

# Homework 3 DeepQ Report

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EE5184 - Machine Learning

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**Problem 1. (0.5%)**請說明你做了哪些比較實驗？

## A. Hyper Parameter Adjustment

### 1. Mobilenetv2

#### a. Pretrained

Optimizer = SGD, Batch size = 32, lr = 0.001, momentum = 0.1, drop out = 0.1

	Pretrained = True	Pretrained = False
Train Accuracy	0.97	0.9415
Valid Accuracy	0.87	0.566

#### b. Optimizer

Pretrained = True, Batch size = 32, lr = 0.001, momentum = 0.1, drop out = 0.1

	SGD	Adam	RMSProp
Train Accuracy	0.97	0.964	0.9972
Val Accuracy	0.87	0.834	0.846

#### c. Batch size

Pretrained = True, Optimizer = SGD, lr = 0.001, momentum = 0.1, drop out = 0.1

	16	32	64
Train Accuracy	0.99	0.97	0.913
Val Accuracy	0.864	0.87	0.856

#### d. learning rate

Optimizer = SGD, Optimizer = SGD, Batch size = 16, momentum = 0.1, drop out = 0.1

	0.01	0.001	0.0001
Train Accuracy	0.9996	0.99	0.77
Val Accuracy	0.874	0.864	0.77

#### e. momentum

Optimizer = SGD, Optimizer = SGD, Batch size = 16, lr = 0.001, drop out = 0.1

	0.05	0.1	0.2
Train Accuracy	0.9833	0.99	0.9845
Val Accuracy	0.864	0.864	0.8482

#### f. drop out

Optimizer = SGD, Optimizer = SGD, Batch size = 16, lr = 0.001, momentum = 0.1

	0.1	0.2	0.3
Train Accuracy	0.99	0.97	0.97
Val Accuracy	0.864	0.854	0.84

## 2. Resnet50

### a. Pretrained

Optimizer = SGD, Batch size = 32, lr = 0.01, momentum = 0.1

	Pretrained = True	Pretrained = False
Train Accuracy	0.99	0.92
Valid Accuracy	0.90	0.33

### b. Optimizer

Pretrained = True, Batch size = 32, lr = 0.01, momentum = 0.1

	SGD	Adam	RMSProp
Train Accuracy	0.99	0.9391	0.9596
Val Accuracy	0.90	0.5940	0.6480

### c. Batch size

Pretrained = True, Optimizer = SGD, lr = 0.01, momentum = 0.1

	16	32	64
Train Accuracy	0.99	0.99	0.9828
Val Accuracy	0.89	0.90	0.7860

### d. learning rate

Optimizer = SGD, Optimizer = SGD, Batch size = 16, momentum = 0.1

	0.1	0.01	0.001
Train Accuracy	0.99	0.99	0.998
Val Accuracy	0.89	0.89	0.878

### e. momentum

Optimizer = SGD, Optimizer = SGD, Batch size = 16, lr = 0.01

	0.05	0.1	0.3
Train Accuracy	0.99	0.99	0.99
Val Accuracy	0.89	0.89	0.82

## B. Data Preprocessing

原始程式法碼中的 transform 只做了 resize，在這邊我加入 transform.RandomAffine(10, shear=10)

### 1. Mobilenetv2

Pretrained = True, Opti = SGD, Batch = 16, lr = 0.01, momentum: 0.1, drop: 0.1

	Before	After
Train Accuracy	0.9996	0.9968
Valid Accuracy	0.874	0.9000

### 2. Resnet50

Pretrained = True, Opti = SGD, Batch = 32, lr = 0.01, momentum: 0.1

	Before	After
Train Accuracy	0.99	0.9956
Valid Accuracy	0.89	0.9140

**Problem 2. (0.5%)最後選擇此值/此 scheduling 的原因？**

透過上述分析，根據 val accuracy 的大小去決定各個 hyper parameter 要選哪個數值。

最後的選擇如下：

1. Mobilenetv2

Pretrained = True, Opti = SGD, Batch = 16, lr = 0.01, momentum: 0.1, drop: 0.1

2. Resnet50

Pretrained = True, Opti = SGD, Batch = 32, lr = 0.01, momentum: 0.1

Kaggle public score 為 0.91333