MSBD6000B Project 2 Flower Recognition

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Stage 1 : Fine-Tuning Fully connected layer

In this project , I used VGG19 model weight which is trained on IMAGENET dataset ,to do fine tuning and finally get an strong classifier on this dataset.

strategy is: in the first stage I did not update the convolutional layers weight, only update the backend FC layers, so that we can straightly get an better initial weight for stage2's training.

In stage1 training, firstly I met a serious overfitting problem, so i tried more aggressive Dropout rate(=0.7) and used the Batch Normalization, get 93.964% validation accuracy by only train the fc layer and not preprocessed original training set.

```
model.add(Dense(1024))
model.add(BatchNormalization())
model.add(Activation('relu'))
model.add(Dropout(0.7))

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```

after that I use the fully connected layer that is pretrained as the bottom of my final model.

Stage 2 : Fine-Tuning VGG19 network

In stage2 I trained whole network, except the first 6 layers , because according to

First time I tried learning rate = 1e-5 , momentum = 0.9,by 160 epochs then I find that learning rate seems too small

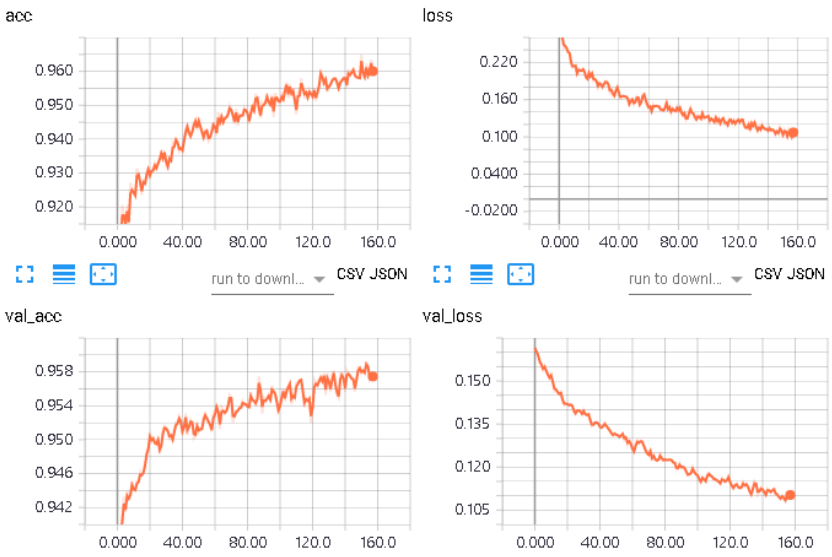

Figure (1) : 1st experiment : learning rate = 1e-5 , momentum = 0.9,by 160 epochs

So in final experiment I tried Learning rate = 1e-4, momentum = 0.9, decay = 1e-7, and got my final fine tuned VGG 19 model

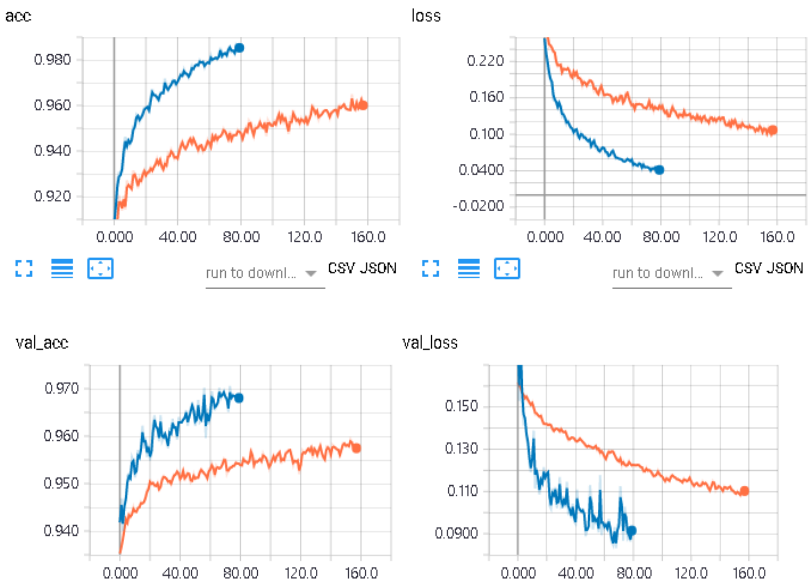

Figure (2) : 2nd experiment (blue line) learning rate = 1e-4 , momentum = 0.9,decay=1e-7,by 160 epochs

Final result :

VGG19 _Train the last 13 layer and FC layer pretrained by bottleneck feature

Highest validation accuracy is 97.1%