學號:R05944041 系級:網媒所碩二 姓名:戴長昕

1. Build a CNN

Kaggle Public Score	0.68514
epoch	250
batch_size	128

Structure:

Conv2D, Input: 48x48x1, Output: 48x48x32 Padding: Same, Kernel: (3x3)x32 Activation: Leaky Relu + BN

Conv2D, Input: 48x48x1, Output: 48x48x32 Padding: Same, Kernel: (3x3)x32 Activation: Leaky Relu + BN

Average pooling2D Input:48x48x32, Output:24x24x32

Conv2D, Input: 24x24x32, Output: 24x24x64
Padding: Same, Kernel: (3x3)x64 Activation: Leaky Relu + BN

Conv2D, Input: 24x24x32, Output: 24x24x64 Padding: Same, Kernel: (3x3)x64 Activation: Leaky Relu + BN

Average pooling2D Input:24x24x64, Output:12x12x64

Conv2D, Input: 12x12x64, Output: 12x12x128
Padding: Same, Kernel: (3x3)x128 Activation: Leaky Relu + BN

Conv2D, Input: 12x12x64, Output: 12x12x128
Padding: Same, Kernel: (3x3)x128 Activation: Leaky Relu + BN

Average pooling2D Input: 6x6x128, Output: 6x6x128

Flatten, Dense: 2048, Activation: Leaky Relu + BN, Dropout: 0.3

Dense: 1024, Activation: Leaky Relu + BN, Dropout: 0.3

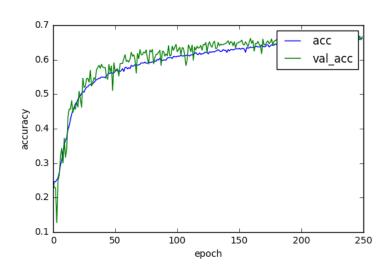
Flatten, Dense: 7, Activation: Softmax, Dropout: 0.5

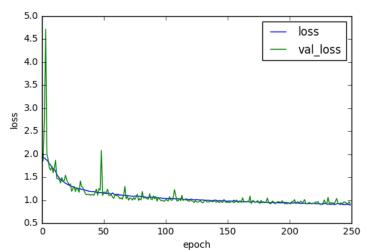
Parameters:

Total params: 4,880,743

Trainable params: 4,870,887Non-trainable params: 9,856

Training Procedure:





2. Build a DNN

通常Fully-Connected layer的參數量最多,架構一個參數量和 CNN差不多的神經網路可深可淺,關鍵在於層間隱藏單元的數量,應題目要求DNN,所以建造一個五層Dense layer且隱藏單元為1024的DNN。

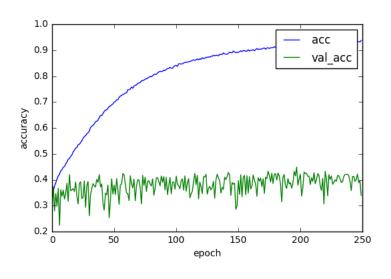
Parameters:

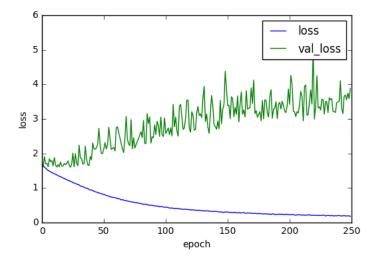
• Total params: 5,532,679

Trainable params: 5,524,487Non-trainable params: 8,192

Kaggle Public Score	0.33832
epoch	250
batch_size	128

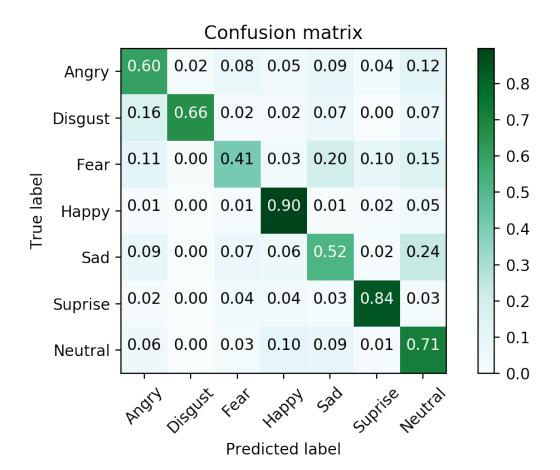
可以發現DNN能夠在training data中收斂並得到很好的training accuracy,然而在validation data和testing data上表現得很糟糕。





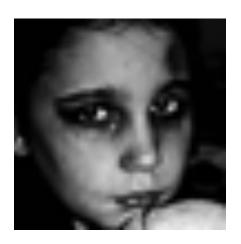
3. Analyze the Model by Confusion Matrix

使用Pt.1的CNN模型在validation data上做預測,從Confusion Matrix可以看出哪些表情不容易分辨,如Fear, Angry, Sad, Neutral這些表情較難界定。除了表情本身外,training data的數量也和預測的準確率成正向關,可以知道類別的training data的數量對於訓練的影響。



5. Analyze the Model by Visualizing Filters

原圖



較活躍的第二層filters。

