

Project Proposal- CS-512

Project Title

Real Time Facial Emotion Detection in Live Videos Feed

Student Group

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Problem Statement:

Emotions often mediate and facilitate interactions among human beings. Thus, understanding emotion often brings context to seemingly bizarre and/or complex social communication. Emotion can be recognized through a variety of means such as voice intonation, body language, and more complex methods such as electroencephalography (EEG). However, the easier, more practical method is to examine facial expressions. There are seven types of human emotions shown to be universally recognizable across different cultures: anger, disgust, fear, happiness, sadness, surprise, contempt. Interestingly, even for complex expressions where a mixture of emotions could be used as descriptors, cross-cultural agreement is still observed. Therefore, a utility that detects emotion from facial expressions would be widely applicable.

Proposed Solution Model:

Training:

- a) We will be using following freely available datasets to develop our model-,
- i) The extended Cohn-Kanade dataset (CK+) and
 - ii) The Japanese Female Facial Expression (JAFPE) dataset.

The CK+ dataset, although small, provides well-defined facial expressions in a controlled laboratory environment. Additionally we may use FER, AFEW, MMI or CKP datasets

b) Next, we will be training our model using Convolutional Neural Networks (CNNs) on the above mentioned datasets. For our CNN model, we will be experimenting with different CNN architectures like AlexNet and GoogLeNet and would find the best performing architecture to train our model.

c) We will be using TensorFlow as deep learning library to train our model. We are also planning to leverage GPU capabilities provided by Nvidia.

Testing:

Once we are done with training, we will be focusing on testing on our own captured video feed. We will be extracting frames from the live video and identifying the frames using feature extraction to perform emotion detection using OpenCV and will feed those static images to our trained model in order to get testing result on unknown video stream. We will also be calculating the confusion matrix which will contain accuracy, precision and recall for our model.

By the end of this project, we will be targeting one of the application –

- 1. Monitor lecture rooms to improve overall performance and efficiency** - Based on the resultant emotion categories for a student, we will be labeling the overall behavior of the students in the class which will help lecturer to improve every day and make his/her class more interactive or exciting.
- 2. Real conversation experience to blind people**- Based on the resultant emotion category of the person, our system will be generating the text speech to annotate the actual emotion to the blind people. It will assist the person to know if the person standing in front is feeling the same way while communicating verbally.

Roles and Responsibilities:

- Train the CNN model using AlexNet using TensorFlow as deep learning library - **Sudipta**
- Training the CNN model using GoogLeNet using TensorFlow as deep learning library - **Mahima**
- Testing with feature extraction (OpenCV) and trained data model - **Sudipta , Mahima**

References:

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