MID EVALUATION REPORT FOR MACHINE LEARNING COURSE PROJECT

PROJECT TEAM MEMBERS:

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Project Description

In this project we plan to solve the problem of face detection using a face detector. Once trained the face detector should be able to identify multiple faces within a picture.

Collection of Dataset

We have used the same dataset as used by the paper https://arxiv.org/pdf/1502.02766.pdf
The dataset is available at https://lrs.icg.tugraz.at/research/aflw/. We had already asked for permission for this dataset and we have got the required access for this.

Pre-processing of the data

We have pre-processed the data that we received to get postive and negative examples for our training. We have constructed 24000(approx) black and white images from the data for faces, which are postive examples. We have also constructed 1,20,000(approx) negative images from the faces.
For this, we have used sliding windows across each image. If the intesection over Union (IoU) of the sliding window with the positive image is lesser than 0.3. All the images have been taken to be 128x128.

Program

We have used tensorflow for creating the model of Deep Convolutional Neural Network. Taking in so many images for training has been a challenge. We have used training batches of 120 each of which has 24 images and 96 positive images.
The layers that we have used in our program are as follows:-

-- Convolutional Layer of size (5 x 5 x 1 x 20) - stride used is 'same'
-- Convolutional Layer of size (5 x 5 x 20 x 35) - stride used is 'same'
-- Max Pool Layer – reduces image to 64 x 64
-- Convolutional Layer of size (5 x 5 x 35 x 40) - stride used is 'same'
-- Convolutional Layer of size (5 x 5 x 40 x 25) - stride used is 'same'
-- Convolutional Layer of size (5 x 5 x 25 x 20) - stride used is 'same'
-- Max Pool Layer – reduces image to 32 x 32
-- Fully Connected Layer (32 x 32 x 20)-1024
-- Fully Connected Layer (1024)-1024
-- Fully Connected Layer (1024)-1

We have used Cross Entropy Loss function in our program and are using the inbulit 'Adam Optimizer' in Tensorflow. Our learning rate is 3e-3 and we are using a reqularization parameter of 0.01.

We have also employed the dropout feature of Tensorflow with the keepprob factor as 0.8.

Actvation units at all the layers has been kept to be ReLU. At the last layer we have used sigmoid activation.

With this we have achieved an accuracy of 75% on training data.