Name: ADARSH THAKUR

Batch: **AI-MAJOR-AUG**

**DOCUMENTATION**

a) Which Neural Network and why?

Ans: I have used Convolutional Neural Networks in my project. Convolutional networks are flexible and work well on image data.  As one researcher points out, convolutional layers exploit the fact that an interesting pattern can occur in any region of the image, and regions are contiguous blocks of pixels.  But one of the reasons why researchers are excited about deep learning is the potential for the model to learn useful features from raw data. Now, convolutional neural networks can extract informative features from images, eliminating the need of traditional manual image processing methods.

b) Which optimizer and why?

Ans: I have used Stochastic Gradient Descent (SGD) in my project. Stochastic Gradient Descent addresses both of these issues by following the negative gradient of the objective after seeing only a single or a few training examples. The use of SGD in the neural network setting is motivated by the high cost of running back propagation over the full training set.

c) Which accuracy metric and why?

Ans: I have used Area Under Curve in my project. Area Under Curve (AUC) is one of the most widely used metrics for evaluation. It is used for binary classification problem. AUC of a classifier is equal to the probability that the classifier will rank a randomly chosen positive example higher than a randomly chosen negative example.

d) Which loss function and why?

Ans: Computes the crossentropy loss between the labels and predictions. Use this crossentropy loss function when there are two or more label classes. We expect labels to be provided in a one\_hot representation. If you want to provide labels as integers, please use SparseCategoricalCrossentropy loss. There should be # classes floating point values per feature.

e) Brief information on how cleaning was done (if any)?

Ans: The name of the data set is [fer2013](https://www.kaggle.com/deadskull7/fer2013) which is an open-source data set that was made publicly available for a Kaggle competition. It contains 48 X 48-pixel grayscale images of the face. There are seven categories (0=Angry, 1=Disgust, 2=Fear, 3=Happy, 4=Sad, 5=Surprise, 6=Neutral) present in the data. The CSV file contains two columns that are emotion that contains numeric code from 0-6 and a pixel column that includes a string surrounded in quotes for each image.

We then create different lists of storing the testing and training image pixels. After this, we check if the pixel belongs to training then we append it into the training list & training labels. Similarly, for pixels belonging to the Public test, we append it to testing lists.

Once we have added the pixel to the lists then we convert them into NumPy arrays and reshape X\_train, X\_test. After doing this we convert the training labels and testing labels into categorical ones.

g) What functions/features of OpenCV were used?

Ans: functions/features:

1. Read/Write/Display images and videos with function cv::imwrite, cv::imshow, cv::imread, cv.VideoCapture(), cv.VideoWriter()

2. Used rectangle shape making by cv2.rectangle().

3. Print text on the live video screen by cv2.putText().

4. apply layers using Sequential(),model.add().

h) Which dataset have you used?

Ans: “fer2013.csv”