Pan IIT Hackathon Submission :

Submitted By:

Team : Open_ML (Inspired by OpenAI)

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Final Accuracy : 99.47 % (Transfer Learning using VGG13_BN)

Approach Used :

1. Transfer Learning
2. Fine tuning
3. Data Augmentation

Language , Framework , Libraries and Hardware :

1. Python3
2. PyTorch
3. Numpy , OpenCV , Pandas
4. NVIDIA GTX 1080 (8 GB)

Procedure :

1. Data Augmentation :

For Data Augmentation we used following techniques:

a. **Random Horizontal Flip** : This transform randomly flips the image horizontally with probability **0.5**

b. **Random Vertical Flip** : This transform randomly flips the image vertically with probability **0.5**.

c. **Random Rotation** : This transform randomly rotated the image about an angle between **-60 and 60 degrees**.

2. Transfer Learning + Fine tuning:

Data and Training specifications:

a. All model parameters (Convolutional and Fully connected) are tuned during training.

b. **Cross Entropy Loss Function.**

c. **Stochastic Gradient Descent** is used with momentum 0.9 and learning rate **0.01 for first 20 epochs , 0.001 for next 20 and 0.0001** for rest of the training.

d. Random splitting into training (4000 samples) and testing (1000 samples) set.

e. Batch size of 20 with shufflle=True.

f. Same transformations are applied to testing data while testing but no transformations were applied on submission (40000 samples) data.

g. Input size of the images are changed to 224 x 224 keeping the channels same and converted to tensors of range [0,1].

Using AlexNet :
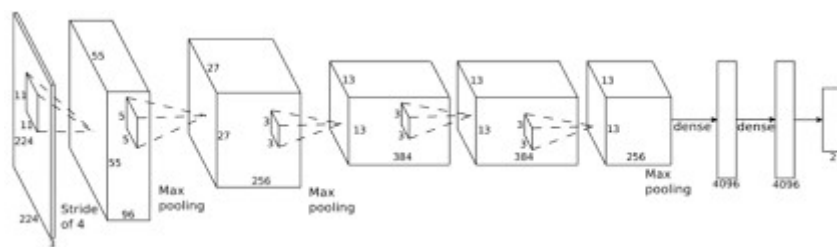
a. Alexnet model is initialised with pretrained weights .

b. The dimension of final output layer is changed to 6.

c. we achieved **98.00 %** automated evaluation accuracy on submission data which on further training increased to **98.3 %**.

Using VGG13 with Batch Normalisation:

a. VGG13_BN model is intialised with pretrained weights.
b. The fully connected layers are modified a bit from standard one to reduce the parameters and dimension of final layer is changed to 6.
c. we achieved **99.145 %** automated evaluation accuracy on submission data which on further training increased to **99.47 %**.

Note : Final Submission is based on VGG13_BN