

The background features several abstract geometric elements. In the top left, a thin grey line extends horizontally and then diagonally down to a small grey dot. In the bottom left, a dashed grey semi-circle is partially visible. A series of thin grey lines form a stepped, zig-zag pattern across the lower half of the image. On the right side, there are large, overlapping geometric shapes: a dark teal hexagon, a yellow diamond with a white border, and another dark teal hexagon below it.

FACIAL **EMOTION DETECTION**

Course Name : Mini Project
Course Code : CSD317

Team Introduction

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Problem Description

- Sentiment Analysis is already widely used by different companies to gauge consumer mood towards their product or brand in the digital world.
- However, in offline world users are also interacting with the brands and products in retail stores, showrooms, etc. and solutions to measure user's reaction automatically under such settings has remained a challenging task.
- Emotion Detection from facial expressions using AI can be a viable alternative to automatically measure consumer's engagement with their content and brands.



Problem Description

- A candidate-interviewer interaction is susceptible to many categories of judgment and subjectivity. Such subjectivity makes it hard to determine whether candidate's personality is a good fit for the job.
- Identifying what a candidate is trying to say is out of our hands because of the multiple layers of language interpretation, cognitive biases, and context that lie in between.
- That's where AI comes in, which can measure candidate's facial expressions to capture their moods and further assess their personality traits.



Problem Description

- Video games are designed keeping in mind a specific target audience. Each video game aims to evoke a particular behavior and set of emotions from the users.
- During the testing phase, users are asked to play the game for a given period and their feedback is incorporated to make the final product.
- Using facial emotion detection can aid in understanding which emotions a user is going through in real-time as he is playing without analyzing the complete video manually.



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- Using facial emotion detection can aid in understanding which emotions a user is going through in real-time as he is playing without analyzing the complete video manually.
- Emotion detection software enhance the overall user experience



The slide features decorative geometric elements on both the left and right sides. These consist of overlapping triangles and parallelograms in dark teal, yellow, and white, creating a modern, abstract border.

Problem Statement

Develop the solution for detection of facial emotions using webcam.

Input/Output

➤ Input

- Video Frames

➤ Output

- Video frames indicating detected facial emotion.



Problem Solution

- To develop the solution we used the TensorFlow, Keras, OpenCV and NumPy etc. OpenCV library used for capturing and processing of video frames. TensorFlow and Keras library used to train the deep learning model. NumPy library is used to convert images into NumPy matrix.
- This solution recognizes facial emotion of “Happy”, “Angry”, “Sad”, “Surprised”, “Disgusted”, “Neutral”, “Fear”.



Problem Solution

- Import required libraries.
- Generate images of classes which have less images to avoid biasing.
- Resize the images in the dataset.
- Create training data array of images.
- Shuffle the images randomly.
- Separate Dependent variable(Output Label) and Independent variable(Image Matrix).
- Normalize the matrix values.
- Import a pretrained model.
- Change the last layer classes to seven and create a new model.
- Compile the new model.
- Train the model on given training data.
- Save the trained model.



Problem Solution

- Import required libraries.
- Create a dictionary of emotions and their numbers.
- Load the model
- Load the weights of the model.
- Initialize the webcam using OpenCV.
- Take video frames until 'q' key is not pressed.
- Give the frame to face detection pretrained model.
- Detect faces available on camera.
- Take each face available on the camera and Preprocess it as follows:
 - Convert the coloured image to grayscale image.
 - Get the co-ordinates of faces to plot the rectangle.

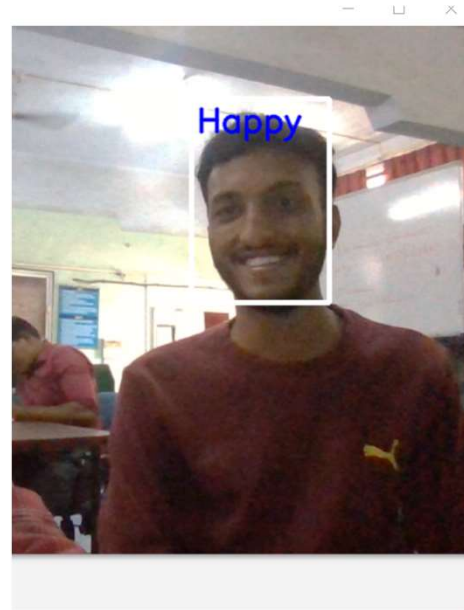
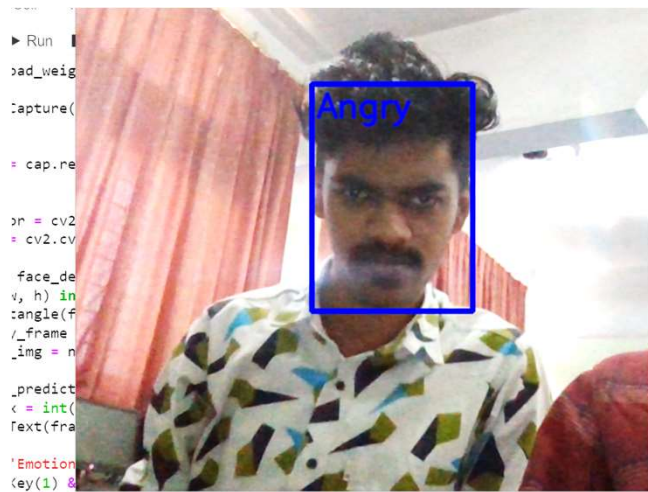


Problem Solution

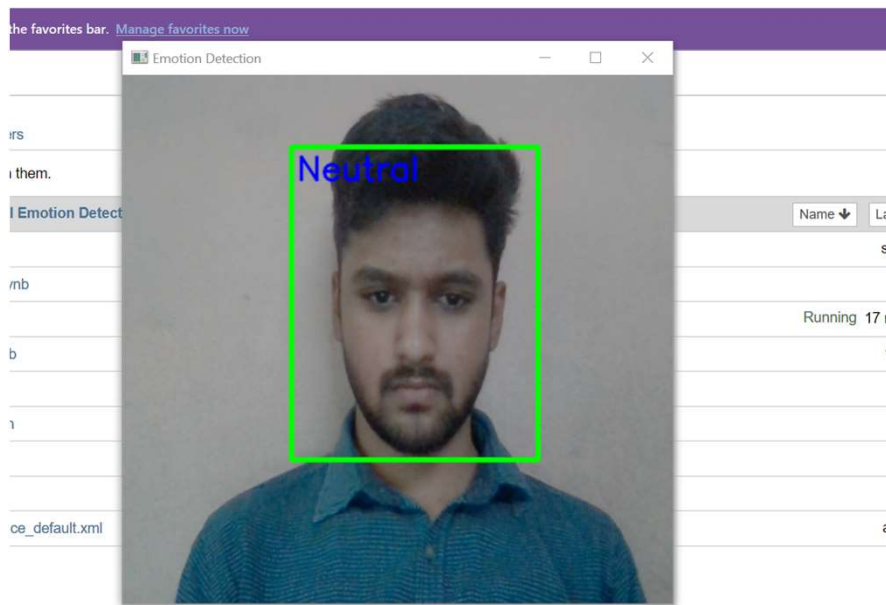
- Get the cropped image of faces.
- Predict the Emotion and find the corresponding dictionary value.
- Output the emotion using OpenCV.



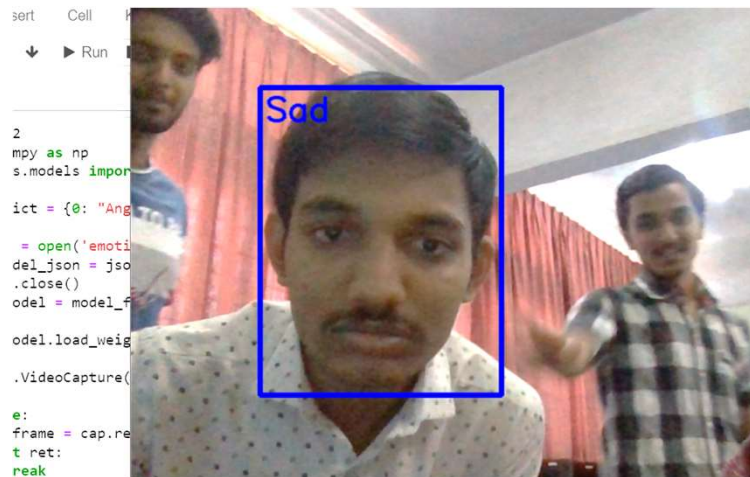
Snapshots



Snapshots



Snapshots



Conclusion

- In this we used two models and OpenCV to get the required output. Benefit of using two models is multiple faces will be detected in frame.
- The face detection and emotion recognition are very challenging problems. They require a heavy effort for enhancing the performance measure of face detection and emotion recognition.
- In this project we used CNN(Convolutional Neural Network) to train the model. This method have some advantages and some disadvantages.





Thank You!

