

## 파일을 통해 모델을 학습시켜보자

In [24]:

```
import numpy as np
from keras.models import Sequential
from keras.layers import Dense
from urllib import request
import matplotlib.pyplot as plt

%matplotlib inline
```

In [35]:

```
#당뇨병 환자관련 파일 불러오기
dataset=np.loadtxt("./data/pima-indians-diabetes.csv",delimiter=",")
```

In [37]:

```
dataset
#행렬의 마지막 열은 당뇨병 유무 관련 데이터
#1이면 당뇨병환자
#0이면 환자가 아니다
```

Out [37]:

```
array([[ 6.   , 148.   , 72.   , ..., 0.627, 50.   , 1.   ],
       [ 1.   , 85.   , 66.   , ..., 0.351, 31.   , 0.   ],
       [ 8.   , 183.   , 64.   , ..., 0.672, 32.   , 1.   ],
       ...,
       [ 5.   , 121.   , 72.   , ..., 0.245, 30.   , 0.   ],
       [ 1.   , 126.   , 60.   , ..., 0.349, 47.   , 1.   ],
       [ 1.   , 93.   , 70.   , ..., 0.315, 23.   , 0.   ]])
```

In [47]:

```
#dataset 설정
x_train=dataset[:700,0:8]
y_train=dataset[:700,8]

x_test=dataset[700:,0:8]
y_test=dataset[700:,8]
```

In [51]:

```
model=Sequential()
model.add(Dense(12,input_dim=8,activation="relu"))
model.add(Dense(8,activation="relu"))
model.add(Dense(1,activation="sigmoid")) #1인 이유는 결과 값이 0,1 중 하나 #mnist에서는 값의 범위.
```

In [52]:

```
# 모델 학습과정 설정하기
model.compile(loss='binary_crossentropy', optimizer='adam' , metrics=['accuracy'] )
```

In [56]:

```
# 모델 학습시키기
```

```
hist=model.fit(x_train, y_train , epochs=1000, batch_size=64)
```

Epoch 1/1000

700/700 [=====] - 0s 24us/step - loss: 0.4064 - accuracy: 0.8157

Epoch 2/1000

700/700 [=====] - 0s 50us/step - loss: 0.4197 - accuracy: 0.7986

Epoch 3/1000

700/700 [=====] - 0s 39us/step - loss: 0.4204 - accuracy: 0.8043

Epoch 4/1000

700/700 [=====] - 0s 32us/step - loss: 0.4112 - accuracy: 0.7943

Epoch 5/1000

700/700 [=====] - 0s 36us/step - loss: 0.4109 - accuracy: 0.8029

Epoch 6/1000

700/700 [=====] - 0s 28us/step - loss: 0.4035 - accuracy: 0.8043

Epoch 7/1000

700/700 [=====] - 0s 36us/step - loss: 0.4013 - accuracy: 0.8100

Epoch 8/1000

700/700 [=====] - 0s 28us/step - loss: 0.4024 - accuracy: 0.8086

Epoch 9/1000

700/700 [=====] - 0s 33us/step - loss: 0.4028 - accuracy: 0.8000

Epoch 10/1000

700/700 [=====] - 0s 28us/step - loss: 0.4099 - accuracy: 0.8057

Epoch 11/1000

700/700 [=====] - 0s 33us/step - loss: 0.4081 - accuracy: 0.8100

Epoch 12/1000

700/700 [=====] - 0s 35us/step - loss: 0.4012 - accuracy: 0.8114

Epoch 13/1000

700/700 [=====] - 0s 28us/step - loss: 0.4020 - accuracy: 0.8143

Epoch 14/1000

700/700 [=====] - 0s 28us/step - loss: 0.4031 - accuracy: 0.8114

Epoch 15/1000

700/700 [=====] - 0s 29us/step - loss: 0.4121 - accuracy: 0.8086

Epoch 16/1000

700/700 [=====] - 0s 27us/step - loss: 0.4136 - accuracy: 0.8043

Epoch 17/1000

700/700 [=====] - 0s 32us/step - loss: 0.4111 - accuracy: 0.8071

Epoch 18/1000

700/700 [=====] - 0s 21us/step - loss: 0.4154 - accuracy: 0.8071

Epoch 19/1000

700/700 [=====] - 0s 27us/step - loss: 0.4103 - accuracy:

0.7971  
Epoch 20/1000  
700/700 [=====] - 0s 29us/step - loss: 0.4051 - accuracy:  
0.8143  
Epoch 21/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4091 - accuracy:  
0.8186  
Epoch 22/1000  
700/700 [=====] - 0s 31us/step - loss: 0.4075 - accuracy:  
0.8071  
Epoch 23/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4030 - accuracy:  
0.8186  
Epoch 24/1000  
700/700 [=====] - 0s 27us/step - loss: 0.4021 - accuracy:  
0.8086  
Epoch 25/1000  
700/700 [=====] - 0s 32us/step - loss: 0.4041 - accuracy:  
0.8114  
Epoch 26/1000  
700/700 [=====] - 0s 29us/step - loss: 0.4043 - accuracy:  
0.8100  
Epoch 27/1000  
700/700 [=====] - 0s 33us/step - loss: 0.4040 - accuracy:  
0.8114  
Epoch 28/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4026 - accuracy:  
0.8157  
Epoch 29/1000  
700/700 [=====] - 0s 28us/step - loss: 0.4037 - accuracy:  
0.8114  
Epoch 30/1000  
700/700 [=====] - ETA: 0s - loss: 0.4036 - accuracy: 0.84 -  
0s 25us/step - loss: 0.4034 - accuracy: 0.8171  
Epoch 31/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3995 - accuracy:  
0.8071  
Epoch 32/1000  
700/700 [=====] - 0s 31us/step - loss: 0.4061 - accuracy:  
0.8100  
Epoch 33/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4053 - accuracy:  
0.8143  
Epoch 34/1000  
700/700 [=====] - 0s 31us/step - loss: 0.4103 - accuracy:  
0.8029  
Epoch 35/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4105 - accuracy:  
0.8071  
Epoch 36/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4124 - accuracy:  
0.8071  
Epoch 37/1000  
700/700 [=====] - 0s 28us/step - loss: 0.4030 - accuracy:  
0.8200  
Epoch 38/1000  
700/700 [=====] - 0s 32us/step - loss: 0.4014 - accuracy:  
0.8071  
Epoch 39/1000  
700/700 [=====] - 0s 28us/step - loss: 0.4027 - accuracy:  
0.8057

Epoch 40/1000  
700/700 [=====] - 0s 36us/step - loss: 0.4048 - accuracy:  
0.8029  
Epoch 41/1000  
700/700 [=====] - 0s 39us/step - loss: 0.4000 - accuracy:  
0.8086  
Epoch 42/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3975 - accuracy:  
0.8114  
Epoch 43/1000  
700/700 [=====] - 0s 32us/step - loss: 0.4062 - accuracy:  
0.8086  
Epoch 44/1000  
700/700 [=====] - 0s 27us/step - loss: 0.4045 - accuracy:  
0.8100  
Epoch 45/1000  
700/700 [=====] - 0s 35us/step - loss: 0.3997 - accuracy:  
0.8086  
Epoch 46/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4082 - accuracy:  
0.8086  
Epoch 47/1000  
700/700 [=====] - 0s 33us/step - loss: 0.4000 - accuracy:  
0.8214  
Epoch 48/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4041 - accuracy:  
0.8100  
Epoch 49/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4043 - accuracy:  
0.8186  
Epoch 50/1000  
700/700 [=====] - 0s 32us/step - loss: 0.4021 - accuracy:  
0.8129  
Epoch 51/1000  
700/700 [=====] - 0s 27us/step - loss: 0.4058 - accuracy:  
0.8071  
Epoch 52/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3985 - accuracy:  
0.8129  
Epoch 53/1000  
700/700 [=====] - 0s 42us/step - loss: 0.4030 - accuracy:  
0.8171  
Epoch 54/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3999 - accuracy:  
0.8114  
Epoch 55/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3974 - accuracy:  
0.8114  
Epoch 56/1000  
700/700 [=====] - 0s 29us/step - loss: 0.4010 - accuracy:  
0.8157  
Epoch 57/1000  
700/700 [=====] - 0s 32us/step - loss: 0.4030 - accuracy:  
0.8029  
Epoch 58/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4069 - accuracy:  
0.8014  
Epoch 59/1000  
700/700 [=====] - 0s 28us/step - loss: 0.4086 - accuracy:  
0.7914  
Epoch 60/1000

700/700 [=====] - 0s 31us/step - loss: 0.4061 - accuracy:  
0.8043  
Epoch 61/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4045 - accuracy:  
0.8100  
Epoch 62/1000  
700/700 [=====] - 0s 35us/step - loss: 0.4120 - accuracy:  
0.8100  
Epoch 63/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3999 - accuracy:  
0.8186  
Epoch 64/1000  
700/700 [=====] - 0s 27us/step - loss: 0.4034 - accuracy:  
0.8057  
Epoch 65/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3993 - accuracy:  
0.8057  
Epoch 66/1000  
700/700 [=====] - 0s 36us/step - loss: 0.4075 - accuracy:  
0.8071  
Epoch 67/1000  
700/700 [=====] - 0s 27us/step - loss: 0.4170 - accuracy:  
0.8014  
Epoch 68/1000  
700/700 [=====] - 0s 28us/step - loss: 0.4076 - accuracy:  
0.7900  
Epoch 69/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3987 - accuracy:  
0.8100  
Epoch 70/1000  
700/700 [=====] - 0s 27us/step - loss: 0.4046 - accuracy:  
0.8129  
Epoch 71/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4014 - accuracy:  
0.8129  
Epoch 72/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4021 - accuracy:  
0.8143  
Epoch 73/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3994 - accuracy:  
0.8071  
Epoch 74/1000  
700/700 [=====] - ETA: 0s - loss: 0.3316 - accuracy: 0.85 -  
0s 27us/step - loss: 0.3994 - accuracy: 0.8171  
Epoch 75/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3997 - accuracy:  
0.8057  
Epoch 76/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3989 - accuracy:  
0.8043  
Epoch 77/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4041 - accuracy:  
0.8057  
Epoch 78/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3999 - accuracy:  
0.8043  
Epoch 79/1000

700/700 [=====] - 0s 25us/step - loss: 0.3988 - accurac  
y: 0.8100



Epoch 80/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4097 - accuracy: 0.8129  
Epoch 81/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4042 - accuracy: 0.7986  
Epoch 82/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4012 - accuracy: 0.8071  
Epoch 83/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4064 - accuracy: 0.8000  
Epoch 84/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4058 - accuracy: 0.8100  
Epoch 85/1000  
700/700 [=====] - 0s 27us/step - loss: 0.4055 - accuracy: 0.8000  
Epoch 86/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3990 - accuracy: 0.8114  
Epoch 87/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4046 - accuracy: 0.8071  
Epoch 88/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4020 - accuracy: 0.8029  
Epoch 89/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3985 - accuracy: 0.8000  
Epoch 90/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3987 - accuracy: 0.8186  
Epoch 91/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3994 - accuracy: 0.8100  
Epoch 92/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3986 - accuracy: 0.8014  
Epoch 93/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3986 - accuracy: 0.8057  
Epoch 94/1000  
700/700 [=====] - 0s 29us/step - loss: 0.4026 - accuracy: 0.8043  
Epoch 95/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3985 - accuracy: 0.8243  
Epoch 96/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3987 - accuracy: 0.8029  
Epoch 97/1000  
700/700 [=====] - 0s 31us/step - loss: 0.4012 - accuracy: 0.8029  
Epoch 98/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4058 - accuracy: 0.8143  
Epoch 99/1000  
700/700 [=====] - 0s 28us/step - loss: 0.4037 - accuracy: 0.8071  
Epoch 100/1000

700/700 [=====] - 0s 24us/step - loss: 0.4120 - accurac  
y: 0.8029  
Epoch 101/1000  
700/700 [=====] - 0s 20us/step - loss: 0.4097 - accurac  
y: 0.8043  
Epoch 102/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4048 - accurac  
y: 0.8300  
Epoch 103/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3990 - accurac  
y: 0.8057  
Epoch 104/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4006 - accurac  
y: 0.8000  
Epoch 105/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4000 - accurac  
y: 0.8157  
Epoch 106/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4059 - accurac  
y: 0.8014  
Epoch 107/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3989 - accurac  
y: 0.8100  
Epoch 108/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4064 - accurac  
y: 0.8086  
Epoch 109/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4126 - accurac  
y: 0.8114  
Epoch 110/1000  
700/700 [=====] - 0s 28us/step - loss: 0.4039 - accurac  
y: 0.8100  
Epoch 111/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4025 - accurac  
y: 0.8014  
Epoch 112/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3949 - accurac  
y: 0.8086  
Epoch 113/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4013 - accurac  
y: 0.8114  
Epoch 114/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4071 - accurac  
y: 0.8043  
Epoch 115/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4074 - accurac  
y: 0.8057  
Epoch 116/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3996 - accurac  
y: 0.8129  
Epoch 117/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4036 - accurac  
y: 0.8100  
Epoch 118/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4009 - accurac  
y: 0.8071  
Epoch 119/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4036 - accurac  
y: 0.8071  
Epoch 120/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3974 - accurac

y: 0.8114  
Epoch 121/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3997 - accurac  
y: 0.8043  
Epoch 122/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4024 - accurac  
y: 0.8057  
Epoch 123/1000  
700/700 [=====] - 0s 27us/step - loss: 0.4023 - accurac  
y: 0.8071  
Epoch 124/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4016 - accurac  
y: 0.8086  
Epoch 125/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3995 - accurac  
y: 0.7986  
Epoch 126/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3992 - accurac  
y: 0.8100  
Epoch 127/1000  
700/700 [=====] - 0s 32us/step - loss: 0.4013 - accurac  
y: 0.8086  
Epoch 128/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4020 - accurac  
y: 0.8029  
Epoch 129/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3992 - accurac  
y: 0.8014  
Epoch 130/1000  
700/700 [=====] - 0s 33us/step - loss: 0.4008 - accurac  
y: 0.8129  
Epoch 131/1000  
700/700 [=====] - ETA: 0s - loss: 0.4794 - accuracy: 0.7  
9 - 0s 24us/step - loss: 0.4059 - accuracy: 0.8043  
Epoch 132/1000  
700/700 [=====] - 0s 29us/step - loss: 0.4018 - accurac  
y: 0.8214  
Epoch 133/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4068 - accurac  
y: 0.8071  
Epoch 134/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4045 - accurac  
y: 0.8057  
Epoch 135/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3971 - accurac  
y: 0.8029  
Epoch 136/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4011 - accurac  
y: 0.8100  
Epoch 137/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3976 - accurac  
y: 0.8043  
Epoch 138/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3972 - accurac  
y: 0.8086  
Epoch 139/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3972 - accurac  
y: 0.8071  
Epoch 140/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3961 - accurac  
y: 0.8157



Epoch 141/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4037 - accuracy: 0.8043  
Epoch 142/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4087 - accuracy: 0.8029  
Epoch 143/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4014 - accuracy: 0.8171  
Epoch 144/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3974 - accuracy: 0.8071  
Epoch 145/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4032 - accuracy: 0.8014  
Epoch 146/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4044 - accuracy: 0.8029  
Epoch 147/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4072 - accuracy: 0.7957  
Epoch 148/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4009 - accuracy: 0.8157  
Epoch 149/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3966 - accuracy: 0.8114  
Epoch 150/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4040 - accuracy: 0.8071  
Epoch 151/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3953 - accuracy: 0.8114  
Epoch 152/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3973 - accuracy: 0.8157  
Epoch 153/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4081 - accuracy: 0.8114  
Epoch 154/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4065 - accuracy: 0.8071  
Epoch 155/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4021 - accuracy: 0.8100  
Epoch 156/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3974 - accuracy: 0.8100  
Epoch 157/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4061 - accuracy: 0.7986  
Epoch 158/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4072 - accuracy: 0.8100  
Epoch 159/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4149 - accuracy: 0.7943  
Epoch 160/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4088 - accuracy: 0.7957  
Epoch 161/1000

700/700 [=====] - 0s 25us/step - loss: 0.3993 - accuracy:  
0.8129  
Epoch 162/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4066 - accuracy:  
0.8086  
Epoch 163/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4073 - accuracy:  
0.8100  
Epoch 164/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4062 - accuracy:  
0.8029  
Epoch 165/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3987 - accuracy:  
0.8114  
Epoch 166/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3948 - accuracy:  
0.8057  
Epoch 167/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4009 - accuracy:  
0.7986  
Epoch 168/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3961 - accuracy:  
0.8100  
Epoch 169/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3952 - accuracy:  
0.8029  
Epoch 170/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3977 - accuracy:  
0.8043  
Epoch 171/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3953 - accuracy:  
0.8057  
Epoch 172/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3938 - accuracy:  
0.8100  
Epoch 173/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3962 - accuracy:  
0.8014  
Epoch 174/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3939 - accuracy:  
0.8014  
Epoch 175/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3943 - accuracy:  
0.8071  
Epoch 176/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4029 - accuracy:  
0.8043  
Epoch 177/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4032 - accuracy:  
0.8057  
Epoch 178/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4032 - accuracy:  
0.8043  
Epoch 179/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3984 - accuracy:  
0.8171  
Epoch 180/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3973 - accuracy:  
0.8000  
Epoch 181/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3996 - accuracy:

0.8143  
Epoch 182/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3992 - accuracy:  
0.8071  
Epoch 183/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3975 - accuracy:  
0.8114  
Epoch 184/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3925 - accuracy:  
0.8171  
Epoch 185/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4088 - accuracy:  
0.8014  
Epoch 186/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3977 - accuracy:  
0.8100  
Epoch 187/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3971 - accuracy:  
0.8029  
Epoch 188/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3966 - accuracy:  
0.8071  
Epoch 189/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3961 - accuracy:  
0.8186  
Epoch 190/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3982 - accuracy:  
0.8043  
Epoch 191/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4212 - accuracy:  
0.7957  
Epoch 192/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4094 - accuracy:  
0.8157  
Epoch 193/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4067 - accuracy:  
0.8086  
Epoch 194/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3998 - accuracy:  
0.8057  
Epoch 195/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3986 - accuracy:  
0.8129  
Epoch 196/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3937 - accuracy:  
0.8157  
Epoch 197/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4025 - accuracy:  
0.8086  
Epoch 198/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3952 - accuracy:  
0.8129  
Epoch 199/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3990 - accuracy:  
0.8029  
Epoch 200/1000  
700/700 [=====] - 0s 29us/step - loss: 0.4009 - accuracy:  
0.8100  
Epoch 201/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4056 - accuracy:  
0.8086

Epoch 202/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4059 - accuracy:  
0.8100  
Epoch 203/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4038 - accuracy:  
0.8057  
Epoch 204/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3945 - accuracy:  
0.8114  
Epoch 205/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3947 - accuracy:  
0.8043  
Epoch 206/1000  
700/700 [=====] - 0s 33us/step - loss: 0.4019 - accuracy:  
0.8014  
Epoch 207/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4212 - accuracy:  
0.8000  
Epoch 208/1000  
700/700 [=====] - 0s 28us/step - loss: 0.4010 - accuracy:  
0.8029  
Epoch 209/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3979 - accuracy:  
0.8057  
Epoch 210/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3977 - accuracy:  
0.8114  
Epoch 211/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4039 - accuracy:  
0.8057  
Epoch 212/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4031 - accuracy:  
0.8029  
Epoch 213/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3940 - accuracy:  
0.8043  
Epoch 214/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3963 - accuracy:  
0.8071  
Epoch 215/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3959 - accuracy:  
0.8143  
Epoch 216/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3964 - accuracy:  
0.8129  
Epoch 217/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3994 - accuracy:  
0.8157  
Epoch 218/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4051 - accuracy:  
0.7986  
Epoch 219/1000  
700/700 [=====] - 0s 20us/step - loss: 0.3937 - accuracy:  
0.8100  
Epoch 220/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4021 - accuracy:  
0.8071  
Epoch 221/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3999 - accuracy:  
0.8057  
Epoch 222/1000

700/700 [=====] - 0s 22us/step - loss: 0.4002 - accuracy:  
0.8129  
Epoch 223/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3994 - accuracy:  
0.8086  
Epoch 224/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3985 - accuracy:  
0.8000  
Epoch 225/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3958 - accuracy:  
0.8086  
Epoch 226/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3934 - accuracy:  
0.8114  
Epoch 227/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3947 - accuracy:  
0.8086  
Epoch 228/1000  
700/700 [=====] - 0s 32us/step - loss: 0.3978 - accuracy:  
0.8086  
Epoch 229/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4012 - accuracy:  
0.8171  
Epoch 230/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4061 - accuracy:  
0.8071  
Epoch 231/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4048 - accuracy:  
0.8057  
Epoch 232/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3976 - accuracy:  
0.7957  
Epoch 233/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4042 - accuracy:  
0.8114  
Epoch 234/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3966 - accuracy:  
0.8157  
Epoch 235/1000  
700/700 [=====] - 0s 27us/step - loss: 0.4002 - accuracy:  
0.8043  
Epoch 236/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4003 - accuracy:  
0.8143  
Epoch 237/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4048 - accuracy:  
0.8100  
Epoch 238/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4053 - accuracy:  
0.8014  
Epoch 239/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3951 - accuracy:  
0.7929  
Epoch 240/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3990 - accuracy:  
0.8114  
Epoch 241/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3970 - accuracy:  
0.8229  
Epoch 242/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3938 - accuracy:

0.8014  
Epoch 243/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3966 - accuracy:  
0.8086  
Epoch 244/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3987 - accuracy:  
0.8100  
Epoch 245/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3958 - accuracy:  
0.8114  
Epoch 246/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3970 - accuracy:  
0.8071  
Epoch 247/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4019 - accuracy:  
0.7929  
Epoch 248/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3947 - accuracy:  
0.8043  
Epoch 249/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4006 - accuracy:  
0.8186  
Epoch 250/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3971 - accuracy:  
0.8114  
Epoch 251/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4061 - accuracy:  
0.7986  
Epoch 252/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4017 - accuracy:  
0.7986  
Epoch 253/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4030 - accuracy:  
0.8057  
Epoch 254/1000  
700/700 [=====] - 0s 27us/step - loss: 0.4140 - accuracy:  
0.8029  
Epoch 255/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4053 - accuracy:  
0.8100  
Epoch 256/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3963 - accuracy:  
0.8086  
Epoch 257/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3979 - accuracy:  
0.8114  
Epoch 258/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3974 - accuracy:  
0.8071  
Epoch 259/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4011 - accuracy:  
0.8043  
Epoch 260/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3985 - accuracy:  
0.8057  
Epoch 261/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3917 - accuracy:  
0.8071  
Epoch 262/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3945 - accuracy:  
0.8086

Epoch 263/1000  
700/700 [=====] - 0s 33us/step - loss: 0.3960 - accuracy:  
0.8171

Epoch 264/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3977 - accuracy:  
0.8114

Epoch 265/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3969 - accuracy:  
0.8186

Epoch 266/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3950 - accuracy:  
0.8014

Epoch 267/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3979 - accuracy:  
0.8057

Epoch 268/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3928 - accuracy:  
0.8086

Epoch 269/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3984 - accuracy:  
0.8129

Epoch 270/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4026 - accuracy:  
0.8100

Epoch 271/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3968 - accuracy:  
0.8029

Epoch 272/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4023 - accuracy:  
0.8057

Epoch 273/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3966 - accuracy:  
0.8029

Epoch 274/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3945 - accuracy:  
0.8143

Epoch 275/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3934 - accuracy:  
0.8157

Epoch 276/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3935 - accuracy:  
0.8100

Epoch 277/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3968 - accuracy:  
0.8071

Epoch 278/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3984 - accuracy:  
0.8043

Epoch 279/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3981 - accuracy:  
0.8129

Epoch 280/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3975 - accuracy:  
0.8071

Epoch 281/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3938 - accuracy:  
0.8086

Epoch 282/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3983 - accuracy:  
0.8100

Epoch 283/1000

700/700 [=====] - 0s 24us/step - loss: 0.3926 - accuracy:  
0.8057  
Epoch 284/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3961 - accuracy:  
0.8200  
Epoch 285/1000  
700/700 [=====] - 0s 28us/step - loss: 0.4053 - accuracy:  
0.8214  
Epoch 286/1000  
700/700 [=====] - 0s 33us/step - loss: 0.3931 - accuracy:  
0.8114  
Epoch 287/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3959 - accuracy:  
0.8100  
Epoch 288/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3973 - accuracy:  
0.8071  
Epoch 289/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3954 - accuracy:  
0.8100  
Epoch 290/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4056 - accuracy:  
0.8014  
Epoch 291/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3980 - accuracy:  
0.8100  
Epoch 292/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3993 - accuracy:  
0.8057  
Epoch 293/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3969 - accuracy:  
0.8100  
Epoch 294/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4016 - accuracy:  
0.8114  
Epoch 295/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3917 - accuracy:  
0.8129  
Epoch 296/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3928 - accuracy:  
0.8200  
Epoch 297/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4030 - accuracy:  
0.8043  
Epoch 298/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3941 - accuracy:  
0.8114  
Epoch 299/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3949 - accuracy:  
0.8086  
Epoch 300/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3937 - accuracy:  
0.8157  
Epoch 301/1000  
700/700 [=====] - 0s 33us/step - loss: 0.3983 - accuracy:  
0.8086  
Epoch 302/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3963 - accuracy:  
0.8071  
Epoch 303/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3950 - accuracy:



0.8129  
Epoch 304/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4027 - accuracy:  
0.8086  
Epoch 305/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3974 - accuracy:  
0.8100  
Epoch 306/1000  
700/700 [=====] - 0s 20us/step - loss: 0.4030 - accuracy:  
0.8129  
Epoch 307/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4041 - accuracy:  
0.8171  
Epoch 308/1000  
700/700 [=====] - 0s 31us/step - loss: 0.4140 - accuracy:  
0.8000  
Epoch 309/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4119 - accuracy:  
0.8114  
Epoch 310/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3948 - accuracy:  
0.8157  
Epoch 311/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3958 - accuracy:  
0.8029  
Epoch 312/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3945 - accuracy:  
0.8057  
Epoch 313/1000  
  
700/700 [=====] - 0s 27us/step - loss: 0.3966 - accurac  
y: 0.8157  
Epoch 314/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3928 - accurac  
y: 0.8086  
Epoch 315/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3913 - accurac  
y: 0.8029  
Epoch 316/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3916 - accurac  
y: 0.8071  
Epoch 317/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3914 - accurac  
y: 0.8000  
Epoch 318/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3958 - accurac  
y: 0.8114  
Epoch 319/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3972 - accurac  
y: 0.8143  
Epoch 320/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3937 - accurac  
y: 0.8129  
Epoch 321/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3985 - accurac  
y: 0.8200  
Epoch 322/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3980 - accurac  
y: 0.8200  
Epoch 323/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3981 - accurac

y: 0.8086  
Epoch 324/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3972 - accurac  
y: 0.8100  
Epoch 325/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3916 - accurac  
y: 0.8057  
Epoch 326/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3909 - accurac  
y: 0.8171  
Epoch 327/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3939 - accurac  
y: 0.8029  
Epoch 328/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3930 - accurac  
y: 0.8043  
Epoch 329/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3965 - accurac  
y: 0.8071  
Epoch 330/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4028 - accurac  
y: 0.8071  
Epoch 331/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3950 - accurac  
y: 0.8057  
Epoch 332/1000  
700/700 [=====] - 0s 32us/step - loss: 0.3945 - accurac  
y: 0.8057  
Epoch 333/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3961 - accurac  
y: 0.8129  
Epoch 334/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3955 - accurac  
y: 0.8057  
Epoch 335/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3910 - accurac  
y: 0.8143  
Epoch 336/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3916 - accurac  
y: 0.8100  
Epoch 337/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3970 - accurac  
y: 0.8000  
Epoch 338/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3941 - accurac  
y: 0.8157  
Epoch 339/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3939 - accurac  
y: 0.8114  
Epoch 340/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3954 - accurac  
y: 0.8143  
Epoch 341/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3948 - accurac  
y: 0.8100  
Epoch 342/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3942 - accurac  
y: 0.8043  
Epoch 343/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3935 - accurac  
y: 0.8057

Epoch 344/1000  
700/700 [=====] - 0s 31us/step - loss: 0.4172 - accuracy: 0.8129  
Epoch 345/1000  
700/700 [=====] - 0s 28us/step - loss: 0.4009 - accuracy: 0.8043  
Epoch 346/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3929 - accuracy: 0.8086  
Epoch 347/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4003 - accuracy: 0.8029  
Epoch 348/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3944 - accuracy: 0.8014  
Epoch 349/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3926 - accuracy: 0.8043  
Epoch 350/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3904 - accuracy: 0.8157  
Epoch 351/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3915 - accuracy: 0.8043  
Epoch 352/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3935 - accuracy: 0.8171  
Epoch 353/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3901 - accuracy: 0.8086  
Epoch 354/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3977 - accuracy: 0.7929  
Epoch 355/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3909 - accuracy: 0.8100  
Epoch 356/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3959 - accuracy: 0.8071  
Epoch 357/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3923 - accuracy: 0.8043  
Epoch 358/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3899 - accuracy: 0.8029  
Epoch 359/1000  
700/700 [=====] - 0s 35us/step - loss: 0.3937 - accuracy: 0.8086  
Epoch 360/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3924 - accuracy: 0.8071  
Epoch 361/1000  
700/700 [=====] - 0s 32us/step - loss: 0.3984 - accuracy: 0.8029  
Epoch 362/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4016 - accuracy: 0.8014  
Epoch 363/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3945 - accuracy: 0.8071  
Epoch 364/1000

700/700 [=====] - 0s 22us/step - loss: 0.3924 - accurac  
y: 0.8114  
Epoch 365/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3937 - accurac  
y: 0.8129  
Epoch 366/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3898 - accurac  
y: 0.8071  
Epoch 367/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3937 - accurac  
y: 0.8114  
Epoch 368/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3978 - accurac  
y: 0.8071  
Epoch 369/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4003 - accurac  
y: 0.8086  
Epoch 370/1000  
700/700 [=====] - 0s 32us/step - loss: 0.3968 - accurac  
y: 0.8100  
Epoch 371/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3983 - accurac  
y: 0.7957  
Epoch 372/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3897 - accurac  
y: 0.8100  
Epoch 373/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4020 - accurac  
y: 0.8100  
Epoch 374/1000  
700/700 [=====] - 0s 28us/step - loss: 0.4044 - accurac  
y: 0.8071  
Epoch 375/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3922 - accurac  
y: 0.8114  
Epoch 376/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3921 - accurac  
y: 0.8129  
Epoch 377/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3928 - accurac  
y: 0.8143  
Epoch 378/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3959 - accurac  
y: 0.8100  
Epoch 379/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3964 - accurac  
y: 0.7986  
Epoch 380/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3962 - accurac  
y: 0.8157  
Epoch 381/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3954 - accurac  
y: 0.8057  
Epoch 382/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3938 - accurac  
y: 0.8171  
Epoch 383/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3906 - accurac  
y: 0.8057  
Epoch 384/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3916 - accurac

y: 0.8071  
Epoch 385/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3939 - accurac  
y: 0.8129  
Epoch 386/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3954 - accurac  
y: 0.8143  
Epoch 387/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3970 - accurac  
y: 0.8129  
Epoch 388/1000  
700/700 [=====] - 0s 27us/step - loss: 0.4042 - accurac  
y: 0.8029  
Epoch 389/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4024 - accurac  
y: 0.8000  
Epoch 390/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3981 - accurac  
y: 0.8029  
Epoch 391/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3951 - accurac  
y: 0.8029  
Epoch 392/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3935 - accurac  
y: 0.8071  
Epoch 393/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3964 - accurac  
y: 0.8143  
Epoch 394/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3902 - accurac  
y: 0.8071  
Epoch 395/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3896 - accurac  
y: 0.7971  
Epoch 396/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3918 - accurac  
y: 0.8157  
Epoch 397/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3931 - accurac  
y: 0.8057  
Epoch 398/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3885 - accurac  
y: 0.8057  
Epoch 399/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3913 - accurac  
y: 0.8129  
Epoch 400/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4020 - accurac  
y: 0.8171  
Epoch 401/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4065 - accurac  
y: 0.8000  
Epoch 402/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3911 - accurac  
y: 0.8100  
Epoch 403/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3965 - accurac  
y: 0.8129  
Epoch 404/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3946 - accurac  
y: 0.8086

Epoch 405/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3920 - accuracy: 0.8129  
Epoch 406/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4045 - accuracy: 0.8029  
Epoch 407/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3952 - accuracy: 0.8100  
Epoch 408/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4014 - accuracy: 0.8029  
Epoch 409/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4026 - accuracy: 0.7957  
Epoch 410/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4100 - accuracy: 0.8014  
Epoch 411/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3876 - accuracy: 0.8200  
Epoch 412/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3920 - accuracy: 0.8100  
Epoch 413/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3887 - accuracy: 0.8114  
Epoch 414/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4021 - accuracy: 0.8029  
Epoch 415/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3981 - accuracy: 0.8000  
Epoch 416/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3963 - accuracy: 0.8129  
Epoch 417/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4065 - accuracy: 0.7986  
Epoch 418/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4006 - accuracy: 0.8200  
Epoch 419/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4037 - accuracy: 0.8029  
Epoch 420/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3991 - accuracy: 0.8100  
Epoch 421/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4008 - accuracy: 0.8029  
Epoch 422/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3925 - accuracy: 0.8043  
Epoch 423/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3916 - accuracy: 0.8086  
Epoch 424/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3898 - accuracy: 0.8100  
Epoch 425/1000

700/700 [=====] - 0s 21us/step - loss: 0.3982 - accuracy: 0.8071  
Epoch 426/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3923 - accuracy: 0.8086  
Epoch 427/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3905 - accuracy: 0.8043  
Epoch 428/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3971 - accuracy: 0.8086  
Epoch 429/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4046 - accuracy: 0.8029  
Epoch 430/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3917 - accuracy: 0.8029  
Epoch 431/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3909 - accuracy: 0.8100  
Epoch 432/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3910 - accuracy: 0.8171  
Epoch 433/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3959 - accuracy: 0.8029  
Epoch 434/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3885 - accuracy: 0.8143  
Epoch 435/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3891 - accuracy: 0.8057  
Epoch 436/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3908 - accuracy: 0.8086  
Epoch 437/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3937 - accuracy: 0.8157  
Epoch 438/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3881 - accuracy: 0.8071  
Epoch 439/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3949 - accuracy: 0.8029  
Epoch 440/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3890 - accuracy: 0.8129  
Epoch 441/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3914 - accuracy: 0.8029  
Epoch 442/1000  
700/700 [=====] - 0s 20us/step - loss: 0.3922 - accuracy: 0.8014  
Epoch 443/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3896 - accuracy: 0.8114  
Epoch 444/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3944 - accuracy: 0.8000  
Epoch 445/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3929 - accuracy:

y: 0.8071  
Epoch 446/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4023 - accurac  
y: 0.8129  
Epoch 447/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3914 - accurac  
y: 0.8186  
Epoch 448/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3925 - accurac  
y: 0.8071  
Epoch 449/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3920 - accurac  
y: 0.8086  
Epoch 450/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3910 - accurac  
y: 0.8186  
Epoch 451/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3974 - accurac  
y: 0.8143  
Epoch 452/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3944 - accurac  
y: 0.8100  
Epoch 453/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3951 - accurac  
y: 0.8186  
Epoch 454/1000  
700/700 [=====] - 0s 33us/step - loss: 0.4025 - accurac  
y: 0.8086  
Epoch 455/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3953 - accurac  
y: 0.8071  
Epoch 456/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3905 - accurac  
y: 0.8086  
Epoch 457/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3937 - accurac  
y: 0.8057  
Epoch 458/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3921 - accurac  
y: 0.8043  
Epoch 459/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3975 - accurac  
y: 0.8129  
Epoch 460/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4051 - accurac  
y: 0.8057  
Epoch 461/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4006 - accurac  
y: 0.8000  
Epoch 462/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3946 - accurac  
y: 0.8186  
Epoch 463/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4012 - accurac  
y: 0.8086  
Epoch 464/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3916 - accurac  
y: 0.8129  
Epoch 465/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3878 - accurac  
y: 0.8071



Epoch 466/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3907 - accuracy: 0.8071  
Epoch 467/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3930 - accuracy: 0.8043  
Epoch 468/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3910 - accuracy: 0.8157  
Epoch 469/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3904 - accuracy: 0.8129  
Epoch 470/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3904 - accuracy: 0.8071  
Epoch 471/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3949 - accuracy: 0.8029  
Epoch 472/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3917 - accuracy: 0.8086  
Epoch 473/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3901 - accuracy: 0.8043  
Epoch 474/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3922 - accuracy: 0.8100  
Epoch 475/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3926 - accuracy: 0.8071  
Epoch 476/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3915 - accuracy: 0.8057  
Epoch 477/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3915 - accuracy: 0.8029  
Epoch 478/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3921 - accuracy: 0.8014  
Epoch 479/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3954 - accuracy: 0.8086  
Epoch 480/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3912 - accuracy: 0.8057  
Epoch 481/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3880 - accuracy: 0.8000  
Epoch 482/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3935 - accuracy: 0.7986  
Epoch 483/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4098 - accuracy: 0.8029  
Epoch 484/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3949 - accuracy: 0.8000  
Epoch 485/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3961 - accuracy: 0.7914

Epoch 486/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4058 - accuracy:  
0.8157  
Epoch 487/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3980 - accuracy:  
0.8086  
Epoch 488/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3985 - accuracy:  
0.8114  
Epoch 489/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3889 - accuracy:  
0.8257  
Epoch 490/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3988 - accuracy:  
0.8100  
Epoch 491/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3892 - accuracy:  
0.8029  
Epoch 492/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3873 - accuracy:  
0.8114  
Epoch 493/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3924 - accuracy:  
0.8100  
Epoch 494/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4023 - accuracy:  
0.8014  
Epoch 495/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4002 - accuracy:  
0.8029  
Epoch 496/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3988 - accuracy:  
0.8043  
Epoch 497/1000  
700/700 [=====] - 0s 32us/step - loss: 0.3882 - accuracy:  
0.8029  
Epoch 498/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4092 - accuracy:  
0.8071  
Epoch 499/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4000 - accuracy:  
0.8100  
Epoch 500/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4024 - accuracy:  
0.8014  
Epoch 501/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3915 - accuracy:  
0.8086  
Epoch 502/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3910 - accuracy:  
0.8029  
Epoch 503/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3912 - accuracy:  
0.8129  
Epoch 504/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3954 - accuracy:  
0.8114  
Epoch 505/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3941 - accuracy:  
0.8014  
Epoch 506/1000

700/700 [=====] - 0s 24us/step - loss: 0.3945 - accuracy:  
0.8043  
Epoch 507/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3908 - accuracy:  
0.8071  
Epoch 508/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3922 - accuracy:  
0.8043  
Epoch 509/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3943 - accuracy:  
0.8000  
Epoch 510/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3949 - accuracy:  
0.7971  
Epoch 511/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3874 - accuracy:  
0.8057  
Epoch 512/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3906 - accuracy:  
0.8143  
Epoch 513/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3927 - accuracy:  
0.8114  
Epoch 514/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3883 - accuracy:  
0.8057  
Epoch 515/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3875 - accuracy:  
0.8071  
Epoch 516/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3901 - accuracy:  
0.8057  
Epoch 517/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3879 - accuracy:  
0.8114  
Epoch 518/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3876 - accuracy:  
0.8114  
Epoch 519/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3912 - accuracy:  
0.8157  
Epoch 520/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3905 - accuracy:  
0.8171  
Epoch 521/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3990 - accuracy:  
0.8143  
Epoch 522/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3935 - accuracy:  
0.8014  
Epoch 523/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3945 - accuracy:  
0.8143  
Epoch 524/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3977 - accuracy:  
0.8071  
Epoch 525/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4002 - accuracy:  
0.8043  
Epoch 526/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3960 - accuracy:

0.8114  
Epoch 527/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3947 - accuracy:  
0.8086  
Epoch 528/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4005 - accuracy:  
0.8100  
Epoch 529/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3882 - accuracy:  
0.8071  
Epoch 530/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4060 - accuracy:  
0.8014  
Epoch 531/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3919 - accuracy:  
0.8157  
Epoch 532/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4053 - accuracy:  
0.8029  
Epoch 533/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3938 - accuracy:  
0.8071  
Epoch 534/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3901 - accuracy:  
0.8086  
Epoch 535/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3915 - accuracy:  
0.8071  
Epoch 536/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3946 - accuracy:  
0.8000  
Epoch 537/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3920 - accuracy:  
0.8000  
Epoch 538/1000  
700/700 [=====] - 0s 32us/step - loss: 0.3904 - accuracy:  
0.8214  
Epoch 539/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3969 - accuracy:  
0.8014  
Epoch 540/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3898 - accuracy:  
0.8057  
Epoch 541/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3902 - accuracy:  
0.8086  
Epoch 542/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3933 - accuracy:  
0.8071  
Epoch 543/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3914 - accuracy:  
0.8143  
Epoch 544/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3906 - accuracy:  
0.8100  
Epoch 545/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3885 - accuracy:  
0.8129  
Epoch 546/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3919 - accuracy:  
0.8086

Epoch 547/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3861 - accuracy:  
0.8143  
Epoch 548/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3930 - accuracy:  
0.8100  
Epoch 549/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3872 - accuracy:  
0.8171  
Epoch 550/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3872 - accuracy:  
0.8114  
Epoch 551/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3894 - accuracy:  
0.8171  
Epoch 552/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4057 - accuracy:  
0.8014  
Epoch 553/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3881 - accuracy:  
0.8214  
Epoch 554/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3890 - accuracy:  
0.8143  
Epoch 555/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3873 - accuracy:  
0.8171  
Epoch 556/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3872 - accuracy:  
0.8100  
Epoch 557/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3858 - accuracy:  
0.8086  
Epoch 558/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3856 - accuracy:  
0.8071  
Epoch 559/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3902 - accuracy:  
0.8071  
Epoch 560/1000  
700/700 [=====] - 0s 20us/step - loss: 0.3864 - accuracy:  
0.8129  
Epoch 561/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3897 - accuracy:  
0.7971  
Epoch 562/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3879 - accuracy:  
0.8143  
Epoch 563/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3970 - accuracy:  
0.8114  
Epoch 564/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3963 - accuracy:  
0.8029  
Epoch 565/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3942 - accuracy:  
0.8100  
Epoch 566/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3894 - accuracy:  
0.8057  
Epoch 567/1000

700/700 [=====] - 0s 25us/step - loss: 0.3932 - accuracy:  
0.8071  
Epoch 568/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3924 - accuracy:  
0.8043  
Epoch 569/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3889 - accuracy:  
0.8143  
Epoch 570/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3864 - accuracy:  
0.8157  
Epoch 571/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3894 - accuracy:  
0.8200  
Epoch 572/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3949 - accuracy:  
0.8114  
Epoch 573/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3875 - accuracy:  
0.8129  
Epoch 574/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3911 - accuracy:  
0.8086  
Epoch 575/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3884 - accuracy:  
0.8129  
Epoch 576/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3885 - accuracy:  
0.8057  
Epoch 577/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3869 - accuracy:  
0.8100  
Epoch 578/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3937 - accuracy:  
0.8100  
Epoch 579/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4017 - accuracy:  
0.7829  
Epoch 580/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3992 - accuracy:  
0.7971  
Epoch 581/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4022 - accuracy:  
0.8129  
Epoch 582/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3915 - accuracy:  
0.8086  
Epoch 583/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3906 - accuracy:  
0.8071  
Epoch 584/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3939 - accuracy:  
0.8114  
Epoch 585/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3897 - accuracy:  
0.8129  
Epoch 586/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3871 - accuracy:  
0.8086  
Epoch 587/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3855 - accuracy:

0.8143  
Epoch 588/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3956 - accuracy:  
0.8129  
Epoch 589/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3939 - accuracy:  
0.8057  
Epoch 590/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3875 - accuracy:  
0.8057  
Epoch 591/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3891 - accuracy:  
0.8100  
Epoch 592/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3836 - accuracy:  
0.8086  
Epoch 593/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3866 - accuracy:  
0.8086  
Epoch 594/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3852 - accuracy:  
0.8057  
Epoch 595/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3884 - accuracy:  
0.8100  
Epoch 596/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3861 - accuracy:  
0.8214  
Epoch 597/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3999 - accuracy:  
0.8029  
Epoch 598/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3898 - accuracy:  
0.8086  
Epoch 599/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3832 - accuracy:  
0.8086  
Epoch 600/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3861 - accuracy:  
0.8043  
Epoch 601/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3833 - accuracy:  
0.8114  
Epoch 602/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3991 - accuracy:  
0.8071  
Epoch 603/1000  
700/700 [=====] - 0s 21us/step - loss: 0.4013 - accuracy:  
0.8057  
Epoch 604/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3902 - accuracy:  
0.8071  
Epoch 605/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4117 - accuracy:  
0.8100  
Epoch 606/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3973 - accuracy:  
0.8129  
Epoch 607/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3893 - accuracy:  
0.8100

Epoch 608/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3911 - accuracy: 0.8057  
Epoch 609/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3912 - accuracy: 0.8057  
Epoch 610/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3862 - accuracy: 0.8014  
Epoch 611/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3882 - accuracy: 0.8043  
Epoch 612/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3909 - accuracy: 0.8014  
Epoch 613/1000  
700/700 [=====] - 0s 33us/step - loss: 0.3934 - accuracy: 0.7957  
Epoch 614/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3935 - accuracy: 0.8129  
Epoch 615/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3907 - accuracy: 0.8129  
Epoch 616/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3986 - accuracy: 0.8143  
Epoch 617/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4114 - accuracy: 0.7971  
Epoch 618/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3943 - accuracy: 0.8186  
Epoch 619/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3855 - accuracy: 0.8057  
Epoch 620/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3898 - accuracy: 0.8143  
Epoch 621/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3867 - accuracy: 0.8100  
Epoch 622/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3861 - accuracy: 0.8086  
Epoch 623/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3893 - accuracy: 0.8071  
Epoch 624/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3877 - accuracy: 0.8086  
Epoch 625/1000  
  
700/700 [=====] - 0s 32us/step - loss: 0.3922 - accuracy: 0.8014  
Epoch 626/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3883 - accuracy: 0.8071  
Epoch 627/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3899 - accuracy: 0.8014



Epoch 628/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3930 - accuracy: 0.8043  
Epoch 629/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3880 - accuracy: 0.8029  
Epoch 630/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3874 - accuracy: 0.8043  
Epoch 631/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3837 - accuracy: 0.8143  
Epoch 632/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3892 - accuracy: 0.8129  
Epoch 633/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3868 - accuracy: 0.8000  
Epoch 634/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3887 - accuracy: 0.8186  
Epoch 635/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3931 - accuracy: 0.8057  
Epoch 636/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3977 - accuracy: 0.8143  
Epoch 637/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3958 - accuracy: 0.8157  
Epoch 638/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3917 - accuracy: 0.8086  
Epoch 639/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3938 - accuracy: 0.8057  
Epoch 640/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3965 - accuracy: 0.8057  
Epoch 641/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3844 - accuracy: 0.8100  
Epoch 642/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3878 - accuracy: 0.8000  
Epoch 643/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3862 - accuracy: 0.8057  
Epoch 644/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3832 - accuracy: 0.8071  
Epoch 645/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3931 - accuracy: 0.8143  
Epoch 646/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3948 - accuracy: 0.8014  
Epoch 647/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3872 - accuracy: 0.8057  
Epoch 648/1000

700/700 [=====] - 0s 21us/step - loss: 0.3917 - accurac  
y: 0.8171  
Epoch 649/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3972 - accurac  
y: 0.8071  
Epoch 650/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3970 - accurac  
y: 0.8114  
Epoch 651/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3893 - accurac  
y: 0.8129  
Epoch 652/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3903 - accurac  
y: 0.8057  
Epoch 653/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3876 - accurac  
y: 0.8086  
Epoch 654/1000  
700/700 [=====] - 0s 32us/step - loss: 0.3921 - accurac  
y: 0.8129  
Epoch 655/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3931 - accurac  
y: 0.8143  
Epoch 656/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3940 - accurac  
y: 0.8129  
Epoch 657/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3878 - accurac  
y: 0.8157  
Epoch 658/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3883 - accurac  
y: 0.8071  
Epoch 659/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3857 - accurac  
y: 0.8043  
Epoch 660/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3887 - accurac  
y: 0.8071  
Epoch 661/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3859 - accurac  
y: 0.8043  
Epoch 662/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3861 - accurac  
y: 0.8086  
Epoch 663/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3855 - accurac  
y: 0.8057  
Epoch 664/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3890 - accurac  
y: 0.8043  
Epoch 665/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3893 - accurac  
y: 0.8086  
Epoch 666/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3912 - accurac  
y: 0.8086  
Epoch 667/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3909 - accurac  
y: 0.8000  
Epoch 668/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3881 - accurac

y: 0.8043  
Epoch 669/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3845 - accurac  
y: 0.8086  
Epoch 670/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3904 - accurac  
y: 0.8143  
Epoch 671/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3881 - accurac  
y: 0.8014  
Epoch 672/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3901 - accurac  
y: 0.8143  
Epoch 673/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3887 - accurac  
y: 0.8114  
Epoch 674/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3849 - accurac  
y: 0.8100  
Epoch 675/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3895 - accurac  
y: 0.8000  
Epoch 676/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3872 - accurac  
y: 0.8143  
Epoch 677/1000  
700/700 [=====] - ETA: 0s - loss: 0.3096 - accuracy: 0.8  
7 - 0s 22us/step - loss: 0.3979 - accuracy: 0.8143  
Epoch 678/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3846 - accurac  
y: 0.8000  
Epoch 679/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3922 - accurac  
y: 0.8071  
Epoch 680/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3985 - accurac  
y: 0.8071  
Epoch 681/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3961 - accurac  
y: 0.8029  
Epoch 682/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3933 - accurac  
y: 0.8014  
Epoch 683/1000  
700/700 [=====] - 0s 32us/step - loss: 0.3975 - accurac  
y: 0.8086  
Epoch 684/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3848 - accurac  
y: 0.8086  
Epoch 685/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3842 - accurac  
y: 0.8043  
Epoch 686/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3909 - accurac  
y: 0.8043  
Epoch 687/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3963 - accurac  
y: 0.8014  
Epoch 688/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3922 - accurac  
y: 0.8157

Epoch 689/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3865 - accuracy: 0.8171  
Epoch 690/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3944 - accuracy: 0.8186  
Epoch 691/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4017 - accuracy: 0.8000  
Epoch 692/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4014 - accuracy: 0.7986  
Epoch 693/1000  
700/700 [=====] - 0s 29us/step - loss: 0.4085 - accuracy: 0.8114  
Epoch 694/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3945 - accuracy: 0.8029  
Epoch 695/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3928 - accuracy: 0.8029  
Epoch 696/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3891 - accuracy: 0.8086  
Epoch 697/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3932 - accuracy: 0.8043  
Epoch 698/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3843 - accuracy: 0.8057  
Epoch 699/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3843 - accuracy: 0.8143  
Epoch 700/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3856 - accuracy: 0.8014  
Epoch 701/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3894 - accuracy: 0.8171  
Epoch 702/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3899 - accuracy: 0.8071  
Epoch 703/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3833 - accuracy: 0.8157  
Epoch 704/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3901 - accuracy: 0.8143  
Epoch 705/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3881 - accuracy: 0.8086  
Epoch 706/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3924 - accuracy: 0.8086  
Epoch 707/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3850 - accuracy: 0.8043  
Epoch 708/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3883 - accuracy: 0.8129  
Epoch 709/1000

700/700 [=====] - 0s 22us/step - loss: 0.3911 - accuracy: 0.8057  
Epoch 710/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3906 - accuracy: 0.8071  
Epoch 711/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3798 - accuracy: 0.8129  
Epoch 712/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3877 - accuracy: 0.8157  
Epoch 713/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3940 - accuracy: 0.8086  
Epoch 714/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3866 - accuracy: 0.8086  
Epoch 715/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3842 - accuracy: 0.8143  
Epoch 716/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3932 - accuracy: 0.8014  
Epoch 717/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3891 - accuracy: 0.8143  
Epoch 718/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3846 - accuracy: 0.8114  
Epoch 719/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3854 - accuracy: 0.8043  
Epoch 720/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3853 - accuracy: 0.8057  
Epoch 721/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3855 - accuracy: 0.8057  
Epoch 722/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3859 - accuracy: 0.8071  
Epoch 723/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3928 - accuracy: 0.7986  
Epoch 724/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3838 - accuracy: 0.8057  
Epoch 725/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3826 - accuracy: 0.8114  
Epoch 726/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3870 - accuracy: 0.8029  
Epoch 727/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3858 - accuracy: 0.8029  
Epoch 728/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3866 - accuracy: 0.7986  
Epoch 729/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3832 - accuracy:

y: 0.8086  
Epoch 730/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3869 - accurac  
y: 0.7986  
Epoch 731/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3831 - accurac  
y: 0.8057  
Epoch 732/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3908 - accurac  
y: 0.8014  
Epoch 733/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3960 - accurac  
y: 0.8086  
Epoch 734/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3866 - accurac  
y: 0.8100  
Epoch 735/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3917 - accurac  
y: 0.8086  
Epoch 736/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3905 - accurac  
y: 0.8071  
Epoch 737/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3847 - accurac  
y: 0.8129  
Epoch 738/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3939 - accurac  
y: 0.8014  
Epoch 739/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3850 - accurac  
y: 0.7971  
Epoch 740/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3892 - accurac  
y: 0.8157  
Epoch 741/1000  
700/700 [=====] - 0s 32us/step - loss: 0.4049 - accurac  
y: 0.7971  
Epoch 742/1000  
700/700 [=====] - 0s 25us/step - loss: 0.4046 - accurac  
y: 0.8171  
Epoch 743/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3948 - accurac  
y: 0.8086  
Epoch 744/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3869 - accurac  
y: 0.8100  
Epoch 745/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3933 - accurac  
y: 0.8171  
Epoch 746/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3901 - accurac  
y: 0.8214  
Epoch 747/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3858 - accurac  
y: 0.8043  
Epoch 748/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3867 - accurac  
y: 0.8014  
Epoch 749/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3847 - accurac  
y: 0.8029

Epoch 750/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3834 - accuracy: 0.8143  
Epoch 751/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3897 - accuracy: 0.8000  
Epoch 752/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3854 - accuracy: 0.8014  
Epoch 753/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3838 - accuracy: 0.8071  
Epoch 754/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3835 - accuracy: 0.8100  
Epoch 755/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3830 - accuracy: 0.8114  
Epoch 756/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3835 - accuracy: 0.8071  
Epoch 757/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3876 - accuracy: 0.8071  
Epoch 758/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3837 - accuracy: 0.8129  
Epoch 759/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3825 - accuracy: 0.8114  
Epoch 760/1000  
700/700 [=====] - 0s 32us/step - loss: 0.3869 - accuracy: 0.8086  
Epoch 761/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3841 - accuracy: 0.8086  
Epoch 762/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3914 - accuracy: 0.8129  
Epoch 763/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3928 - accuracy: 0.8129  
Epoch 764/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3851 - accuracy: 0.8143  
Epoch 765/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3855 - accuracy: 0.8100  
Epoch 766/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3856 - accuracy: 0.8071  
Epoch 767/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3816 - accuracy: 0.8043  
Epoch 768/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3872 - accuracy: 0.8086  
Epoch 769/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3846 - accuracy: 0.7957  
Epoch 770/1000

700/700 [=====] - 0s 21us/step - loss: 0.3815 - accuracy: 0.8157  
Epoch 771/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3845 - accuracy: 0.8057  
Epoch 772/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3831 - accuracy: 0.8143  
Epoch 773/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3975 - accuracy: 0.7971  
Epoch 774/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3807 - accuracy: 0.8086  
Epoch 775/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3842 - accuracy: 0.8100  
Epoch 776/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3840 - accuracy: 0.8114  
Epoch 777/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3889 - accuracy: 0.8000  
Epoch 778/1000  
700/700 [=====] - 0s 20us/step - loss: 0.3873 - accuracy: 0.8114  
Epoch 779/1000  
700/700 [=====] - 0s 35us/step - loss: 0.3888 - accuracy: 0.8029  
Epoch 780/1000  
  
700/700 [=====] - 0s 31us/step - loss: 0.4010 - accuracy: 0.8071  
Epoch 781/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3982 - accuracy: 0.8129  
Epoch 782/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3831 - accuracy: 0.8071  
Epoch 783/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3823 - accuracy: 0.8114  
Epoch 784/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3806 - accuracy: 0.8100  
Epoch 785/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3855 - accuracy: 0.8043  
Epoch 786/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3842 - accuracy: 0.8143  
Epoch 787/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3849 - accuracy: 0.8129  
Epoch 788/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3858 - accuracy: 0.8114  
Epoch 789/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3836 - accuracy: 0.8071  
Epoch 790/1000



700/700 [=====] - 0s 24us/step - loss: 0.3860 - accurac  
y: 0.8100  
Epoch 791/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3907 - accurac  
y: 0.8086  
Epoch 792/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3813 - accurac  
y: 0.8071  
Epoch 793/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3896 - accurac  
y: 0.8071  
Epoch 794/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3892 - accurac  
y: 0.8100  
Epoch 795/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3896 - accurac  
y: 0.8014  
Epoch 796/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3839 - accurac  
y: 0.8100  
Epoch 797/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3852 - accurac  
y: 0.8000  
Epoch 798/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3924 - accurac  
y: 0.8014  
Epoch 799/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3856 - accurac  
y: 0.8057  
Epoch 800/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3926 - accurac  
y: 0.7929  
Epoch 801/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3867 - accurac  
y: 0.8114  
Epoch 802/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3875 - accurac  
y: 0.8043  
Epoch 803/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3859 - accurac  
y: 0.8129  
Epoch 804/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3818 - accurac  
y: 0.8114  
Epoch 805/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3836 - accurac  
y: 0.8071  
Epoch 806/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3803 - accurac  
y: 0.8057  
Epoch 807/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3877 - accurac  
y: 0.8100  
Epoch 808/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3855 - accurac  
y: 0.8086  
Epoch 809/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3882 - accurac  
y: 0.8114  
Epoch 810/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3920 - accurac

y: 0.8071  
Epoch 811/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3856 - accurac  
y: 0.8100  
Epoch 812/1000  
700/700 [=====] - 0s 32us/step - loss: 0.3825 - accurac  
y: 0.8129  
Epoch 813/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3880 - accurac  
y: 0.8143  
Epoch 814/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3833 - accurac  
y: 0.8071  
Epoch 815/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3957 - accurac  
y: 0.8071  
Epoch 816/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3903 - accurac  
y: 0.8157  
Epoch 817/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3863 - accurac  
y: 0.8071  
Epoch 818/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3823 - accurac  
y: 0.8086  
Epoch 819/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3951 - accurac  
y: 0.8057  
Epoch 820/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3872 - accurac  
y: 0.8143  
Epoch 821/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3877 - accurac  
y: 0.8043  
Epoch 822/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3823 - accurac  
y: 0.8129  
Epoch 823/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3909 - accurac  
y: 0.8129  
Epoch 824/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3877 - accurac  
y: 0.8214  
Epoch 825/1000  
700/700 [=====] - 0s 32us/step - loss: 0.3838 - accurac  
y: 0.8086  
Epoch 826/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3809 - accurac  
y: 0.8114  
Epoch 827/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3844 - accurac  
y: 0.8057  
Epoch 828/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3846 - accurac  
y: 0.8114  
Epoch 829/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3841 - accurac  
y: 0.8114  
Epoch 830/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3882 - accurac  
y: 0.8014

Epoch 831/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4027 - accuracy: 0.8057  
Epoch 832/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3923 - accuracy: 0.8071  
Epoch 833/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3924 - accuracy: 0.8029  
Epoch 834/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3877 - accuracy: 0.8014  
Epoch 835/1000  
700/700 [=====] - ETA: 0s - loss: 0.4791 - accuracy: 0.70 - 0s 24us/step - loss: 0.3825 - accuracy: 0.8057  
Epoch 836/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3795 - accuracy: 0.8114  
Epoch 837/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3856 - accuracy: 0.8086  
Epoch 838/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3806 - accuracy: 0.8129  
Epoch 839/1000  
700/700 [=====] - ETA: 0s - loss: 0.3961 - accuracy: 0.79 - 0s 22us/step - loss: 0.3843 - accuracy: 0.8114  
Epoch 840/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3872 - accuracy: 0.8057  
Epoch 841/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3830 - accuracy: 0.8100  
Epoch 842/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3816 - accuracy: 0.8029  
Epoch 843/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3875 - accuracy: 0.8014  
Epoch 844/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3925 - accuracy: 0.8014  
Epoch 845/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3860 - accuracy: 0.8057  
Epoch 846/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3840 - accuracy: 0.8057  
Epoch 847/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3840 - accuracy: 0.8129  
Epoch 848/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3829 - accuracy: 0.8100  
Epoch 849/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3802 - accuracy: 0.8100  
Epoch 850/1000  
700/700 [=====] - 0s 32us/step - loss: 0.3823 - accuracy: 0.8057  
Epoch 851/1000

700/700 [=====] - 0s 22us/step - loss: 0.3823 - accuracy: 0.8157  
Epoch 852/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3891 - accuracy: 0.8129  
Epoch 853/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3882 - accuracy: 0.8071  
Epoch 854/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3870 - accuracy: 0.8086  
Epoch 855/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3826 - accuracy: 0.8171  
Epoch 856/1000  
700/700 [=====] - 0s 22us/step - loss: 0.4110 - accuracy: 0.8071  
Epoch 857/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3891 - accuracy: 0.8129  
Epoch 858/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3834 - accuracy: 0.8071  
Epoch 859/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3796 - accuracy: 0.8200  
Epoch 860/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3854 - accuracy: 0.8057  
Epoch 861/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3853 - accuracy: 0.8143  
Epoch 862/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3813 - accuracy: 0.8100  
Epoch 863/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3811 - accuracy: 0.8186  
Epoch 864/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3821 - accuracy: 0.8157  
Epoch 865/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3816 - accuracy: 0.8129  
Epoch 866/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3862 - accuracy: 0.8100  
Epoch 867/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3810 - accuracy: 0.8071  
Epoch 868/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3818 - accuracy: 0.8086  
Epoch 869/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3840 - accuracy: 0.8114  
Epoch 870/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3850 - accuracy: 0.8057  
Epoch 871/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3840 - accuracy:

y: 0.8157  
Epoch 872/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3847 - accurac  
y: 0.8071  
Epoch 873/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3798 - accurac  
y: 0.8129  
Epoch 874/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3830 - accurac  
y: 0.8071  
Epoch 875/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3806 - accurac  
y: 0.8100  
Epoch 876/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3806 - accurac  
y: 0.8114  
Epoch 877/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3818 - accurac  
y: 0.8100  
Epoch 878/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3811 - accurac  
y: 0.8114  
Epoch 879/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3801 - accurac  
y: 0.8186  
Epoch 880/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3846 - accurac  
y: 0.7986  
Epoch 881/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3812 - accurac  
y: 0.8014  
Epoch 882/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3842 - accurac  
y: 0.8071  
Epoch 883/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3930 - accurac  
y: 0.8071  
Epoch 884/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3869 - accurac  
y: 0.8000  
Epoch 885/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3838 - accurac  
y: 0.8157  
Epoch 886/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3856 - accurac  
y: 0.8057  
Epoch 887/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3870 - accurac  
y: 0.8043  
Epoch 888/1000  
700/700 [=====] - 0s 36us/step - loss: 0.3825 - accurac  
y: 0.8029  
Epoch 889/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3827 - accurac  
y: 0.8114  
Epoch 890/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3878 - accurac  
y: 0.8057  
Epoch 891/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3803 - accurac  
y: 0.8086

Epoch 892/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3898 - accuracy: 0.7986  
Epoch 893/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3907 - accuracy: 0.8071  
Epoch 894/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3883 - accuracy: 0.8029  
Epoch 895/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3941 - accuracy: 0.8071  
Epoch 896/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3880 - accuracy: 0.7957  
Epoch 897/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3827 - accuracy: 0.8086  
Epoch 898/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3828 - accuracy: 0.8100  
Epoch 899/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3782 - accuracy: 0.8129  
Epoch 900/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3909 - accuracy: 0.8100  
Epoch 901/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3912 - accuracy: 0.8057  
Epoch 902/1000  
700/700 [=====] - 0s 32us/step - loss: 0.3855 - accuracy: 0.8129  
Epoch 903/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3797 - accuracy: 0.8071  
Epoch 904/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3841 - accuracy: 0.8071  
Epoch 905/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3918 - accuracy: 0.8114  
Epoch 906/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3890 - accuracy: 0.8157  
Epoch 907/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3905 - accuracy: 0.8157  
Epoch 908/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3864 - accuracy: 0.8100  
Epoch 909/1000  
700/700 [=====] - 0s 32us/step - loss: 0.3803 - accuracy: 0.8143  
Epoch 910/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3885 - accuracy: 0.8171  
Epoch 911/1000  
700/700 [=====] - 0s 35us/step - loss: 0.3884 - accuracy: 0.8143  
Epoch 912/1000

700/700 [=====] - 0s 22us/step - loss: 0.3788 - accuracy: 0.8000  
Epoch 913/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3896 - accuracy: 0.8100  
Epoch 914/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3933 - accuracy: 0.8043  
Epoch 915/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3870 - accuracy: 0.8129  
Epoch 916/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3836 - accuracy: 0.8143  
Epoch 917/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3847 - accuracy: 0.8057  
Epoch 918/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3901 - accuracy: 0.8129  
Epoch 919/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3898 - accuracy: 0.8143  
Epoch 920/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3879 - accuracy: 0.8143  
Epoch 921/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3955 - accuracy: 0.8071  
Epoch 922/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3858 - accuracy: 0.8229  
Epoch 923/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3956 - accuracy: 0.8100  
Epoch 924/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3878 - accuracy: 0.8171  
Epoch 925/1000  
700/700 [=====] - 0s 29us/step - loss: 0.3808 - accuracy: 0.8114  
Epoch 926/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3784 - accuracy: 0.8143  
Epoch 927/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3795 - accuracy: 0.8057  
Epoch 928/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3846 - accuracy: 0.8100  
Epoch 929/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3789 - accuracy: 0.8057  
Epoch 930/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3778 - accuracy: 0.8071  
Epoch 931/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3833 - accuracy: 0.8129  
Epoch 932/1000  
700/700 [=====] - 0s 36us/step - loss: 0.3822 - accuracy:

y: 0.8014  
Epoch 933/1000  
700/700 [=====] - ETA: 0s - loss: 0.3759 - accuracy: 0.8  
1 - 0s 24us/step - loss: 0.3765 - accuracy: 0.8114  
Epoch 934/1000  
  
700/700 [=====] - 0s 22us/step - loss: 0.3824 - accuracy:  
0.8071  
Epoch 935/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3835 - accuracy:  
0.8143  
Epoch 936/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3834 - accuracy:  
0.8071  
Epoch 937/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3808 - accuracy:  
0.8100  
Epoch 938/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3872 - accuracy:  
0.7957  
Epoch 939/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3858 - accuracy:  
0.8114  
Epoch 940/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3807 - accuracy:  
0.8057  
Epoch 941/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3786 - accuracy:  
0.8029  
Epoch 942/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3791 - accuracy:  
0.8143  
Epoch 943/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3840 - accuracy:  
0.8129  
Epoch 944/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3845 - accuracy:  
0.8086  
Epoch 945/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3789 - accuracy:  
0.8100  
Epoch 946/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3803 - accuracy:  
0.8014  
Epoch 947/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3800 - accuracy:  
0.8100  
Epoch 948/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3845 - accuracy:  
0.8014  
Epoch 949/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3896 - accuracy:  
0.8029  
Epoch 950/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3896 - accuracy:  
0.8000  
Epoch 951/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3838 - accuracy:  
0.8071  
Epoch 952/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3786 - accuracy:



0.8143  
Epoch 953/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3811 - accuracy:  
0.8129  
Epoch 954/1000  
700/700 [=====] - 0s 28us/step - loss: 0.3837 - accuracy:  
0.8043  
Epoch 955/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3829 - accuracy:  
0.8129  
Epoch 956/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3810 - accuracy:  
0.8114  
Epoch 957/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3790 - accuracy:  
0.8114  
Epoch 958/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3823 - accuracy:  
0.8143  
Epoch 959/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3845 - accuracy:  
0.8157  
Epoch 960/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3919 - accuracy:  
0.8114  
Epoch 961/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3837 - accuracy:  
0.8171  
Epoch 962/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3808 - accuracy:  
0.8114  
Epoch 963/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3812 - accuracy:  
0.8043  
Epoch 964/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3844 - accuracy:  
0.8057  
Epoch 965/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3755 - accuracy:  
0.8171  
Epoch 966/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3791 - accuracy:  
0.8114  
Epoch 967/1000  
700/700 [=====] - 0s 32us/step - loss: 0.3867 - accuracy:  
0.8086  
Epoch 968/1000  
700/700 [=====] - 0s 32us/step - loss: 0.3879 - accuracy:  
0.8143  
Epoch 969/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3804 - accuracy:  
0.8114  
Epoch 970/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3814 - accuracy:  
0.8071  
Epoch 971/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3869 - accuracy:  
0.7957  
Epoch 972/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3819 - accuracy:  
0.8057

Epoch 973/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3831 - accuracy:  
0.8186  
Epoch 974/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3919 - accuracy:  
0.8114  
Epoch 975/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3823 - accuracy:  
0.8071  
Epoch 976/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3806 - accuracy:  
0.8057  
Epoch 977/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3854 - accuracy:  
0.8043  
Epoch 978/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3831 - accuracy:  
0.8100  
Epoch 979/1000  
700/700 [=====] - 0s 31us/step - loss: 0.3803 - accuracy:  
0.8086  
Epoch 980/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3784 - accuracy:  
0.8114  
Epoch 981/1000  
700/700 [=====] - 0s 27us/step - loss: 0.3819 - accuracy:  
0.8129  
Epoch 982/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3809 - accuracy:  
0.8043  
Epoch 983/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3813 - accuracy:  
0.8057  
Epoch 984/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3781 - accuracy:  
0.8100  
Epoch 985/1000  
700/700 [=====] - 0s 33us/step - loss: 0.3885 - accuracy:  
0.8100  
Epoch 986/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3846 - accuracy:  
0.8014  
Epoch 987/1000  
700/700 [=====] - 0s 24us/step - loss: 0.4016 - accuracy:  
0.7986  
Epoch 988/1000  
700/700 [=====] - 0s 24us/step - loss: 0.3910 - accuracy:  
0.7986  
Epoch 989/1000  
700/700 [=====] - 0s 21us/step - loss: 0.3785 - accuracy:  
0.8171  
Epoch 990/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3781 - accuracy:  
0.8086  
Epoch 991/1000  
700/700 [=====] - 0s 22us/step - loss: 0.3784 - accuracy:  
0.8029  
Epoch 992/1000  
700/700 [=====] - 0s 25us/step - loss: 0.3865 - accuracy:  
0.8043  
Epoch 993/1000

```
700/700 [=====] - 0s 22us/step - loss: 0.3864 - accuracy: 0.8086
Epoch 994/1000
700/700 [=====] - 0s 25us/step - loss: 0.3789 - accuracy: 0.8171
Epoch 995/1000
700/700 [=====] - 0s 22us/step - loss: 0.3790 - accuracy: 0.8057
Epoch 996/1000
700/700 [=====] - 0s 24us/step - loss: 0.3822 - accuracy: 0.8014
Epoch 997/1000
700/700 [=====] - 0s 24us/step - loss: 0.3852 - accuracy: 0.8014
Epoch 998/1000
700/700 [=====] - 0s 22us/step - loss: 0.3812 - accuracy: 0.8086
Epoch 999/1000
700/700 [=====] - 0s 24us/step - loss: 0.3853 - accuracy: 0.8014
Epoch 1000/1000
700/700 [=====] - 0s 22us/step - loss: 0.3811 - accuracy: 0.8014
```

In [54]:

```
evaluation=model.evaluate(x_test,y_test,batch_size=64)
```

```
68/68 [=====] - 0s 1ms/step
```

In [55]:

```
print(evaluation)
```

```
[0.551052054938148, 0.8235294222831726]
```

정확도가 82% 정도

In [68]:

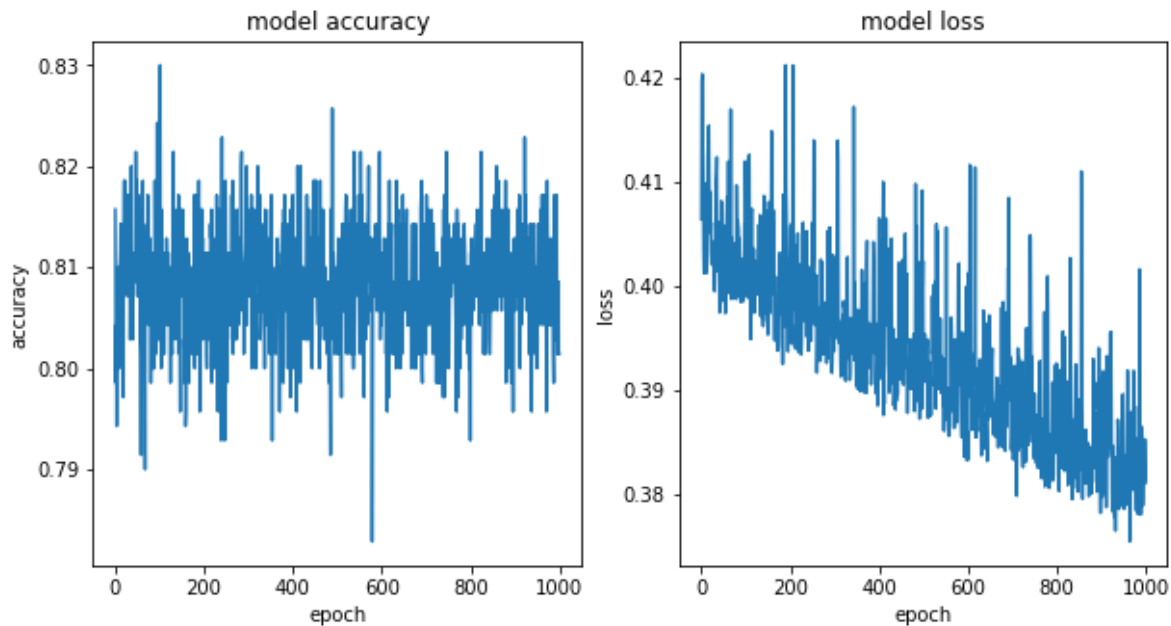
```
# Get the figure and the axes
fig, (ax0, ax1) = plt.subplots(nrows=1,ncols=2, sharey=False, figsize=(10, 5))

# 모델의 정확도 그리기
ax0.plot(hist.history['accuracy'])
ax0.set(title='model accuracy', xlabel='epoch', ylabel='accuracy')

# 모델의 오차 그리기
ax1.plot(hist.history['loss'])
ax1.set(title='model loss', xlabel='epoch', ylabel='loss')
```

Out[68]:

```
[Text(0, 0.5, 'loss'), Text(0.5, 0, 'epoch'), Text(0.5, 1.0, 'model loss')]
```



In [71]:

```
#다음과 같이 주어졌을 때
patient=np.array([[0,137,90,35,168,43.1,2.288,33]])
```

In [74]:

```
#예측하기

prediction=model.predict(patient)
print(prediction)
```

```
[[0.9417441]]
```