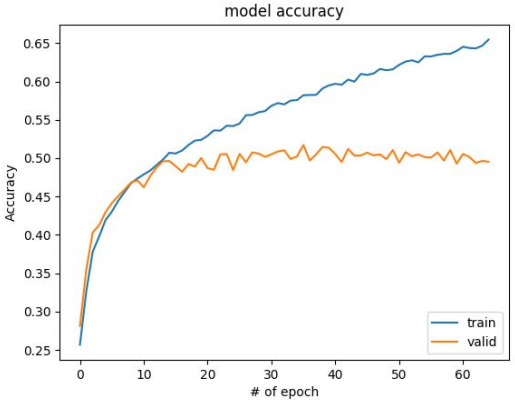
學號：R06942113 系級： 電信碩一 姓名：林怡均

1. (1%) 請說明你實作的 CNN model，其模型架構、訓練過程和準確率為何？ (Collaborators:)

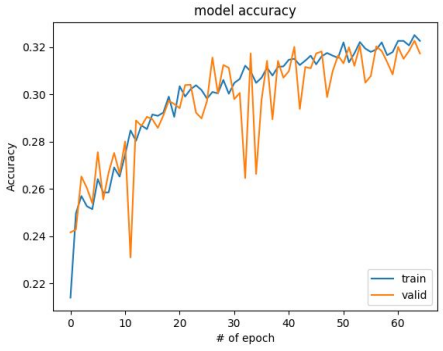
答：

Layer (type)	Output Shape	Param #
conv2d_1 (Conv2D)	(None, 46, 46, 32)	320
max_pooling2d_1 (MaxPooling2	(None, 23, 23, 32)	0
conv2d_2 (Conv2D)	(None, 21, 21, 32)	9248
max_pooling2d_2 (MaxPooling2	(None, 10, 10, 32)	0
flatten_1 (Flatten)	(None, 3200)	0
dense_1 (Dense)	(None, 256)	819456
dense_2 (Dense)	(None, 256)	65792
dropout_1 (Dropout)	(None, 256)	0
dense_3 (Dense)	(None, 256)	65792
dropout_2 (Dropout)	(None, 256)	0
dense_4 (Dense)	(None, 256)	65792
dropout_3 (Dropout)	(None, 256)	0
dense_5 (Dense)	(None, 256)	65792
dropout_4 (Dropout)	(None, 256)	0
dense_6 (Dense)	(None, 256)	65792
dropout_5 (Dropout)	(None, 256)	0
dense_7 (Dense)	(None, 256)	65792
dropout_6 (Dropout)	(None, 256)	0
dense_8 (Dense)	(None, 256)	65792
dropout_7 (Dropout)	(None, 256)	0
dense_9 (Dense)	(None, 256)	65792
dropout_8 (Dropout)	(None, 256)	0
dense_10 (Dense)	(None, 7)	1799

Total params: 1,357,159
Trainable params: 1,357,159
Non-trainable params: 0



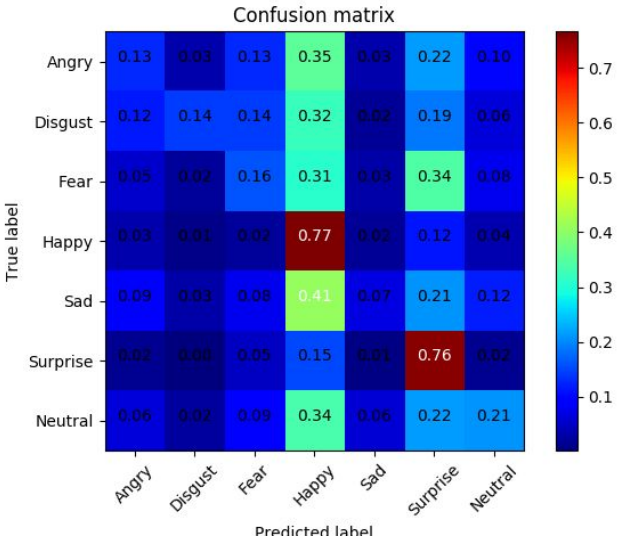
2. (1%) 承上題，請用與上述 CNN 接近的參數量，實做簡單的 DNN model。其模型架構、訓練過程和準確率為何？試與上題結果做比較，並說明你觀察到了什麼？ (Collaborators:)



答： CNN在多次epoch時比DNN容易overfit

3. (1%) 觀察答錯的圖片中，哪些 class 彼此間容易用混？[繪出 confusion matrix 分析]
(Collaborators:)

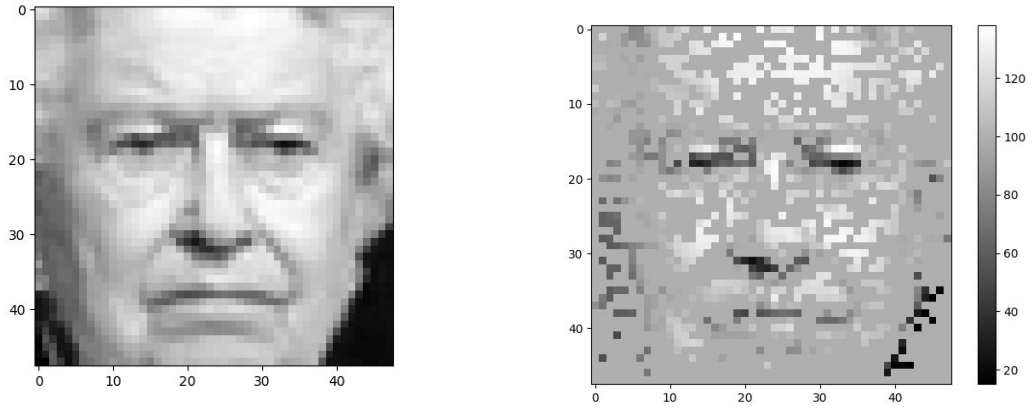
答：



除了高興跟驚訝，都容易搞混

4. (1%) 從(1)(2)可以發現，使用 CNN 的確有些好處，試繪出其 saliency maps，觀察模型在做 classification 時，是 focus 在圖片的哪些部份？
(Collaborators:)

答：



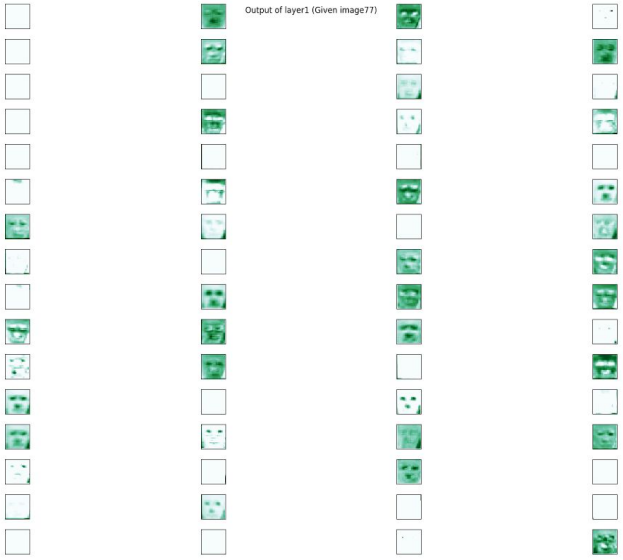
focus on 五官

5. (1%) 承(1)(2)，利用上課所提到的 gradient ascent 方法，觀察特定層的filter最容易被哪種圖片 activate。

(Collaborators:)

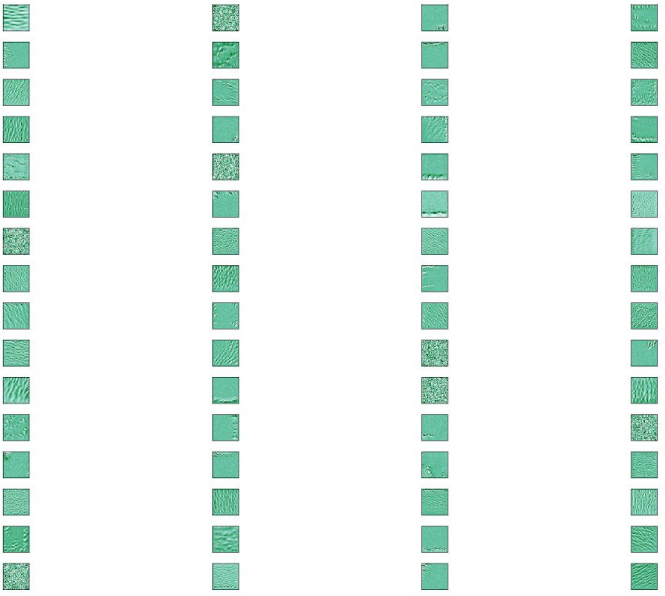
答： layer 0

layer 1



layer 2

layer 3



輪廓清晰的圖片