Project Summary

Live Class Monitoring Face Emotion Recognition

Emotion recognition is the process of identifying human emotion. People vary widely in their accuracy at recognizing the emotions of others. Use of technology to help people with emotion recognition is a relatively nascent research area. Generally, the technology works best if it uses multiple modalities in context. To date, the most work has been conducted on automating the recognition of facial expressions from video, spoken expressions from audio, written expressions from text, and physiology as measured by wearables.

While digital platforms have limitations in terms of physical surveillance but it comes with the power of data and machines which can work for you. It provides data in the form of video, audio, and texts which can be analyzed using deep learning algorithms. Deep learning backed system not only solves the surveillance issue, but it also removes the human bias from the system, and all information is no longer in the teacher's brain rather translated in numbers that can be analyzed and tracked.

As a first step, I took dataset from the Kaggle competition, which included images classified into seven different categories of face expression and contained almost 35000 images.

Then I started training with a CNN Model, which gave us training and testing accurately 75.09% and 65.19% respectively. If the training dataset had more images, there would be very high improvement in the training and testing accuracy.

Saved my CNN model as .h5 file, which is an HDF format that can hold multi-dimensional arrays. Following that, I tested my application on a local camera, for which I created app.py, requirements.txt, procfile and some other files used in both deployment and testing my model. Next, I created my web application using streamlit.

Web app was then created on streamlit an deployed to the website using streamlit-webrtc, which allows us to access the web app on the website, which is a real-time video on the network. I created a streamlit web app and then deployed it to Heroku, an easy-to-use cloud platform for deploying web apps.

Our model is giving an accuracy of 75.09% in training and 65.19% in testing, it is robust, works well in a dim light environment as well. The application is able to detect face and predict the right expression while checking it on a local host. Finally, through this model teachers can understand the students' change in emotions during online classes and address the problems faced my students and change their way of teaching if necessary.

Contributor Roles:

1. **Sharath Diwakar** *(mailmesharathd@gmail.com)*
    - Selecting the dataset
    - Basic visualization to see different images of different emotions
    - CNN Algorithm
    - Data Preprocessing
    - Data Validation
    - Web application (testing on webcam(localhost))
    - Deployment on Streamlit and Heroku

GitHub Link: *https://github.com/Sharath2021/-LIVE-CLASS-MONITORING-SYSTEM-Face-Emotion-Recognition*

Streamlit Link: *https://share.streamlit.io/sharath2021/-live-class-monitoring-system-face-emotion-recognition-/main/app.py*

Heroku Link: *https://livefaceemotiondetection.herokuapp.com/*