epoch 641/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
902 - val_loss: 0.1813
Epoch 642/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
896 - val_loss: 0.1763
Epoch 643/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
891 - val_loss: 0.1790
Epoch 644/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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896 - val_loss: 0.1787
Epoch 645/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
897 - val_loss: 0.1788
Epoch 646/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
902 - val_loss: 0.1806
Epoch 647/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
891 - val_loss: 0.1767
Epoch 648/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
891 - val_loss: 0.1774
Epoch 649/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
885 - val_loss: 0.1778
Epoch 650/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
884 - val_loss: 0.1778
Epoch 651/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
882 - val_loss: 0.1772
Epoch 652/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
884 - val_loss: 0.1785
Epoch 653/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
887 - val_loss: 0.1761
Epoch 654/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
894 - val_loss: 0.1775
Epoch 655/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
889 - val_loss: 0.1788
Epoch 656/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
882 - val_loss: 0.1785
Epoch 657/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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876 - val_loss: 0.1763
Epoch 658/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
880 - val_loss: 0.1755
Epoch 659/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
888 - val_loss: 0.1769
Epoch 660/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
898 - val_loss: 0.1821
Epoch 661/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
895 - val_loss: 0.1753
Epoch 662/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
881 - val_loss: 0.1790
Epoch 663/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
883 - val_loss: 0.1780
Epoch 664/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
891 - val_loss: 0.1748
Epoch 665/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
880 - val_loss: 0.1791
Epoch 666/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
900 - val_loss: 0.1748
Epoch 667/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
902 - val_loss: 0.1821
Epoch 668/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
869 - val_loss: 0.1747
Epoch 669/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
884 - val_loss: 0.1772
Epoch 670/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```



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867 - val_loss: 0.1768
Epoch 671/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
867 - val_loss: 0.1756
Epoch 672/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
871 - val_loss: 0.1793
Epoch 673/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
877 - val_loss: 0.1743
Epoch 674/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
897 - val_loss: 0.1839
Epoch 675/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
893 - val_loss: 0.1744
Epoch 676/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
864 - val_loss: 0.1794
Epoch 677/1000
1791/1791 [=====] - 0s 17us/sample - loss: 0.1
872 - val_loss: 0.1747
Epoch 678/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
864 - val_loss: 0.1769
Epoch 679/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
865 - val_loss: 0.1755
Epoch 680/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
858 - val_loss: 0.1753
Epoch 681/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
861 - val_loss: 0.1760
Epoch 682/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
860 - val_loss: 0.1748
Epoch 683/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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860 - val_loss: 0.1787
Epoch 684/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
865 - val_loss: 0.1770
Epoch 685/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
865 - val_loss: 0.1763
Epoch 686/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
861 - val_loss: 0.1756
Epoch 687/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
854 - val_loss: 0.1746
Epoch 688/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
852 - val_loss: 0.1759
Epoch 689/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
850 - val_loss: 0.1743
Epoch 690/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
853 - val_loss: 0.1740
Epoch 691/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
846 - val_loss: 0.1758
Epoch 692/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
849 - val_loss: 0.1757
Epoch 693/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
850 - val_loss: 0.1738
Epoch 694/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
848 - val_loss: 0.1754
Epoch 695/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
848 - val_loss: 0.1745
Epoch 696/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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848 - val_loss: 0.1740
Epoch 697/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
860 - val_loss: 0.1734
Epoch 698/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
850 - val_loss: 0.1739
Epoch 699/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
841 - val_loss: 0.1743
Epoch 700/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
846 - val_loss: 0.1738
Epoch 701/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
859 - val_loss: 0.1774
Epoch 702/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
859 - val_loss: 0.1740
Epoch 703/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
839 - val_loss: 0.1741
Epoch 704/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
838 - val_loss: 0.1739
Epoch 705/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
839 - val_loss: 0.1744
Epoch 706/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
831 - val_loss: 0.1733
Epoch 707/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
844 - val_loss: 0.1737
Epoch 708/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
836 - val_loss: 0.1731
Epoch 709/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```

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833 - val_loss: 0.1746
Epoch 710/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
835 - val_loss: 0.1745
Epoch 711/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
834 - val_loss: 0.1726
Epoch 712/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
836 - val_loss: 0.1740
Epoch 713/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
839 - val_loss: 0.1747
Epoch 714/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
838 - val_loss: 0.1729
Epoch 715/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
823 - val_loss: 0.1734
Epoch 716/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
827 - val_loss: 0.1724
Epoch 717/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
825 - val_loss: 0.1763
Epoch 718/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
828 - val_loss: 0.1717
Epoch 719/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
821 - val_loss: 0.1731
Epoch 720/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
820 - val_loss: 0.1733
Epoch 721/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
837 - val_loss: 0.1714
Epoch 722/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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828 - val_loss: 0.1746
Epoch 723/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
841 - val_loss: 0.1715
Epoch 724/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
819 - val_loss: 0.1732
Epoch 725/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
822 - val_loss: 0.1712
Epoch 726/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
813 - val_loss: 0.1727
Epoch 727/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
815 - val_loss: 0.1725
Epoch 728/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
819 - val_loss: 0.1722
Epoch 729/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
814 - val_loss: 0.1741
Epoch 730/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
816 - val_loss: 0.1713
Epoch 731/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
807 - val_loss: 0.1728
Epoch 732/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
810 - val_loss: 0.1709
Epoch 733/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
810 - val_loss: 0.1714
Epoch 734/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
808 - val_loss: 0.1724
Epoch 735/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
```

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809 - val_loss: 0.1715
Epoch 736/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
802 - val_loss: 0.1715
Epoch 737/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
806 - val_loss: 0.1722
Epoch 738/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
802 - val_loss: 0.1722
Epoch 739/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
799 - val_loss: 0.1702
Epoch 740/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
806 - val_loss: 0.1735
Epoch 741/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
810 - val_loss: 0.1711
Epoch 742/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
802 - val_loss: 0.1705
Epoch 743/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
800 - val_loss: 0.1709
Epoch 744/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
802 - val_loss: 0.1708
Epoch 745/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
796 - val_loss: 0.1706
Epoch 746/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
798 - val_loss: 0.1697
Epoch 747/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
804 - val_loss: 0.1689
Epoch 748/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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802 - val_loss: 0.1703
Epoch 749/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
792 - val_loss: 0.1697
Epoch 750/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
795 - val_loss: 0.1707
Epoch 751/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
799 - val_loss: 0.1706
Epoch 752/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
789 - val_loss: 0.1696
Epoch 753/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
794 - val_loss: 0.1684
Epoch 754/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
802 - val_loss: 0.1714
Epoch 755/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
781 - val_loss: 0.1682
Epoch 756/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
784 - val_loss: 0.1697
Epoch 757/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
785 - val_loss: 0.1685
Epoch 758/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
785 - val_loss: 0.1695
Epoch 759/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
776 - val_loss: 0.1675
Epoch 760/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
780 - val_loss: 0.1675
Epoch 761/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```

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779 - val_loss: 0.1690
Epoch 762/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
796 - val_loss: 0.1669
Epoch 763/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
776 - val_loss: 0.1708
Epoch 764/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
782 - val_loss: 0.1677
Epoch 765/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
777 - val_loss: 0.1664
Epoch 766/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
777 - val_loss: 0.1696
Epoch 767/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
774 - val_loss: 0.1680
Epoch 768/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
772 - val_loss: 0.1657
Epoch 769/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
769 - val_loss: 0.1684
Epoch 770/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
778 - val_loss: 0.1662
Epoch 771/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
775 - val_loss: 0.1661
Epoch 772/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
767 - val_loss: 0.1673
Epoch 773/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
769 - val_loss: 0.1685
Epoch 774/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```



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776 - val_loss: 0.1656
Epoch 775/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
776 - val_loss: 0.1679
Epoch 776/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
761 - val_loss: 0.1663
Epoch 777/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
760 - val_loss: 0.1665
Epoch 778/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
762 - val_loss: 0.1663
Epoch 779/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
762 - val_loss: 0.1653
Epoch 780/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
765 - val_loss: 0.1668
Epoch 781/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
760 - val_loss: 0.1661
Epoch 782/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
766 - val_loss: 0.1675
Epoch 783/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
756 - val_loss: 0.1653
Epoch 784/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
759 - val_loss: 0.1659
Epoch 785/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
761 - val_loss: 0.1680
Epoch 786/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
764 - val_loss: 0.1659
Epoch 787/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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754 - val_loss: 0.1648
Epoch 788/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
793 - val_loss: 0.1736
Epoch 789/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
774 - val_loss: 0.1634
Epoch 790/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
774 - val_loss: 0.1644
Epoch 791/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
756 - val_loss: 0.1659
Epoch 792/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
754 - val_loss: 0.1657
Epoch 793/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
752 - val_loss: 0.1658
Epoch 794/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
751 - val_loss: 0.1652
Epoch 795/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
762 - val_loss: 0.1633
Epoch 796/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
761 - val_loss: 0.1648
Epoch 797/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
746 - val_loss: 0.1649
Epoch 798/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
758 - val_loss: 0.1624
Epoch 799/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
745 - val_loss: 0.1639
Epoch 800/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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740 - val_loss: 0.1634
Epoch 801/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
738 - val_loss: 0.1651
Epoch 802/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
735 - val_loss: 0.1625
Epoch 803/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
747 - val_loss: 0.1629
Epoch 804/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
738 - val_loss: 0.1670
Epoch 805/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
746 - val_loss: 0.1631
Epoch 806/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
735 - val_loss: 0.1671
Epoch 807/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
739 - val_loss: 0.1620
Epoch 808/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
735 - val_loss: 0.1633
Epoch 809/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
741 - val_loss: 0.1669
Epoch 810/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
746 - val_loss: 0.1619
Epoch 811/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
731 - val_loss: 0.1631
Epoch 812/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
727 - val_loss: 0.1626
Epoch 813/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```

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733 - val_loss: 0.1623
Epoch 814/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
726 - val_loss: 0.1642
Epoch 815/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
733 - val_loss: 0.1612
Epoch 816/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
719 - val_loss: 0.1645
Epoch 817/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
723 - val_loss: 0.1620
Epoch 818/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
723 - val_loss: 0.1614
Epoch 819/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
726 - val_loss: 0.1608
Epoch 820/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
726 - val_loss: 0.1611
Epoch 821/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
724 - val_loss: 0.1610
Epoch 822/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
716 - val_loss: 0.1617
Epoch 823/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
719 - val_loss: 0.1636
Epoch 824/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
731 - val_loss: 0.1599
Epoch 825/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
716 - val_loss: 0.1616
Epoch 826/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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713 - val_loss: 0.1610
Epoch 827/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
707 - val_loss: 0.1612
Epoch 828/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
702 - val_loss: 0.1624
Epoch 829/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
707 - val_loss: 0.1622
Epoch 830/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
716 - val_loss: 0.1601
Epoch 831/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
708 - val_loss: 0.1609
Epoch 832/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
692 - val_loss: 0.1616
Epoch 833/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
702 - val_loss: 0.1598
Epoch 834/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
715 - val_loss: 0.1639
Epoch 835/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
701 - val_loss: 0.1595
Epoch 836/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
689 - val_loss: 0.1608
Epoch 837/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
685 - val_loss: 0.1599
Epoch 838/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
685 - val_loss: 0.1621
Epoch 839/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```

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679 - val_loss: 0.1602
Epoch 840/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
678 - val_loss: 0.1615
Epoch 841/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
678 - val_loss: 0.1602
Epoch 842/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
677 - val_loss: 0.1605
Epoch 843/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
678 - val_loss: 0.1602
Epoch 844/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
678 - val_loss: 0.1609
Epoch 845/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
684 - val_loss: 0.1590
Epoch 846/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
680 - val_loss: 0.1589
Epoch 847/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
693 - val_loss: 0.1648
Epoch 848/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
682 - val_loss: 0.1595
Epoch 849/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
673 - val_loss: 0.1615
Epoch 850/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
669 - val_loss: 0.1599
Epoch 851/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
667 - val_loss: 0.1617
Epoch 852/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```

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684 - val_loss: 0.1585
Epoch 853/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
671 - val_loss: 0.1604
Epoch 854/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
670 - val_loss: 0.1598
Epoch 855/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
664 - val_loss: 0.1591
Epoch 856/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
661 - val_loss: 0.1589
Epoch 857/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
660 - val_loss: 0.1590
Epoch 858/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
660 - val_loss: 0.1598
Epoch 859/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
666 - val_loss: 0.1598
Epoch 860/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
657 - val_loss: 0.1588
Epoch 861/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
661 - val_loss: 0.1591
Epoch 862/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
655 - val_loss: 0.1614
Epoch 863/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
673 - val_loss: 0.1587
Epoch 864/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
655 - val_loss: 0.1604
Epoch 865/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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661 - val_loss: 0.1584
Epoch 866/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
669 - val_loss: 0.1582
Epoch 867/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
668 - val_loss: 0.1599
Epoch 868/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
657 - val_loss: 0.1572
Epoch 869/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
666 - val_loss: 0.1603
Epoch 870/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
670 - val_loss: 0.1582
Epoch 871/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
667 - val_loss: 0.1570
Epoch 872/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
667 - val_loss: 0.1630
Epoch 873/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
664 - val_loss: 0.1571
Epoch 874/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
645 - val_loss: 0.1604
Epoch 875/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
649 - val_loss: 0.1579
Epoch 876/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
649 - val_loss: 0.1592
Epoch 877/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
652 - val_loss: 0.1602
Epoch 878/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```



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651 - val_loss: 0.1569
Epoch 879/1000
1791/1791 [=====] - 0s 19us/sample - loss: 0.1
649 - val_loss: 0.1581
Epoch 880/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
645 - val_loss: 0.1573
Epoch 881/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
648 - val_loss: 0.1585
Epoch 882/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
645 - val_loss: 0.1598
Epoch 883/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
648 - val_loss: 0.1568
Epoch 884/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
637 - val_loss: 0.1594
Epoch 885/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
644 - val_loss: 0.1578
Epoch 886/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
640 - val_loss: 0.1584
Epoch 887/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
635 - val_loss: 0.1577
Epoch 888/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
644 - val_loss: 0.1565
Epoch 889/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
642 - val_loss: 0.1569
Epoch 890/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
644 - val_loss: 0.1579
Epoch 891/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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651 - val_loss: 0.1605
Epoch 892/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
671 - val_loss: 0.1567
Epoch 893/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
632 - val_loss: 0.1596
Epoch 894/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
637 - val_loss: 0.1567
Epoch 895/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
628 - val_loss: 0.1592
Epoch 896/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
631 - val_loss: 0.1582
Epoch 897/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
652 - val_loss: 0.1568
Epoch 898/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
649 - val_loss: 0.1583
Epoch 899/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
632 - val_loss: 0.1573
Epoch 900/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
631 - val_loss: 0.1567
Epoch 901/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
635 - val_loss: 0.1574
Epoch 902/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
625 - val_loss: 0.1571
Epoch 903/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
630 - val_loss: 0.1563
Epoch 904/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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627 - val_loss: 0.1591
Epoch 905/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
625 - val_loss: 0.1568
Epoch 906/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
622 - val_loss: 0.1577
Epoch 907/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
622 - val_loss: 0.1571
Epoch 908/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
623 - val_loss: 0.1576
Epoch 909/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
623 - val_loss: 0.1577
Epoch 910/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
632 - val_loss: 0.1592
Epoch 911/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
629 - val_loss: 0.1565
Epoch 912/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
622 - val_loss: 0.1588
Epoch 913/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
615 - val_loss: 0.1573
Epoch 914/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
617 - val_loss: 0.1580
Epoch 915/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
628 - val_loss: 0.1569
Epoch 916/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
614 - val_loss: 0.1571
Epoch 917/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

```
610 - val_loss: 0.1589
Epoch 918/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
618 - val_loss: 0.1585
Epoch 919/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
617 - val_loss: 0.1561
Epoch 920/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
614 - val_loss: 0.1576
Epoch 921/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
608 - val_loss: 0.1578
Epoch 922/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
607 - val_loss: 0.1581
Epoch 923/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
605 - val_loss: 0.1566
Epoch 924/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
628 - val_loss: 0.1596
Epoch 925/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
601 - val_loss: 0.1560
Epoch 926/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
628 - val_loss: 0.1577
Epoch 927/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
606 - val_loss: 0.1585
Epoch 928/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
604 - val_loss: 0.1555
Epoch 929/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
609 - val_loss: 0.1588
Epoch 930/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```

```
602 - val_loss: 0.1576
Epoch 931/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
609 - val_loss: 0.1589
Epoch 932/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
608 - val_loss: 0.1575
Epoch 933/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
600 - val_loss: 0.1596
Epoch 934/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
611 - val_loss: 0.1560
Epoch 935/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
613 - val_loss: 0.1564
Epoch 936/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
600 - val_loss: 0.1581
Epoch 937/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
596 - val_loss: 0.1579
Epoch 938/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
594 - val_loss: 0.1572
Epoch 939/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
597 - val_loss: 0.1579
Epoch 940/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
601 - val_loss: 0.1565
Epoch 941/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
589 - val_loss: 0.1587
Epoch 942/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
592 - val_loss: 0.1585
Epoch 943/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

```
591 - val_loss: 0.1565
Epoch 944/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
589 - val_loss: 0.1567
Epoch 945/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
598 - val_loss: 0.1574
Epoch 946/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
604 - val_loss: 0.1585
Epoch 947/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
586 - val_loss: 0.1569
Epoch 948/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
589 - val_loss: 0.1583
Epoch 949/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
589 - val_loss: 0.1566
Epoch 950/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
586 - val_loss: 0.1557
Epoch 951/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
582 - val_loss: 0.1568
Epoch 952/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
583 - val_loss: 0.1569
Epoch 953/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
583 - val_loss: 0.1570
Epoch 954/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
584 - val_loss: 0.1573
Epoch 955/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
583 - val_loss: 0.1587
Epoch 956/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

```
590 - val_loss: 0.1567
Epoch 957/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
587 - val_loss: 0.1583
Epoch 958/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
581 - val_loss: 0.1557
Epoch 959/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
601 - val_loss: 0.1608
Epoch 960/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
584 - val_loss: 0.1560
Epoch 961/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
578 - val_loss: 0.1582
Epoch 962/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
588 - val_loss: 0.1572
Epoch 963/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
607 - val_loss: 0.1592
Epoch 964/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
571 - val_loss: 0.1558
Epoch 965/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
578 - val_loss: 0.1562
Epoch 966/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
576 - val_loss: 0.1575
Epoch 967/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
575 - val_loss: 0.1571
Epoch 968/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
570 - val_loss: 0.1561
Epoch 969/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```

```
576 - val_loss: 0.1569
Epoch 970/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
586 - val_loss: 0.1556
Epoch 971/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
578 - val_loss: 0.1562
Epoch 972/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
570 - val_loss: 0.1575
Epoch 973/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
569 - val_loss: 0.1558
Epoch 974/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
568 - val_loss: 0.1563
Epoch 975/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
566 - val_loss: 0.1562
Epoch 976/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
570 - val_loss: 0.1564
Epoch 977/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
578 - val_loss: 0.1558
Epoch 978/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
563 - val_loss: 0.1571
Epoch 979/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
571 - val_loss: 0.1571
Epoch 980/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
568 - val_loss: 0.1558
Epoch 981/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
577 - val_loss: 0.1552
Epoch 982/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```



```
576 - val_loss: 0.1555
Epoch 983/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
569 - val_loss: 0.1573
Epoch 984/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
563 - val_loss: 0.1551
Epoch 985/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
562 - val_loss: 0.1585
Epoch 986/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
555 - val_loss: 0.1554
Epoch 987/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
570 - val_loss: 0.1592
Epoch 988/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
559 - val_loss: 0.1548
Epoch 989/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
570 - val_loss: 0.1562
Epoch 990/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
565 - val_loss: 0.1560
Epoch 991/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
559 - val_loss: 0.1556
Epoch 992/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
562 - val_loss: 0.1550
Epoch 993/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
560 - val_loss: 0.1563
Epoch 994/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
559 - val_loss: 0.1564
Epoch 995/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```

```

558 - val_loss: 0.1563
Epoch 996/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
552 - val_loss: 0.1568
Epoch 997/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
559 - val_loss: 0.1553
Epoch 998/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
561 - val_loss: 0.1577
Epoch 999/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
556 - val_loss: 0.1572
Epoch 1000/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
558 - val_loss: 0.1558

```

Out[134]: <tensorflow.python.keras.callbacks.History at 0x1de55c80388>

In [135]: `losses = pd.DataFrame(model.history.history)`

In [136]: `losses`

Out[136]:

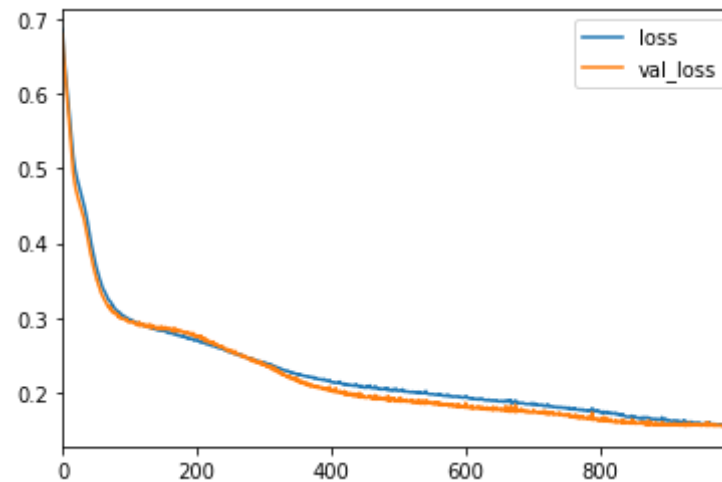
	loss	val_loss
0	0.685315	0.679613
1	0.669409	0.663475
2	0.655284	0.650053
3	0.643712	0.638149
4	0.632999	0.627458
...	...	...
995	0.155239	0.156822
996	0.155896	0.155273

	loss	val_loss
997	0.156120	0.157673
998	0.155611	0.157155
999	0.155787	0.155840

1000 rows × 2 columns

In [137]: `losses.plot()`

Out[137]: `<matplotlib.axes._subplots.AxesSubplot at 0x1de56d8cb48>`



```
In [138]: model = Sequential()

model.add(Dense(9,activation='relu',input_shape=(9, )))
model.add(Dense(9,activation='relu'))
model.add(Dense(1,activation='sigmoid'))

model.compile(loss='binary_crossentropy',optimizer='adam')
```

```
In [139]: from tensorflow.keras.callbacks import EarlyStopping
```

```

In [140]: early_stop = EarlyStopping(monitor='val_loss',mode='min',verbose=1,patience=25)

In [141]: model.fit(x=X_train,y=y_train,epochs=1000,validation_data=(X_test,y_test),
                  callbacks=[early_stop],batch_size=128)

Train on 1791 samples, validate on 597 samples
Epoch 1/1000
1791/1791 [=====] - 0s 201us/sample - loss: 0.6661 - val_loss: 0.6647
Epoch 2/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.6570 - val_loss: 0.6566
Epoch 3/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.6492 - val_loss: 0.6489
Epoch 4/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.6421 - val_loss: 0.6418
Epoch 5/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.6360 - val_loss: 0.6356
Epoch 6/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.6304 - val_loss: 0.6292
Epoch 7/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.6243 - val_loss: 0.6220
Epoch 8/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.6175 - val_loss: 0.6142
Epoch 9/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.6104 - val_loss: 0.6057
Epoch 10/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.6022 - val_loss: 0.5949
Epoch 11/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.5902 - val_loss: 0.5849

```

```
929 - val_loss: 0.5848
Epoch 12/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.5
845 - val_loss: 0.5765
Epoch 13/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.5
770 - val_loss: 0.5689
Epoch 14/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.5
706 - val_loss: 0.5629
Epoch 15/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.5
654 - val_loss: 0.5573
Epoch 16/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.5
599 - val_loss: 0.5509
Epoch 17/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.5
538 - val_loss: 0.5440
Epoch 18/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.5
474 - val_loss: 0.5361
Epoch 19/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.5
403 - val_loss: 0.5285
Epoch 20/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.5
336 - val_loss: 0.5198
Epoch 21/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.5
258 - val_loss: 0.5110
Epoch 22/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.5
183 - val_loss: 0.5023
Epoch 23/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.5
112 - val_loss: 0.4945
Epoch 24/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.5
```

```
049 - val_loss: 0.4873
Epoch 25/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.4
989 - val_loss: 0.4812
Epoch 26/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.4
939 - val_loss: 0.4751
Epoch 27/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.4
890 - val_loss: 0.4702
Epoch 28/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
850 - val_loss: 0.4652
Epoch 29/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.4
812 - val_loss: 0.4611
Epoch 30/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.4
772 - val_loss: 0.4570
Epoch 31/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.4
742 - val_loss: 0.4537
Epoch 32/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
707 - val_loss: 0.4497
Epoch 33/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
679 - val_loss: 0.4469
Epoch 34/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
657 - val_loss: 0.4451
Epoch 35/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.4
626 - val_loss: 0.4411
Epoch 36/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.4
596 - val_loss: 0.4384
Epoch 37/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
```

```
568 - val_loss: 0.4366
Epoch 38/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
541 - val_loss: 0.4333
Epoch 39/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
517 - val_loss: 0.4305
Epoch 40/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
493 - val_loss: 0.4279
Epoch 41/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
467 - val_loss: 0.4246
Epoch 42/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.4
436 - val_loss: 0.4218
Epoch 43/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
408 - val_loss: 0.4183
Epoch 44/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
379 - val_loss: 0.4152
Epoch 45/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.4
348 - val_loss: 0.4125
Epoch 46/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
321 - val_loss: 0.4089
Epoch 47/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
288 - val_loss: 0.4062
Epoch 48/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
260 - val_loss: 0.4039
Epoch 49/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
228 - val_loss: 0.3996
Epoch 50/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
```

```
191 - val_loss: 0.3968
Epoch 51/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.4
162 - val_loss: 0.3933
Epoch 52/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
131 - val_loss: 0.3910
Epoch 53/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.4
090 - val_loss: 0.3866
Epoch 54/1000
1791/1791 [=====] - 0s 19us/sample - loss: 0.4
065 - val_loss: 0.3838
Epoch 55/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.4
027 - val_loss: 0.3806
Epoch 56/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.3
990 - val_loss: 0.3764
Epoch 57/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
958 - val_loss: 0.3744
Epoch 58/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.3
925 - val_loss: 0.3697
Epoch 59/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
883 - val_loss: 0.3673
Epoch 60/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
847 - val_loss: 0.3632
Epoch 61/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
816 - val_loss: 0.3616
Epoch 62/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
785 - val_loss: 0.3565
Epoch 63/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.3
```



```
746 - val_loss: 0.3541
Epoch 64/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
704 - val_loss: 0.3491
Epoch 65/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
664 - val_loss: 0.3462
Epoch 66/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
638 - val_loss: 0.3451
Epoch 67/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.3
616 - val_loss: 0.3402
Epoch 68/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
566 - val_loss: 0.3383
Epoch 69/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
541 - val_loss: 0.3352
Epoch 70/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
512 - val_loss: 0.3336
Epoch 71/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
486 - val_loss: 0.3299
Epoch 72/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
465 - val_loss: 0.3291
Epoch 73/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
436 - val_loss: 0.3264
Epoch 74/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
420 - val_loss: 0.3237
Epoch 75/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
398 - val_loss: 0.3250
Epoch 76/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
```

```
374 - val_loss: 0.3198
Epoch 77/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
360 - val_loss: 0.3200
Epoch 78/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
350 - val_loss: 0.3161
Epoch 79/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
324 - val_loss: 0.3141
Epoch 80/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
301 - val_loss: 0.3150
Epoch 81/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
290 - val_loss: 0.3126
Epoch 82/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
300 - val_loss: 0.3134
Epoch 83/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
273 - val_loss: 0.3069
Epoch 84/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
244 - val_loss: 0.3088
Epoch 85/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
228 - val_loss: 0.3034
Epoch 86/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
207 - val_loss: 0.3067
Epoch 87/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
193 - val_loss: 0.3031
Epoch 88/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
185 - val_loss: 0.3019
Epoch 89/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
```

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175 - val_loss: 0.3002
Epoch 90/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
165 - val_loss: 0.3000
Epoch 91/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
144 - val_loss: 0.2982
Epoch 92/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
129 - val_loss: 0.2993
Epoch 93/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
119 - val_loss: 0.2964
Epoch 94/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
109 - val_loss: 0.2966
Epoch 95/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
105 - val_loss: 0.2962
Epoch 96/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
086 - val_loss: 0.2934
Epoch 97/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
073 - val_loss: 0.2934
Epoch 98/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
064 - val_loss: 0.2912
Epoch 99/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.3
053 - val_loss: 0.2914
Epoch 100/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
042 - val_loss: 0.2884
Epoch 101/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
035 - val_loss: 0.2895
Epoch 102/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
```

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033 - val_loss: 0.2907
Epoch 103/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.3
022 - val_loss: 0.2861
Epoch 104/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.3
009 - val_loss: 0.2869
Epoch 105/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
999 - val_loss: 0.2826
Epoch 106/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
988 - val_loss: 0.2861
Epoch 107/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
978 - val_loss: 0.2846
Epoch 108/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
966 - val_loss: 0.2799
Epoch 109/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
956 - val_loss: 0.2833
Epoch 110/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
948 - val_loss: 0.2796
Epoch 111/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
941 - val_loss: 0.2802
Epoch 112/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
932 - val_loss: 0.2805
Epoch 113/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
934 - val_loss: 0.2763
Epoch 114/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
917 - val_loss: 0.2786
Epoch 115/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
```

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907 - val_loss: 0.2754
Epoch 116/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
903 - val_loss: 0.2776
Epoch 117/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
894 - val_loss: 0.2755
Epoch 118/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
886 - val_loss: 0.2745
Epoch 119/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
884 - val_loss: 0.2725
Epoch 120/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
868 - val_loss: 0.2750
Epoch 121/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
867 - val_loss: 0.2724
Epoch 122/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
858 - val_loss: 0.2730
Epoch 123/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
848 - val_loss: 0.2715
Epoch 124/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
844 - val_loss: 0.2710
Epoch 125/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
837 - val_loss: 0.2707
Epoch 126/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
830 - val_loss: 0.2680
Epoch 127/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
825 - val_loss: 0.2710
Epoch 128/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
```

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824 - val_loss: 0.2667
Epoch 129/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
814 - val_loss: 0.2692
Epoch 130/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
806 - val_loss: 0.2670
Epoch 131/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
800 - val_loss: 0.2658
Epoch 132/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
803 - val_loss: 0.2640
Epoch 133/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
792 - val_loss: 0.2704
Epoch 134/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
787 - val_loss: 0.2646
Epoch 135/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
779 - val_loss: 0.2644
Epoch 136/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
776 - val_loss: 0.2662
Epoch 137/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
772 - val_loss: 0.2645
Epoch 138/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
764 - val_loss: 0.2629
Epoch 139/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
763 - val_loss: 0.2644
Epoch 140/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
751 - val_loss: 0.2618
Epoch 141/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
```

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750 - val_loss: 0.2620
Epoch 142/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
740 - val_loss: 0.2604
Epoch 143/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
736 - val_loss: 0.2600
Epoch 144/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
732 - val_loss: 0.2605
Epoch 145/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
727 - val_loss: 0.2607
Epoch 146/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
725 - val_loss: 0.2593
Epoch 147/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
718 - val_loss: 0.2566
Epoch 148/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
710 - val_loss: 0.2596
Epoch 149/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
714 - val_loss: 0.2561
Epoch 150/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
703 - val_loss: 0.2576
Epoch 151/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
695 - val_loss: 0.2561
Epoch 152/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
694 - val_loss: 0.2553
Epoch 153/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
691 - val_loss: 0.2550
Epoch 154/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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689 - val_loss: 0.2536
Epoch 155/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
681 - val_loss: 0.2545
Epoch 156/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
674 - val_loss: 0.2535
Epoch 157/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
669 - val_loss: 0.2530
Epoch 158/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
670 - val_loss: 0.2551
Epoch 159/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
662 - val_loss: 0.2502
Epoch 160/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
661 - val_loss: 0.2523
Epoch 161/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
665 - val_loss: 0.2515
Epoch 162/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
675 - val_loss: 0.2521
Epoch 163/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
653 - val_loss: 0.2491
Epoch 164/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
643 - val_loss: 0.2501
Epoch 165/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
634 - val_loss: 0.2488
Epoch 166/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
639 - val_loss: 0.2473
Epoch 167/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```



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638 - val_loss: 0.2488
Epoch 168/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
626 - val_loss: 0.2460
Epoch 169/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
625 - val_loss: 0.2474
Epoch 170/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
620 - val_loss: 0.2460
Epoch 171/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
615 - val_loss: 0.2440
Epoch 172/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
609 - val_loss: 0.2469
Epoch 173/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
614 - val_loss: 0.2449
Epoch 174/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
600 - val_loss: 0.2451
Epoch 175/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
599 - val_loss: 0.2445
Epoch 176/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
590 - val_loss: 0.2441
Epoch 177/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
598 - val_loss: 0.2438
Epoch 178/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
579 - val_loss: 0.2406
Epoch 179/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
574 - val_loss: 0.2428
Epoch 180/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
```

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574 - val_loss: 0.2413
Epoch 181/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
570 - val_loss: 0.2391
Epoch 182/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
566 - val_loss: 0.2408
Epoch 183/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
567 - val_loss: 0.2426
Epoch 184/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
557 - val_loss: 0.2386
Epoch 185/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
553 - val_loss: 0.2387
Epoch 186/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
553 - val_loss: 0.2406
Epoch 187/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
549 - val_loss: 0.2391
Epoch 188/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
544 - val_loss: 0.2364
Epoch 189/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
543 - val_loss: 0.2391
Epoch 190/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
534 - val_loss: 0.2355
Epoch 191/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
532 - val_loss: 0.2378
Epoch 192/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
530 - val_loss: 0.2367
Epoch 193/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
```

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526 - val_loss: 0.2358
Epoch 194/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
522 - val_loss: 0.2360
Epoch 195/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
518 - val_loss: 0.2350
Epoch 196/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
522 - val_loss: 0.2359
Epoch 197/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
511 - val_loss: 0.2327
Epoch 198/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
512 - val_loss: 0.2349
Epoch 199/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
516 - val_loss: 0.2335
Epoch 200/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
516 - val_loss: 0.2317
Epoch 201/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
511 - val_loss: 0.2360
Epoch 202/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
503 - val_loss: 0.2313
Epoch 203/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
509 - val_loss: 0.2351
Epoch 204/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
500 - val_loss: 0.2302
Epoch 205/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
483 - val_loss: 0.2314
Epoch 206/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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490 - val_loss: 0.2296
Epoch 207/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
493 - val_loss: 0.2339
Epoch 208/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
480 - val_loss: 0.2301
Epoch 209/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
474 - val_loss: 0.2317
Epoch 210/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
468 - val_loss: 0.2295
Epoch 211/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
465 - val_loss: 0.2308
Epoch 212/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
475 - val_loss: 0.2302
Epoch 213/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
460 - val_loss: 0.2286
Epoch 214/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
461 - val_loss: 0.2298
Epoch 215/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
464 - val_loss: 0.2262
Epoch 216/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
454 - val_loss: 0.2291
Epoch 217/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
446 - val_loss: 0.2266
Epoch 218/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
452 - val_loss: 0.2257
Epoch 219/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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442 - val_loss: 0.2263
Epoch 220/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
439 - val_loss: 0.2279
Epoch 221/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
441 - val_loss: 0.2247
Epoch 222/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
430 - val_loss: 0.2275
Epoch 223/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
431 - val_loss: 0.2265
Epoch 224/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
428 - val_loss: 0.2264
Epoch 225/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
424 - val_loss: 0.2257
Epoch 226/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
424 - val_loss: 0.2256
Epoch 227/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
426 - val_loss: 0.2235
Epoch 228/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
417 - val_loss: 0.2259
Epoch 229/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
413 - val_loss: 0.2232
Epoch 230/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
412 - val_loss: 0.2271
Epoch 231/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
408 - val_loss: 0.2228
Epoch 232/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
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405 - val_loss: 0.2230
Epoch 233/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
403 - val_loss: 0.2224
Epoch 234/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
400 - val_loss: 0.2243
Epoch 235/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
400 - val_loss: 0.2227
Epoch 236/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
397 - val_loss: 0.2227
Epoch 237/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
391 - val_loss: 0.2216
Epoch 238/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
396 - val_loss: 0.2207
Epoch 239/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
395 - val_loss: 0.2239
Epoch 240/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
386 - val_loss: 0.2228
Epoch 241/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
388 - val_loss: 0.2203
Epoch 242/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
384 - val_loss: 0.2233
Epoch 243/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
387 - val_loss: 0.2187
Epoch 244/1000
1791/1791 [=====] - 0s 19us/sample - loss: 0.2
388 - val_loss: 0.2221
Epoch 245/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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373 - val_loss: 0.2186
Epoch 246/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
391 - val_loss: 0.2199
Epoch 247/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
380 - val_loss: 0.2210
Epoch 248/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
368 - val_loss: 0.2210
Epoch 249/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
365 - val_loss: 0.2186
Epoch 250/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
367 - val_loss: 0.2225
Epoch 251/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
399 - val_loss: 0.2196
Epoch 252/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
382 - val_loss: 0.2192
Epoch 253/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
357 - val_loss: 0.2195
Epoch 254/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
354 - val_loss: 0.2197
Epoch 255/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
371 - val_loss: 0.2190
Epoch 256/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
361 - val_loss: 0.2170
Epoch 257/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
347 - val_loss: 0.2172
Epoch 258/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
```

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346 - val_loss: 0.2196
Epoch 259/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
346 - val_loss: 0.2169
Epoch 260/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
341 - val_loss: 0.2169
Epoch 261/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
338 - val_loss: 0.2192
Epoch 262/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
345 - val_loss: 0.2168
Epoch 263/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
334 - val_loss: 0.2170
Epoch 264/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
338 - val_loss: 0.2193
Epoch 265/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
334 - val_loss: 0.2157
Epoch 266/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
341 - val_loss: 0.2172
Epoch 267/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
350 - val_loss: 0.2150
Epoch 268/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
328 - val_loss: 0.2171
Epoch 269/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
327 - val_loss: 0.2142
Epoch 270/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
327 - val_loss: 0.2171
Epoch 271/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
```



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322 - val_loss: 0.2164
Epoch 272/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
312 - val_loss: 0.2154
Epoch 273/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
309 - val_loss: 0.2150
Epoch 274/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
310 - val_loss: 0.2157
Epoch 275/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
303 - val_loss: 0.2158
Epoch 276/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
304 - val_loss: 0.2144
Epoch 277/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
302 - val_loss: 0.2149
Epoch 278/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
301 - val_loss: 0.2151
Epoch 279/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
307 - val_loss: 0.2139
Epoch 280/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
296 - val_loss: 0.2151
Epoch 281/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
291 - val_loss: 0.2143
Epoch 282/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
287 - val_loss: 0.2137
Epoch 283/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
284 - val_loss: 0.2134
Epoch 284/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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281 - val_loss: 0.2145
Epoch 285/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
289 - val_loss: 0.2122
Epoch 286/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
281 - val_loss: 0.2133
Epoch 287/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
273 - val_loss: 0.2144
Epoch 288/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
278 - val_loss: 0.2133
Epoch 289/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
267 - val_loss: 0.2141
Epoch 290/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
267 - val_loss: 0.2125
Epoch 291/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
267 - val_loss: 0.2129
Epoch 292/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
260 - val_loss: 0.2114
Epoch 293/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
264 - val_loss: 0.2116
Epoch 294/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
258 - val_loss: 0.2113
Epoch 295/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
267 - val_loss: 0.2133
Epoch 296/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
263 - val_loss: 0.2105
Epoch 297/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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252 - val_loss: 0.2106
Epoch 298/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
252 - val_loss: 0.2134
Epoch 299/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
245 - val_loss: 0.2108
Epoch 300/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
247 - val_loss: 0.2103
Epoch 301/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
243 - val_loss: 0.2113
Epoch 302/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
241 - val_loss: 0.2097
Epoch 303/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
247 - val_loss: 0.2086
Epoch 304/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
236 - val_loss: 0.2120
Epoch 305/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
237 - val_loss: 0.2098
Epoch 306/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
233 - val_loss: 0.2097
Epoch 307/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
236 - val_loss: 0.2097
Epoch 308/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
230 - val_loss: 0.2093
Epoch 309/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
236 - val_loss: 0.2116
Epoch 310/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
```

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233 - val_loss: 0.2072
Epoch 311/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
224 - val_loss: 0.2087
Epoch 312/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
225 - val_loss: 0.2099
Epoch 313/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
220 - val_loss: 0.2069
Epoch 314/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
220 - val_loss: 0.2103
Epoch 315/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
222 - val_loss: 0.2066
Epoch 316/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
230 - val_loss: 0.2064
Epoch 317/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
215 - val_loss: 0.2084
Epoch 318/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
215 - val_loss: 0.2070
Epoch 319/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
209 - val_loss: 0.2086
Epoch 320/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
206 - val_loss: 0.2065
Epoch 321/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
206 - val_loss: 0.2068
Epoch 322/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
205 - val_loss: 0.2075
Epoch 323/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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200 - val_loss: 0.2055
Epoch 324/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
199 - val_loss: 0.2053
Epoch 325/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
203 - val_loss: 0.2054
Epoch 326/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
199 - val_loss: 0.2076
Epoch 327/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
197 - val_loss: 0.2055
Epoch 328/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
204 - val_loss: 0.2044
Epoch 329/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
191 - val_loss: 0.2074
Epoch 330/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
192 - val_loss: 0.2050
Epoch 331/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
200 - val_loss: 0.2087
Epoch 332/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
192 - val_loss: 0.2045
Epoch 333/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
183 - val_loss: 0.2084
Epoch 334/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
188 - val_loss: 0.2037
Epoch 335/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
185 - val_loss: 0.2042
Epoch 336/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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188 - val_loss: 0.2076
Epoch 337/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
183 - val_loss: 0.2035
Epoch 338/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
174 - val_loss: 0.2052
Epoch 339/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
179 - val_loss: 0.2044
Epoch 340/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
185 - val_loss: 0.2030
Epoch 341/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
191 - val_loss: 0.2080
Epoch 342/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
182 - val_loss: 0.2030
Epoch 343/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
183 - val_loss: 0.2064
Epoch 344/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
170 - val_loss: 0.2025
Epoch 345/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
171 - val_loss: 0.2032
Epoch 346/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
167 - val_loss: 0.2031
Epoch 347/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
165 - val_loss: 0.2036
Epoch 348/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
164 - val_loss: 0.2031
Epoch 349/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
```

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162 - val_loss: 0.2013
Epoch 350/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
164 - val_loss: 0.2048
Epoch 351/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
160 - val_loss: 0.2015
Epoch 352/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
163 - val_loss: 0.2066
Epoch 353/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
157 - val_loss: 0.2014
Epoch 354/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
158 - val_loss: 0.2023
Epoch 355/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
152 - val_loss: 0.2041
Epoch 356/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
154 - val_loss: 0.2017
Epoch 357/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
147 - val_loss: 0.2010
Epoch 358/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
152 - val_loss: 0.2018
Epoch 359/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
155 - val_loss: 0.2026
Epoch 360/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
158 - val_loss: 0.2011
Epoch 361/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
153 - val_loss: 0.2013
Epoch 362/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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146 - val_loss: 0.2006
Epoch 363/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
141 - val_loss: 0.2016
Epoch 364/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
150 - val_loss: 0.1998
Epoch 365/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
149 - val_loss: 0.2041
Epoch 366/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
151 - val_loss: 0.2019
Epoch 367/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
141 - val_loss: 0.1986
Epoch 368/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
136 - val_loss: 0.2041
Epoch 369/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
135 - val_loss: 0.1993
Epoch 370/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
133 - val_loss: 0.2012
Epoch 371/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
133 - val_loss: 0.2007
Epoch 372/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
135 - val_loss: 0.2006
Epoch 373/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
139 - val_loss: 0.1992
Epoch 374/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
130 - val_loss: 0.2005
Epoch 375/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
```



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123 - val_loss: 0.1985
Epoch 376/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
120 - val_loss: 0.2006
Epoch 377/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
141 - val_loss: 0.1984
Epoch 378/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
124 - val_loss: 0.2026
Epoch 379/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
133 - val_loss: 0.1986
Epoch 380/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
118 - val_loss: 0.1994
Epoch 381/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
123 - val_loss: 0.1988
Epoch 382/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
123 - val_loss: 0.1988
Epoch 383/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
124 - val_loss: 0.1988
Epoch 384/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.2
127 - val_loss: 0.1980
Epoch 385/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.2
117 - val_loss: 0.2002
Epoch 386/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
112 - val_loss: 0.1983
Epoch 387/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
109 - val_loss: 0.2002
Epoch 388/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
```

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114 - val_loss: 0.1983
Epoch 389/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
117 - val_loss: 0.1994
Epoch 390/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
108 - val_loss: 0.1967
Epoch 391/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
105 - val_loss: 0.2015
Epoch 392/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
119 - val_loss: 0.1972
Epoch 393/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
110 - val_loss: 0.1977
Epoch 394/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
103 - val_loss: 0.1976
Epoch 395/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
119 - val_loss: 0.1969
Epoch 396/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
111 - val_loss: 0.1988
Epoch 397/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
098 - val_loss: 0.1976
Epoch 398/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
103 - val_loss: 0.1997
Epoch 399/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
105 - val_loss: 0.1961
Epoch 400/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
101 - val_loss: 0.1985
Epoch 401/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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107 - val_loss: 0.1967
Epoch 402/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
105 - val_loss: 0.1975
Epoch 403/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
097 - val_loss: 0.1959
Epoch 404/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
100 - val_loss: 0.1982
Epoch 405/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
093 - val_loss: 0.1965
Epoch 406/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
102 - val_loss: 0.1965
Epoch 407/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
096 - val_loss: 0.1959
Epoch 408/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
089 - val_loss: 0.1971
Epoch 409/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.2
084 - val_loss: 0.1958
Epoch 410/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
086 - val_loss: 0.1958
Epoch 411/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
085 - val_loss: 0.1973
Epoch 412/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
079 - val_loss: 0.1962
Epoch 413/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
093 - val_loss: 0.1979
Epoch 414/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
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084 - val_loss: 0.1947
Epoch 415/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
085 - val_loss: 0.1953
Epoch 416/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
076 - val_loss: 0.1947
Epoch 417/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
076 - val_loss: 0.1965
Epoch 418/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
079 - val_loss: 0.1946
Epoch 419/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
078 - val_loss: 0.1955
Epoch 420/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
071 - val_loss: 0.1952
Epoch 421/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
073 - val_loss: 0.1952
Epoch 422/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
088 - val_loss: 0.1977
Epoch 423/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
087 - val_loss: 0.1951
Epoch 424/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.2
071 - val_loss: 0.1942
Epoch 425/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.2
072 - val_loss: 0.1953
Epoch 426/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
078 - val_loss: 0.1942
Epoch 427/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
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071 - val_loss: 0.1964
Epoch 428/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
070 - val_loss: 0.1944
Epoch 429/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
063 - val_loss: 0.1934
Epoch 430/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
062 - val_loss: 0.1943
Epoch 431/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
068 - val_loss: 0.1960
Epoch 432/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
065 - val_loss: 0.1944
Epoch 433/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
059 - val_loss: 0.1938
Epoch 434/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
063 - val_loss: 0.1952
Epoch 435/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
060 - val_loss: 0.1940
Epoch 436/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
062 - val_loss: 0.1933
Epoch 437/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
065 - val_loss: 0.1932
Epoch 438/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
064 - val_loss: 0.1926
Epoch 439/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
055 - val_loss: 0.1932
Epoch 440/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
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055 - val_loss: 0.1927
Epoch 441/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
052 - val_loss: 0.1931
Epoch 442/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
059 - val_loss: 0.1952
Epoch 443/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
050 - val_loss: 0.1926
Epoch 444/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
049 - val_loss: 0.1934
Epoch 445/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
048 - val_loss: 0.1941
Epoch 446/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
056 - val_loss: 0.1928
Epoch 447/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
054 - val_loss: 0.1956
Epoch 448/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
053 - val_loss: 0.1920
Epoch 449/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
048 - val_loss: 0.1924
Epoch 450/1000
1791/1791 [=====] - 0s 20us/sample - loss: 0.2
042 - val_loss: 0.1919
Epoch 451/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
040 - val_loss: 0.1927
Epoch 452/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
039 - val_loss: 0.1933
Epoch 453/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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037 - val_loss: 0.1924
Epoch 454/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
035 - val_loss: 0.1925
Epoch 455/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
038 - val_loss: 0.1918
Epoch 456/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
041 - val_loss: 0.1933
Epoch 457/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
039 - val_loss: 0.1918
Epoch 458/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
036 - val_loss: 0.1927
Epoch 459/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
040 - val_loss: 0.1903
Epoch 460/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
033 - val_loss: 0.1933
Epoch 461/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
033 - val_loss: 0.1907
Epoch 462/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
039 - val_loss: 0.1944
Epoch 463/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
034 - val_loss: 0.1916
Epoch 464/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
032 - val_loss: 0.1929
Epoch 465/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
037 - val_loss: 0.1933
Epoch 466/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

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032 - val_loss: 0.1906
Epoch 467/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
024 - val_loss: 0.1919
Epoch 468/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
029 - val_loss: 0.1909
Epoch 469/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
032 - val_loss: 0.1904
Epoch 470/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
026 - val_loss: 0.1905
Epoch 471/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
022 - val_loss: 0.1921
Epoch 472/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
024 - val_loss: 0.1907
Epoch 473/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
020 - val_loss: 0.1914
Epoch 474/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
018 - val_loss: 0.1901
Epoch 475/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
017 - val_loss: 0.1936
Epoch 476/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
021 - val_loss: 0.1906
Epoch 477/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
017 - val_loss: 0.1913
Epoch 478/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
020 - val_loss: 0.1907
Epoch 479/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```



```
011 - val_loss: 0.1901
Epoch 480/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
013 - val_loss: 0.1888
Epoch 481/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
014 - val_loss: 0.1910
Epoch 482/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
015 - val_loss: 0.1900
Epoch 483/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
017 - val_loss: 0.1919
Epoch 484/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
005 - val_loss: 0.1893
Epoch 485/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
016 - val_loss: 0.1915
Epoch 486/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
007 - val_loss: 0.1892
Epoch 487/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
006 - val_loss: 0.1891
Epoch 488/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.2
013 - val_loss: 0.1888
Epoch 489/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
001 - val_loss: 0.1905
Epoch 490/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
008 - val_loss: 0.1882
Epoch 491/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
008 - val_loss: 0.1906
Epoch 492/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
```

```
000 - val_loss: 0.1887
Epoch 493/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
002 - val_loss: 0.1892
Epoch 494/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
008 - val_loss: 0.1902
Epoch 495/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.2
018 - val_loss: 0.1878
Epoch 496/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.2
001 - val_loss: 0.1897
Epoch 497/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
001 - val_loss: 0.1882
Epoch 498/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
999 - val_loss: 0.1883
Epoch 499/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
993 - val_loss: 0.1894
Epoch 500/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
997 - val_loss: 0.1886
Epoch 501/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.2
013 - val_loss: 0.1879
Epoch 502/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
999 - val_loss: 0.1880
Epoch 503/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
992 - val_loss: 0.1876
Epoch 504/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
990 - val_loss: 0.1882
Epoch 505/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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988 - val_loss: 0.1882
Epoch 506/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
990 - val_loss: 0.1883
Epoch 507/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
996 - val_loss: 0.1885
Epoch 508/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
998 - val_loss: 0.1880
Epoch 509/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
985 - val_loss: 0.1883
Epoch 510/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
990 - val_loss: 0.1872
Epoch 511/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
985 - val_loss: 0.1899
Epoch 512/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.1
991 - val_loss: 0.1876
Epoch 513/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
994 - val_loss: 0.1875
Epoch 514/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
984 - val_loss: 0.1894
Epoch 515/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
988 - val_loss: 0.1870
Epoch 516/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.1
976 - val_loss: 0.1893
Epoch 517/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
994 - val_loss: 0.1868
Epoch 518/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.1
```

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981 - val_loss: 0.1893
Epoch 519/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.1
977 - val_loss: 0.1874
Epoch 520/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
986 - val_loss: 0.1892
Epoch 521/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
974 - val_loss: 0.1861
Epoch 522/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
976 - val_loss: 0.1865
Epoch 523/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
968 - val_loss: 0.1882
Epoch 524/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
979 - val_loss: 0.1864
Epoch 525/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
974 - val_loss: 0.1888
Epoch 526/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
970 - val_loss: 0.1870
Epoch 527/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
968 - val_loss: 0.1860
Epoch 528/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
970 - val_loss: 0.1876
Epoch 529/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
970 - val_loss: 0.1877
Epoch 530/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
965 - val_loss: 0.1871
Epoch 531/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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968 - val_loss: 0.1858
Epoch 532/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
966 - val_loss: 0.1863
Epoch 533/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
966 - val_loss: 0.1860
Epoch 534/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
973 - val_loss: 0.1863
Epoch 535/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
960 - val_loss: 0.1868
Epoch 536/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
956 - val_loss: 0.1867
Epoch 537/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
964 - val_loss: 0.1863
Epoch 538/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
963 - val_loss: 0.1852
Epoch 539/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
966 - val_loss: 0.1873
Epoch 540/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
966 - val_loss: 0.1868
Epoch 541/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
961 - val_loss: 0.1839
Epoch 542/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
951 - val_loss: 0.1874
Epoch 543/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
950 - val_loss: 0.1861
Epoch 544/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
```

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951 - val_loss: 0.1861
Epoch 545/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
947 - val_loss: 0.1848
Epoch 546/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
951 - val_loss: 0.1866
Epoch 547/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
955 - val_loss: 0.1857
Epoch 548/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
943 - val_loss: 0.1850
Epoch 549/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
948 - val_loss: 0.1874
Epoch 550/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
954 - val_loss: 0.1847
Epoch 551/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
945 - val_loss: 0.1864
Epoch 552/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
959 - val_loss: 0.1848
Epoch 553/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
939 - val_loss: 0.1850
Epoch 554/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
944 - val_loss: 0.1847
Epoch 555/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
940 - val_loss: 0.1850
Epoch 556/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
939 - val_loss: 0.1849
Epoch 557/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
```

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942 - val_loss: 0.1862
Epoch 558/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
940 - val_loss: 0.1856
Epoch 559/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
938 - val_loss: 0.1837
Epoch 560/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
931 - val_loss: 0.1848
Epoch 561/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
936 - val_loss: 0.1863
Epoch 562/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
935 - val_loss: 0.1834
Epoch 563/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
929 - val_loss: 0.1841
Epoch 564/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
944 - val_loss: 0.1835
Epoch 565/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
936 - val_loss: 0.1857
Epoch 566/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
937 - val_loss: 0.1851
Epoch 567/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
933 - val_loss: 0.1837
Epoch 568/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
929 - val_loss: 0.1842
Epoch 569/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
929 - val_loss: 0.1847
Epoch 570/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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938 - val_loss: 0.1829
Epoch 571/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
928 - val_loss: 0.1856
Epoch 572/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
925 - val_loss: 0.1839
Epoch 573/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
925 - val_loss: 0.1839
Epoch 574/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
924 - val_loss: 0.1833
Epoch 575/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
932 - val_loss: 0.1843
Epoch 576/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
919 - val_loss: 0.1831
Epoch 577/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
919 - val_loss: 0.1839
Epoch 578/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
921 - val_loss: 0.1837
Epoch 579/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
924 - val_loss: 0.1834
Epoch 580/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
922 - val_loss: 0.1830
Epoch 581/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
918 - val_loss: 0.1830
Epoch 582/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
917 - val_loss: 0.1846
Epoch 583/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```



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919 - val_loss: 0.1830
Epoch 584/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
920 - val_loss: 0.1827
Epoch 585/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
912 - val_loss: 0.1827
Epoch 586/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
915 - val_loss: 0.1829
Epoch 587/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
914 - val_loss: 0.1817
Epoch 588/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
909 - val_loss: 0.1831
Epoch 589/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
917 - val_loss: 0.1832
Epoch 590/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
931 - val_loss: 0.1812
Epoch 591/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
910 - val_loss: 0.1835
Epoch 592/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
905 - val_loss: 0.1834
Epoch 593/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
907 - val_loss: 0.1829
Epoch 594/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
904 - val_loss: 0.1814
Epoch 595/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
923 - val_loss: 0.1816
Epoch 596/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```

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913 - val_loss: 0.1828
Epoch 597/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.1
906 - val_loss: 0.1826
Epoch 598/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
900 - val_loss: 0.1824
Epoch 599/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
906 - val_loss: 0.1840
Epoch 600/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
904 - val_loss: 0.1819
Epoch 601/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
899 - val_loss: 0.1813
Epoch 602/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
900 - val_loss: 0.1817
Epoch 603/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
901 - val_loss: 0.1812
Epoch 604/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
896 - val_loss: 0.1817
Epoch 605/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
896 - val_loss: 0.1826
Epoch 606/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
902 - val_loss: 0.1829
Epoch 607/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
900 - val_loss: 0.1819
Epoch 608/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
896 - val_loss: 0.1808
Epoch 609/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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904 - val_loss: 0.1806
Epoch 610/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
904 - val_loss: 0.1836
Epoch 611/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
897 - val_loss: 0.1811
Epoch 612/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
892 - val_loss: 0.1812
Epoch 613/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
893 - val_loss: 0.1799
Epoch 614/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
896 - val_loss: 0.1809
Epoch 615/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
912 - val_loss: 0.1842
Epoch 616/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
894 - val_loss: 0.1797
Epoch 617/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
887 - val_loss: 0.1829
Epoch 618/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
888 - val_loss: 0.1798
Epoch 619/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
888 - val_loss: 0.1818
Epoch 620/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
898 - val_loss: 0.1795
Epoch 621/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
896 - val_loss: 0.1821
Epoch 622/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
```

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908 - val_loss: 0.1785
Epoch 623/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
880 - val_loss: 0.1819
Epoch 624/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
889 - val_loss: 0.1795
Epoch 625/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
883 - val_loss: 0.1805
Epoch 626/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
881 - val_loss: 0.1804
Epoch 627/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
897 - val_loss: 0.1787
Epoch 628/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
896 - val_loss: 0.1832
Epoch 629/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
894 - val_loss: 0.1792
Epoch 630/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
879 - val_loss: 0.1790
Epoch 631/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
875 - val_loss: 0.1801
Epoch 632/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
883 - val_loss: 0.1787
Epoch 633/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
890 - val_loss: 0.1815
Epoch 634/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
899 - val_loss: 0.1788
Epoch 635/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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873 - val_loss: 0.1800
Epoch 636/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
876 - val_loss: 0.1807
Epoch 637/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
882 - val_loss: 0.1788
Epoch 638/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
877 - val_loss: 0.1832
Epoch 639/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
879 - val_loss: 0.1784
Epoch 640/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
904 - val_loss: 0.1799
Epoch 641/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
871 - val_loss: 0.1784
Epoch 642/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
868 - val_loss: 0.1783
Epoch 643/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
866 - val_loss: 0.1794
Epoch 644/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.1
869 - val_loss: 0.1786
Epoch 645/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
865 - val_loss: 0.1783
Epoch 646/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
865 - val_loss: 0.1807
Epoch 647/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
872 - val_loss: 0.1776
Epoch 648/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
```

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863 - val_loss: 0.1774
Epoch 649/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
862 - val_loss: 0.1784
Epoch 650/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
862 - val_loss: 0.1784
Epoch 651/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
857 - val_loss: 0.1781
Epoch 652/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
858 - val_loss: 0.1783
Epoch 653/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
864 - val_loss: 0.1775
Epoch 654/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
862 - val_loss: 0.1772
Epoch 655/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
866 - val_loss: 0.1787
Epoch 656/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
861 - val_loss: 0.1770
Epoch 657/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
870 - val_loss: 0.1776
Epoch 658/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
853 - val_loss: 0.1773
Epoch 659/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
852 - val_loss: 0.1767
Epoch 660/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
852 - val_loss: 0.1771
Epoch 661/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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860 - val_loss: 0.1769
Epoch 662/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
863 - val_loss: 0.1769
Epoch 663/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
846 - val_loss: 0.1771
Epoch 664/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
852 - val_loss: 0.1780
Epoch 665/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
853 - val_loss: 0.1773
Epoch 666/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
853 - val_loss: 0.1765
Epoch 667/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
844 - val_loss: 0.1773
Epoch 668/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
855 - val_loss: 0.1763
Epoch 669/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
840 - val_loss: 0.1791
Epoch 670/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
849 - val_loss: 0.1762
Epoch 671/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
849 - val_loss: 0.1810
Epoch 672/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
860 - val_loss: 0.1760
Epoch 673/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
846 - val_loss: 0.1790
Epoch 674/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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846 - val_loss: 0.1767
Epoch 675/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
842 - val_loss: 0.1783
Epoch 676/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
851 - val_loss: 0.1758
Epoch 677/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
843 - val_loss: 0.1782
Epoch 678/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
836 - val_loss: 0.1758
Epoch 679/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
841 - val_loss: 0.1761
Epoch 680/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
839 - val_loss: 0.1755
Epoch 681/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
841 - val_loss: 0.1786
Epoch 682/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
840 - val_loss: 0.1769
Epoch 683/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
837 - val_loss: 0.1750
Epoch 684/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
842 - val_loss: 0.1760
Epoch 685/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
836 - val_loss: 0.1770
Epoch 686/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
838 - val_loss: 0.1757
Epoch 687/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```



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827 - val_loss: 0.1765
Epoch 688/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
829 - val_loss: 0.1764
Epoch 689/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
836 - val_loss: 0.1756
Epoch 690/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
829 - val_loss: 0.1761
Epoch 691/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
845 - val_loss: 0.1757
Epoch 692/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
828 - val_loss: 0.1762
Epoch 693/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
827 - val_loss: 0.1755
Epoch 694/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
832 - val_loss: 0.1767
Epoch 695/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
826 - val_loss: 0.1786
Epoch 696/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
868 - val_loss: 0.1760
Epoch 697/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
834 - val_loss: 0.1766
Epoch 698/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
821 - val_loss: 0.1749
Epoch 699/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
828 - val_loss: 0.1752
Epoch 700/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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832 - val_loss: 0.1756
Epoch 701/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
823 - val_loss: 0.1762
Epoch 702/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
831 - val_loss: 0.1754
Epoch 703/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
819 - val_loss: 0.1755
Epoch 704/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
814 - val_loss: 0.1771
Epoch 705/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
832 - val_loss: 0.1748
Epoch 706/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
831 - val_loss: 0.1748
Epoch 707/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
824 - val_loss: 0.1754
Epoch 708/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
816 - val_loss: 0.1747
Epoch 709/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
821 - val_loss: 0.1758
Epoch 710/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
818 - val_loss: 0.1743
Epoch 711/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
810 - val_loss: 0.1771
Epoch 712/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
818 - val_loss: 0.1745
Epoch 713/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```

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827 - val_loss: 0.1742
Epoch 714/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
828 - val_loss: 0.1762
Epoch 715/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
821 - val_loss: 0.1746
Epoch 716/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
817 - val_loss: 0.1746
Epoch 717/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
828 - val_loss: 0.1763
Epoch 718/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
810 - val_loss: 0.1747
Epoch 719/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
817 - val_loss: 0.1747
Epoch 720/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
825 - val_loss: 0.1777
Epoch 721/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
809 - val_loss: 0.1737
Epoch 722/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
817 - val_loss: 0.1787
Epoch 723/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
841 - val_loss: 0.1732
Epoch 724/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
829 - val_loss: 0.1740
Epoch 725/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
818 - val_loss: 0.1750
Epoch 726/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```

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811 - val_loss: 0.1736
Epoch 727/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
802 - val_loss: 0.1739
Epoch 728/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
812 - val_loss: 0.1743
Epoch 729/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
806 - val_loss: 0.1740
Epoch 730/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
802 - val_loss: 0.1735
Epoch 731/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
810 - val_loss: 0.1744
Epoch 732/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
799 - val_loss: 0.1740
Epoch 733/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
805 - val_loss: 0.1743
Epoch 734/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
804 - val_loss: 0.1745
Epoch 735/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
794 - val_loss: 0.1737
Epoch 736/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
799 - val_loss: 0.1763
Epoch 737/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
796 - val_loss: 0.1740
Epoch 738/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
801 - val_loss: 0.1729
Epoch 739/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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795 - val_loss: 0.1737
Epoch 740/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
799 - val_loss: 0.1740
Epoch 741/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
794 - val_loss: 0.1727
Epoch 742/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
793 - val_loss: 0.1741
Epoch 743/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
797 - val_loss: 0.1743
Epoch 744/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
793 - val_loss: 0.1738
Epoch 745/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
796 - val_loss: 0.1728
Epoch 746/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
796 - val_loss: 0.1727
Epoch 747/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
789 - val_loss: 0.1732
Epoch 748/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
795 - val_loss: 0.1751
Epoch 749/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
817 - val_loss: 0.1765
Epoch 750/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
814 - val_loss: 0.1726
Epoch 751/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
789 - val_loss: 0.1732
Epoch 752/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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796 - val_loss: 0.1747
Epoch 753/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
784 - val_loss: 0.1723
Epoch 754/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
794 - val_loss: 0.1735
Epoch 755/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
794 - val_loss: 0.1742
Epoch 756/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
784 - val_loss: 0.1722
Epoch 757/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
798 - val_loss: 0.1733
Epoch 758/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
784 - val_loss: 0.1738
Epoch 759/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
783 - val_loss: 0.1728
Epoch 760/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
780 - val_loss: 0.1729
Epoch 761/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
780 - val_loss: 0.1737
Epoch 762/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
786 - val_loss: 0.1726
Epoch 763/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
787 - val_loss: 0.1719
Epoch 764/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
781 - val_loss: 0.1726
Epoch 765/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```

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787 - val_loss: 0.1726
Epoch 766/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
788 - val_loss: 0.1743
Epoch 767/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
782 - val_loss: 0.1721
Epoch 768/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
783 - val_loss: 0.1734
Epoch 769/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
777 - val_loss: 0.1728
Epoch 770/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
778 - val_loss: 0.1723
Epoch 771/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
780 - val_loss: 0.1774
Epoch 772/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
810 - val_loss: 0.1729
Epoch 773/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
820 - val_loss: 0.1770
Epoch 774/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
768 - val_loss: 0.1718
Epoch 775/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
772 - val_loss: 0.1777
Epoch 776/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
774 - val_loss: 0.1720
Epoch 777/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
786 - val_loss: 0.1739
Epoch 778/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

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773 - val_loss: 0.1715
Epoch 779/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
773 - val_loss: 0.1743
Epoch 780/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
775 - val_loss: 0.1707
Epoch 781/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
767 - val_loss: 0.1724
Epoch 782/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
765 - val_loss: 0.1719
Epoch 783/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
765 - val_loss: 0.1717
Epoch 784/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
765 - val_loss: 0.1710
Epoch 785/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
763 - val_loss: 0.1713
Epoch 786/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
763 - val_loss: 0.1733
Epoch 787/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
777 - val_loss: 0.1709
Epoch 788/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
769 - val_loss: 0.1705
Epoch 789/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
764 - val_loss: 0.1739
Epoch 790/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
779 - val_loss: 0.1705
Epoch 791/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```



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763 - val_loss: 0.1729
Epoch 792/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
756 - val_loss: 0.1709
Epoch 793/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
765 - val_loss: 0.1723
Epoch 794/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
776 - val_loss: 0.1714
Epoch 795/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
758 - val_loss: 0.1721
Epoch 796/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
763 - val_loss: 0.1701
Epoch 797/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
752 - val_loss: 0.1719
Epoch 798/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
762 - val_loss: 0.1708
Epoch 799/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
748 - val_loss: 0.1717
Epoch 800/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
765 - val_loss: 0.1702
Epoch 801/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
759 - val_loss: 0.1707
Epoch 802/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
755 - val_loss: 0.1702
Epoch 803/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
757 - val_loss: 0.1718
Epoch 804/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.1
```

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752 - val_loss: 0.1711
Epoch 805/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
762 - val_loss: 0.1706
Epoch 806/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
747 - val_loss: 0.1707
Epoch 807/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
748 - val_loss: 0.1700
Epoch 808/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
759 - val_loss: 0.1715
Epoch 809/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
750 - val_loss: 0.1704
Epoch 810/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
746 - val_loss: 0.1704
Epoch 811/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
753 - val_loss: 0.1701
Epoch 812/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
756 - val_loss: 0.1742
Epoch 813/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
779 - val_loss: 0.1710
Epoch 814/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
764 - val_loss: 0.1706
Epoch 815/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
748 - val_loss: 0.1712
Epoch 816/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
739 - val_loss: 0.1701
Epoch 817/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
```

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746 - val_loss: 0.1696
Epoch 818/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
757 - val_loss: 0.1697
Epoch 819/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
750 - val_loss: 0.1731
Epoch 820/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
763 - val_loss: 0.1697
Epoch 821/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
756 - val_loss: 0.1694
Epoch 822/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
749 - val_loss: 0.1712
Epoch 823/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
753 - val_loss: 0.1701
Epoch 824/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
746 - val_loss: 0.1702
Epoch 825/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
744 - val_loss: 0.1704
Epoch 826/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
749 - val_loss: 0.1697
Epoch 827/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
754 - val_loss: 0.1689
Epoch 828/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
743 - val_loss: 0.1704
Epoch 829/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
737 - val_loss: 0.1692
Epoch 830/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```

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736 - val_loss: 0.1704
Epoch 831/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
739 - val_loss: 0.1711
Epoch 832/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
749 - val_loss: 0.1695
Epoch 833/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
752 - val_loss: 0.1687
Epoch 834/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
736 - val_loss: 0.1701
Epoch 835/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
748 - val_loss: 0.1701
Epoch 836/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
738 - val_loss: 0.1693
Epoch 837/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
732 - val_loss: 0.1703
Epoch 838/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
749 - val_loss: 0.1682
Epoch 839/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
742 - val_loss: 0.1700
Epoch 840/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
729 - val_loss: 0.1690
Epoch 841/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
726 - val_loss: 0.1702
Epoch 842/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
732 - val_loss: 0.1689
Epoch 843/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

```
732 - val_loss: 0.1721
Epoch 844/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
735 - val_loss: 0.1689
Epoch 845/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
728 - val_loss: 0.1692
Epoch 846/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
724 - val_loss: 0.1692
Epoch 847/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
722 - val_loss: 0.1693
Epoch 848/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
727 - val_loss: 0.1697
Epoch 849/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
726 - val_loss: 0.1698
Epoch 850/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
724 - val_loss: 0.1691
Epoch 851/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
731 - val_loss: 0.1704
Epoch 852/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
723 - val_loss: 0.1689
Epoch 853/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
723 - val_loss: 0.1704
Epoch 854/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
722 - val_loss: 0.1685
Epoch 855/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
726 - val_loss: 0.1695
Epoch 856/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
```

```
738 - val_loss: 0.1692
Epoch 857/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
725 - val_loss: 0.1688
Epoch 858/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
725 - val_loss: 0.1689
Epoch 859/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
717 - val_loss: 0.1694
Epoch 860/1000
1791/1791 [=====] - 0s 22us/sample - loss: 0.1
721 - val_loss: 0.1691
Epoch 861/1000
1791/1791 [=====] - 0s 18us/sample - loss: 0.1
735 - val_loss: 0.1687
Epoch 862/1000
1791/1791 [=====] - 0s 17us/sample - loss: 0.1
728 - val_loss: 0.1679
Epoch 863/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.1
718 - val_loss: 0.1704
Epoch 864/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.1
727 - val_loss: 0.1679
Epoch 865/1000
1791/1791 [=====] - 0s 17us/sample - loss: 0.1
715 - val_loss: 0.1721
Epoch 866/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
717 - val_loss: 0.1691
Epoch 867/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
736 - val_loss: 0.1710
Epoch 868/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
717 - val_loss: 0.1681
Epoch 869/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

```
722 - val_loss: 0.1683
Epoch 870/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
710 - val_loss: 0.1687
Epoch 871/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
717 - val_loss: 0.1692
Epoch 872/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
708 - val_loss: 0.1687
Epoch 873/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.1
706 - val_loss: 0.1687
Epoch 874/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
717 - val_loss: 0.1698
Epoch 875/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
715 - val_loss: 0.1683
Epoch 876/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
717 - val_loss: 0.1695
Epoch 877/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.1
707 - val_loss: 0.1687
Epoch 878/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
724 - val_loss: 0.1704
Epoch 879/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
736 - val_loss: 0.1687
Epoch 880/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
710 - val_loss: 0.1682
Epoch 881/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
737 - val_loss: 0.1714
Epoch 882/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.1
```

```
708 - val_loss: 0.1676
Epoch 883/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
711 - val_loss: 0.1683
Epoch 884/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
712 - val_loss: 0.1685
Epoch 885/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
704 - val_loss: 0.1682
Epoch 886/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
704 - val_loss: 0.1680
Epoch 887/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
702 - val_loss: 0.1691
Epoch 888/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
700 - val_loss: 0.1690
Epoch 889/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
703 - val_loss: 0.1675
Epoch 890/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
708 - val_loss: 0.1687
Epoch 891/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
702 - val_loss: 0.1680
Epoch 892/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
712 - val_loss: 0.1678
Epoch 893/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
706 - val_loss: 0.1718
Epoch 894/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
700 - val_loss: 0.1682
Epoch 895/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
```



```
729 - val_loss: 0.1682
Epoch 896/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
722 - val_loss: 0.1697
Epoch 897/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
735 - val_loss: 0.1683
Epoch 898/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
690 - val_loss: 0.1688
Epoch 899/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
697 - val_loss: 0.1687
Epoch 900/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
692 - val_loss: 0.1673
Epoch 901/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
704 - val_loss: 0.1686
Epoch 902/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
715 - val_loss: 0.1679
Epoch 903/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
704 - val_loss: 0.1680
Epoch 904/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
693 - val_loss: 0.1677
Epoch 905/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
700 - val_loss: 0.1685
Epoch 906/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
700 - val_loss: 0.1674
Epoch 907/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
696 - val_loss: 0.1694
Epoch 908/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

```
700 - val_loss: 0.1676
Epoch 909/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
697 - val_loss: 0.1694
Epoch 910/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
696 - val_loss: 0.1679
Epoch 911/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
706 - val_loss: 0.1674
Epoch 912/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
698 - val_loss: 0.1698
Epoch 913/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
694 - val_loss: 0.1680
Epoch 914/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
697 - val_loss: 0.1680
Epoch 915/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
693 - val_loss: 0.1691
Epoch 916/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
688 - val_loss: 0.1676
Epoch 917/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
690 - val_loss: 0.1689
Epoch 918/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
690 - val_loss: 0.1672
Epoch 919/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
695 - val_loss: 0.1702
Epoch 920/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
684 - val_loss: 0.1680
Epoch 921/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

```
681 - val_loss: 0.1688
Epoch 922/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
698 - val_loss: 0.1671
Epoch 923/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
690 - val_loss: 0.1702
Epoch 924/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.1
687 - val_loss: 0.1685
Epoch 925/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
679 - val_loss: 0.1677
Epoch 926/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
682 - val_loss: 0.1679
Epoch 927/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
685 - val_loss: 0.1699
Epoch 928/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
689 - val_loss: 0.1682
Epoch 929/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
683 - val_loss: 0.1677
Epoch 930/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
685 - val_loss: 0.1693
Epoch 931/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
680 - val_loss: 0.1684
Epoch 932/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
678 - val_loss: 0.1678
Epoch 933/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
678 - val_loss: 0.1696
Epoch 934/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

```
679 - val_loss: 0.1672
Epoch 935/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
676 - val_loss: 0.1680
Epoch 936/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
679 - val_loss: 0.1695
Epoch 937/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
684 - val_loss: 0.1681
Epoch 938/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
688 - val_loss: 0.1693
Epoch 939/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
681 - val_loss: 0.1674
Epoch 940/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
678 - val_loss: 0.1685
Epoch 941/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
681 - val_loss: 0.1679
Epoch 942/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
678 - val_loss: 0.1679
Epoch 943/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
676 - val_loss: 0.1678
Epoch 944/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
674 - val_loss: 0.1686
Epoch 945/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
671 - val_loss: 0.1676
Epoch 946/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
675 - val_loss: 0.1700
Epoch 947/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

```
673 - val_loss: 0.1670
Epoch 948/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
671 - val_loss: 0.1681
Epoch 949/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
667 - val_loss: 0.1681
Epoch 950/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
669 - val_loss: 0.1686
Epoch 951/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
668 - val_loss: 0.1677
Epoch 952/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
669 - val_loss: 0.1682
Epoch 953/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
669 - val_loss: 0.1685
Epoch 954/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
668 - val_loss: 0.1675
Epoch 955/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
668 - val_loss: 0.1678
Epoch 956/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
686 - val_loss: 0.1716
Epoch 957/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
672 - val_loss: 0.1665
Epoch 958/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
659 - val_loss: 0.1685
Epoch 959/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
682 - val_loss: 0.1691
Epoch 960/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
```

```
662 - val_loss: 0.1678
Epoch 961/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
663 - val_loss: 0.1672
Epoch 962/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.1
662 - val_loss: 0.1678
Epoch 963/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
663 - val_loss: 0.1673
Epoch 964/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
669 - val_loss: 0.1670
Epoch 965/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
668 - val_loss: 0.1689
Epoch 966/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
680 - val_loss: 0.1674
Epoch 967/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
677 - val_loss: 0.1673
Epoch 968/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
656 - val_loss: 0.1675
Epoch 969/1000
1791/1791 [=====] - 0s 13us/sample - loss: 0.1
666 - val_loss: 0.1671
Epoch 970/1000
1791/1791 [=====] - 0s 12us/sample - loss: 0.1
662 - val_loss: 0.1699
Epoch 971/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.1
673 - val_loss: 0.1672
Epoch 972/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.1
676 - val_loss: 0.1677
Epoch 973/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.1
```

```
655 - val_loss: 0.1669
Epoch 974/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.1
665 - val_loss: 0.1690
Epoch 975/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.1
666 - val_loss: 0.1673
Epoch 976/1000
1791/1791 [=====] - 0s 17us/sample - loss: 0.1
664 - val_loss: 0.1664
Epoch 977/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
665 - val_loss: 0.1682
Epoch 978/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
674 - val_loss: 0.1666
Epoch 979/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.1
664 - val_loss: 0.1678
Epoch 980/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
649 - val_loss: 0.1670
Epoch 981/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.1
653 - val_loss: 0.1663
Epoch 982/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.1
658 - val_loss: 0.1701
Epoch 983/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.1
656 - val_loss: 0.1676
Epoch 984/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.1
675 - val_loss: 0.1667
Epoch 985/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
671 - val_loss: 0.1687
Epoch 986/1000
1791/1791 [=====] - 0s 15us/sample - loss: 0.1
```

```
652 - val_loss: 0.1669
Epoch 987/1000
1791/1791 [=====] - 0s 16us/sample - loss: 0.1
653 - val_loss: 0.1668
Epoch 988/1000
1791/1791 [=====] - 0s 14us/sample - loss: 0.1
642 - val_loss: 0.1670
Epoch 989/1000
1791/1791 [=====] - 0s 19us/sample - loss: 0.1
650 - val_loss: 0.1670
Epoch 990/1000
1791/1791 [=====] - 0s 17us/sample - loss: 0.1
658 - val_loss: 0.1683
Epoch 991/1000
1791/1791 [=====] - 0s 17us/sample - loss: 0.1
647 - val_loss: 0.1666
Epoch 992/1000
1791/1791 [=====] - 0s 19us/sample - loss: 0.1
643 - val_loss: 0.1671
Epoch 993/1000
1791/1791 [=====] - 0s 29us/sample - loss: 0.1
652 - val_loss: 0.1682
Epoch 994/1000
1791/1791 [=====] - 0s 23us/sample - loss: 0.1
646 - val_loss: 0.1663
Epoch 995/1000
1791/1791 [=====] - 0s 23us/sample - loss: 0.1
650 - val_loss: 0.1664
Epoch 996/1000
1791/1791 [=====] - 0s 22us/sample - loss: 0.1
638 - val_loss: 0.1676
Epoch 997/1000
1791/1791 [=====] - 0s 22us/sample - loss: 0.1
646 - val_loss: 0.1660
Epoch 998/1000
1791/1791 [=====] - 0s 22us/sample - loss: 0.1
647 - val_loss: 0.1672
Epoch 999/1000
1791/1791 [=====] - 0s 21us/sample - loss: 0.1
```

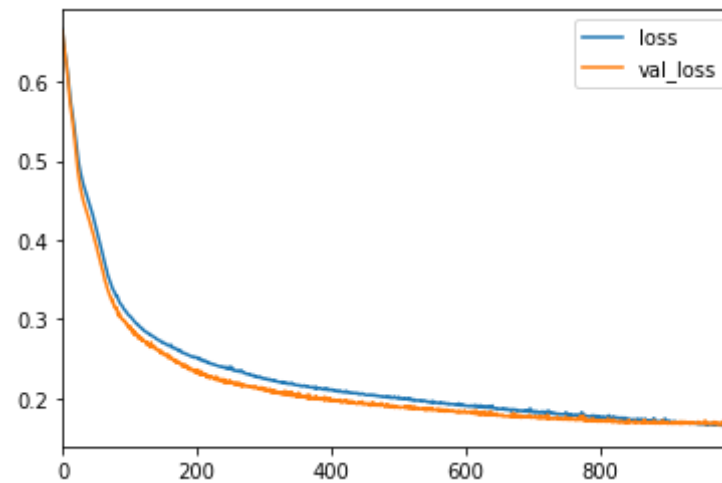


```
653 - val_loss: 0.1659
Epoch 1000/1000
1791/1791 [=====] - 0s 19us/sample - loss: 0.1
640 - val_loss: 0.1666
```

```
Out[141]: <tensorflow.python.keras.callbacks.History at 0x1de56e6f848>
```

```
In [142]: model_loss = pd.DataFrame(model.history.history)
          model_loss.plot()
```

```
Out[142]: <matplotlib.axes._subplots.AxesSubplot at 0x1de56f99c48>
```



```
In [143]: predictions = model.predict_classes(X_test)
```

```
In [144]: predictions
```

```
Out[144]: array([[1],
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```
In [145]: from sklearn.metrics import classification_report, confusion_matrix
```

```
In [146]: print(confusion_matrix(y_test, predictions))
```

```
[[339  10]  
 [ 16 232]]
```

```
In [147]: print(classification_report(y_test, predictions))
```

	precision	recall	f1-score	support
0	0.95	0.97	0.96	349
1	0.96	0.94	0.95	248
accuracy			0.96	597
macro avg	0.96	0.95	0.96	597
weighted avg	0.96	0.96	0.96	597

```
In [148]: from tensorflow.keras.models import load_model
```

```
In [149]: model.save('final_ANN_model1.h5')
```

```
In [ ]:
```