

1.

- Test loss: 0.05518849566578865
Test accuracy: 0.9666666388511658
error rate:0.03333336114883423
- 程式碼：詳見附檔

2.

- 2.1.
 - network structures1: 每層 layer 的 neuron 數量為 2
 - DNN width = 2,
Validation loss:0.4495222568511963,
Validation accuracy:0.9391999840736389
 - model structures detail:

```
Model: "dnn_base_2-units"
```

Layer (type)	Output Shape	Param #
dense_3 (Dense)	multiple	586
dense_4 (Dense)	multiple	6
dense_5 (Dense)	multiple	6
dense_6 (Dense)	multiple	6
dense_7 (Dense)	multiple	6
dense_8 (Dense)	multiple	3

```
=====  
Total params: 613  
Trainable params: 613  
Non-trainable params: 0
```

- network structures2 : 每層 layer 的 neuron 數量為 10
 - DNN width = 10,
Validation loss:0.06767494231462479,
Validation accuracy:0.995199978351593
 - model structures detail:

```
Model: "dnn_base_10-units"
```

Layer (type)	Output Shape	Param #
dense_9 (Dense)	multiple	2930
dense_10 (Dense)	multiple	110
dense_11 (Dense)	multiple	110
dense_12 (Dense)	multiple	110
dense_13 (Dense)	multiple	110
dense_14 (Dense)	multiple	11

```
=====  
Total params: 3,381  
Trainable params: 3,381  
Non-trainable params: 0
```

- network structures3 : 每層 layer 的 neuron 數量為 20
 - DNN width = 20,
Validation loss:0.01158861257135868,
Validation accuracy:0.9959999918937683
 - model structures detail:

```
Model: "dnn_base_20-units"
```

Layer (type)	Output Shape	Param #
dense_15 (Dense)	multiple	5860
dense_16 (Dense)	multiple	420
dense_17 (Dense)	multiple	420
dense_18 (Dense)	multiple	420
dense_19 (Dense)	multiple	420
dense_20 (Dense)	multiple	21

```

Total params: 7,561
Trainable params: 7,561
Non-trainable params: 0

```

○ 2.2.

- 預測結果存放於附檔：q2.csv

3.

○ 3.1.

- Test loss: 0.07127875089645386
- Test accuracy: 0.9793000221252441

○ 3.2.

- Noise level 0 Test loss: 3.1070008277893066, Test accuracy: 0.4009000062942505
- Noise level 1 Test loss: 9.864065170288086, Test accuracy: 0.22259999811649323
- Noise level 2 Test loss: 16.43040657043457, Test accuracy: 0.17249999940395355
- 隨著噪點的比例越高的模型的準確率隨之下降，可以由此推斷，噪點越多，越難以辨識

○ 3.3

- accuracy for regular test data:
 - Test loss: 0.05390617623925209
 - Test accuracy: 0.9837999939918518
- accuracy for with noise test data:

- Noise level 0 Test loss: 3.1070008277893066, Test accuracy: 0.4009000062942505
- Noise level 1 Test loss: 9.864065170288086, Test accuracy: 0.22259999811649323
- Noise level 2 Test loss: 16.43040657043457, Test accuracy: 0.17249999940395355