Synapse Task 3 Synopsis

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EMOJI CREATION WITH FACIAL EMOTION DETECTION USING CNN

I. INTRODUCTION

A person's facial expressions can identify their feelings because they correspond to their emotions. It can be considered as a concrete way of detecting whether persons are being honest or not based on facial expressions, since they are non-verbal ways of expressing emotion. We express our emotions through our voice, hand, and body gestures, and mostly through our facial expressions. People express their emotions in day-to-day interactions. Emojis are visual representations of emotions. Modern communication apps like Facebook, WhatsApp, Twitter, etc. use emoji to express emotions. Interpersonal relations are affected by facial expressions, which convey nonverbal cues. The automatic recognition of human facial expressions can be an important aspect of natural human-machine interfaces; it may also be used in behavioral science. Humans can recognize facial expressions more quickly without any effort, but machine expression recognition is still difficult. Over the past few years, advances in face detection, mechanism for feature extraction, and techniques to classify facial expressions have been made, but it is difficult to develop an automated system to accomplish this task. Techniques for detecting facial expressions have been reported in two distinct ways. Using an explicit classifier, the first method allows separation of facial expressions, whereas the second method uses extracted facial highlights to determine facial recognition. In the facial action coding system (FACS), action units serve as markers for expression.

II. METHODOLOGY

Facial expression is the common signal for all humans to convey the human emotions. There are many attempts to make an automated facial expression analysis tool as it has applications in many areas such as robotics, medicine, driver assistance systems, and polygraph. Dating back to the 20th century, Ekman et al. defined seven basic emotions, independent of the culture in which a human grows with the seven phrases (anger, fear, happiness, sadness, contempt, disgust, and surprise). In recent research on the facial recognition data set, Sajid et al. uncovered the impact of facial asymmetry as a marker of age estimation. Their findings show that the asymmetry of the right face is better than the asymmetry of the left face. The appearance of the face always poses a large problem with the detection of the face. Ratal and others. provides the solution for the variability of the face posture appearance. They used an invariant three-dimensional positional approach using topic specific descriptors. There are many problems such as excessive make-up and expression that are resolved using convolutional networks. Very recently, researchers have made extraordinary accomplishments in the facial expression detection, which helps in improving of neuroscience and cognitive science, in the field of facial expression. As well, the development of computer vision and machine learning makes the identification of emotions much more specific and accessible to the general public. Consequently, the recognition of facial expression develops rapidly as a sub-field of image processing.

III. EXISTING SYSTEM

Current approaches focus mainly on facial investigation, maintaining the background intact and thus constructs a large number of unnecessary and misleading characteristics that confuse the process of CNN formation. Predicting the human emotions through their facial expression. Most of the current approaches are not so

accurate. Some approaches take lot of time to detect the facial expressions

IV. PROJECT GOAL

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V. COMPONENT USED

1. User Requirements: In this project we use user real time facial expression to map with the respective emoji. Where we have to detect the user facial emotion and have to map with the respective emoji with the detected
emotion.

2. Hardware Requirement: Deep learning necessitates a massive amount of processing power. Graphic Processing Units (GPUs) with high performance are ideal because they can manage a big volume of operations in several cores with enough of memory. Managing numerous GPUs on-premises, on the other hand, can place a significant strain on internal resources and be extremely costly to grow.

1. Processor: core(i5)
2. Speed: 2.21 GHz
3. Ram: 8 GB
4. Hard Disk: 1 TB(HDD) 3.2 Non

3. Python 3.9: Python is a free open source tool for constructing and assessing deep learning models that is both powerful and simple to use. It covers the fast numerical computation libraries and lets you define and train neural network models with just a few lines of code.

4. Open CV: OpenCV Python Server side Programming is a programming language that is 10 used to create web applications. OpenCV is a Python package for dealing with computer vision issues. Understanding and analyzing digital images by a computer, as well as processing and providing pertinent data once the image has been analyzed, are all examples of computer vision.

5. Pillow: The most popular and de facto standard library in Python for loading and working with image data is Pillow. Pillow is an updated version of the Python Image Library, or PIL, and supports a range of simple and sophisticated image manipulation functionality. It is also the basis for simple image support in other Python libraries such as SciPy and Matplotlib.

6. Tensorflow(keras): Keras is compact, easy to learn, high-level Python library run on top of TensorFlow framework. It is made with focus of understanding deep learning techniques, such as creating layers for neural networks maintaining the concepts of shapes and mathematical details. The creation of frame work can be of the following two types − o Sequential API o Functional API

7. Dataset: FER2013 by Kaggle . The data comprises of grayscale images of faces at a resolution of 48x48 pixels.

The faces have been automatically registered such that they are more or less centered in each image and take up around the same amount of area. The aim is to categorise each face into one of seven categories based on the emotion displayed in the facial expression (0=Angry, 1=Disgust, 2=Fear, 3=Happy, 4=Sad, 5=Surprise,6=Neutral). There are 28,709 examples in the training set and 3,589 examples in the public test set.

VI. GENERAL BLOCK DIAGRAM

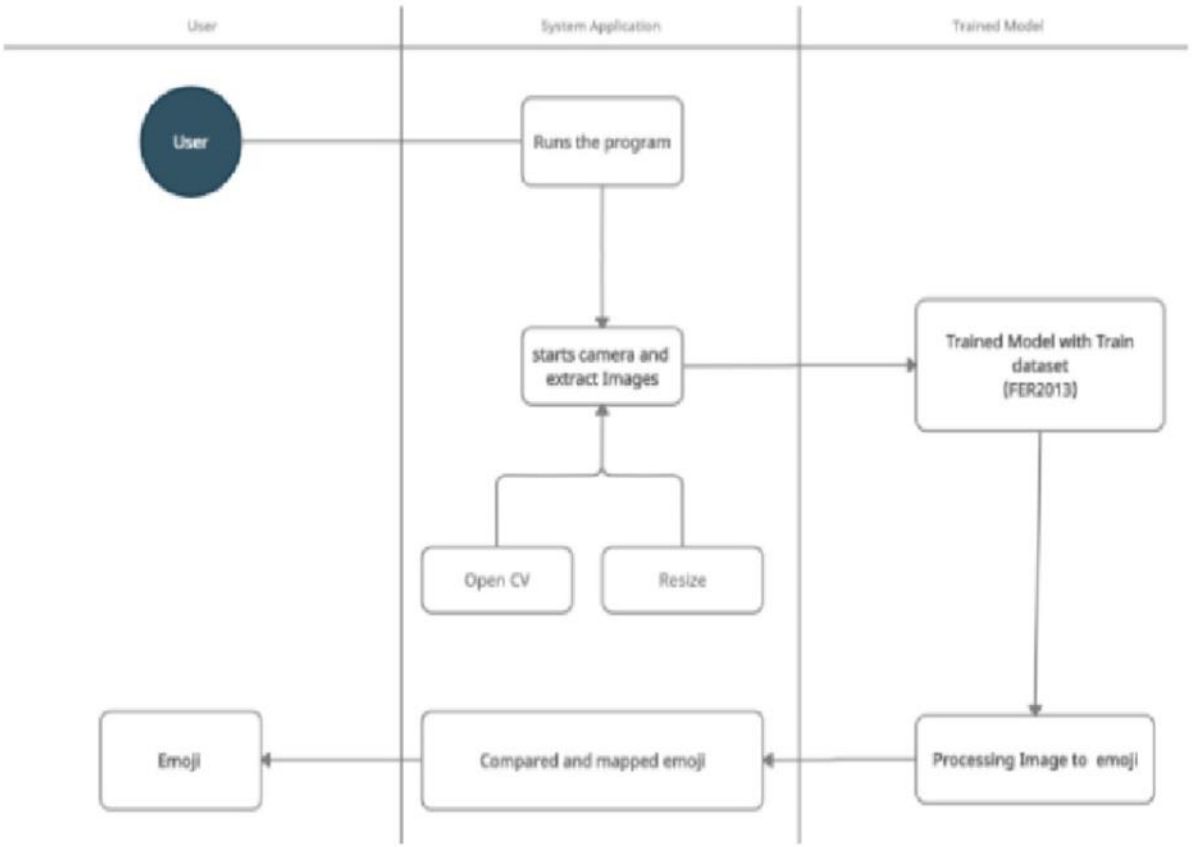

Fig 1: Block Diagram

VII. WORKING PRINCIPLE

The process of FER has three stages. The preprocessing stage consists of preparing the dataset into a form which will work on a

generalized algorithm and generate efficient results. In the face detection stage, the face is detected from the images that are captured real time. The emotion classification step consists of implementing the CNN algorithm to classify input image into one of seven classes.

VIII. PROCEDURE

The proposed system carries out in three steps as Face Detection, Face Recognition and Face Classification. In the first step a video camera is used to capture real time human face and detect the exact location of face by a bounding box coordinates. Face detection is performed using Haar cascade detection with open CV library. The images detected have shapes, objects and landscapes etc. In this phase human face is detected and face features are extracted and stored in the database for face recognition. The CNN model is used to classify human emotions. Faces are recognized from the database and are compared to identify or detect the face through embedding vectors. First face is detected and then recognized with the database features and matching using CNN model training and testing database. Finally, the recognized human face is classified based on the expression in real time as Angry, fear, disgust, happy, neutral and surprise.

IX. CONCLUSION

In this project, we mapped emojis to classify facial emotions over static facial images using deep learning techniques was developed. Emojis are approaches to signify nonverbal cues. These cues have come to be a crucial part of on-line chatting, product review, logo emotion, and plenty of more. It led to growing advanced studies related to emoji-driven storytelling.