Facial Emotion Recognition

horizontal line

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Problem Statement: Recognition of 7 primary emotions displayed by human facial expressions.

According to researchers, 90% of overall communication can be non-verbal. This is based on the various gestures, tones, expressions along with verbal comprises of communication. It has been difficult for technology to keep up and identify the hidden intentions and intonations. In this project, we aim to recognise the facial expressions using a web camera.

The dataset used is open source dataset in Kaggle competition for facial recognition. It comprises of about 28000 images. The labels are 0 to 6.

* 0 = Angry
* 1 = Disgust
* 2 = Fear
* 3 = Happy
* 4 = Sad
* 5 = Surprise
* 6 = Neutral

The data is preprocessed. The values of pixels are normalized. Now the intensities range between 0 to 255.

We referred a research paper to build a CNN to classify the input images. Keras library of Python is used. The input image is a 48 x 48 image. The output is a label to which the image has been classified into. After training, the model architecture is saved as a JSON file. The weights after training are also saved. The number of epochs were 10 to 15.

We used OpenCV’s video capture function to capture the video frame by frame. The frame is then fed to face detector function. We have used pre-trained Haar Cascade to detect the frontal face. This is an open source detector that is published on GitHub. Haar Cascade needs an input which is in grayscale form. So the detected frame is first converted to grayscale. The detector returns a rectangle/bounding box around the face that has the coordinates as x, y, w, h.

There is a list of all detected faces. From this list, each face is fed to the neural network and according to the predicted output, appropriate emotion is printed on the screen.