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# CS 554: Computer Vision: Project Proposal

Complex Facial Emotion Classification

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1. *Project Description and Motivation*

The objective of the project is to perform complex emotion classification using Deep Learning techniques on video sequences.

Automatic emotion recognition has witnessed increased demand both in commercial and surveillance applications. Many commercial companies strive for immediate satisfaction evaluation of customer service. In addition, some delivery companies have shown interest in the technology, for monitoring the mental state of their drivers. Considering this increased interest in the field of emotion classification, our group has decided to tackle this problem as part of the Computer Vision course. In addition, since research areas of both members are related to the use of facial videos for Deepfake detection, we believe that familiarizing ourselves with facial video processing and technologies such as landmark tracking would also benefit us in our research.

The aim is to find emotions of the given dataset by analyzing the facial landmarks of given clips and train a neural network. We will apply computer vision tecniques we have learned during the course to find the facial landmarks. After we implement visual analysis of the video sources, we will try to use audio of the data points to train and test our system. The planned methodology is to train a neural network first based on the visual information of the dataset and then combine audio information to see how it affects the reliability of the system. We will also try to analyze more than 6 types basic emotions which are happy, sad, anger, disgust, suprise and include other types of emotions with respect to dataset we will use.

1. *Datasets*

Several datasets will be used for the training of the model. Some of the datasets are publicly available while others require formal requests to be submitted to the dataset source. Table 1 provides a summary of some of the available datasets considered for the projects. They range in complexity and size. Not all are expected to be used in the final project. In addition as the project progresses some new datasets might be added. Note that some of the datasets are audiovisual, which is indicated by the language that they are using. Once we have implemented our system working with one of the dataset, preferably BAUM-1 if we got the authorization; we will also try to train / test our system with other dataset without changing the hyperparameters to see how well our system generalizing the problem’s solution.

Table 1: Visual databases for emotion recognition.

| Databases | Language | Elicitation method | #of subjects | #of samples | Emotion  description | Year |
| --- | --- | --- | --- | --- | --- | --- |
| BAUM-1[1] | Turkish/English | Spontaneous | 31 | 2102 | 9 distinct emotions | 2017 |
| BAUM-2[2] | Turkish/English | Acted | 286 | 1047 | 8 distinct emotions | 2016 |
| SEMAINE[3] | English | Spontaneous | 150 | 959 conversations | 27 associated categories | 2013 |
| SAVEE [4] | English | Acted | 4 | 480 utterances | 7 distinct emotions | 2009 |

**Reference**

[1] S. Zhalehpour, O.Onder, Z.Akhtar and C.E.Erdem, “BAUM-1: A Spontaneous Audio-Visual Face Database of Affective and Mental States”, IEEE Trans. on Affective Computing, , Database web site: http://baum1.bahcesehir.edu.tr DOI: 10.1109/TAFFC.2016.2553038

[2]C. E. Erdem, C. Turan, Z. Aydin, "BAUM-2: A Multilingual Audio-Visual Affective Face Database", Multimedia Tools and Applications, vol. 74, No. 18, pp. 7429- 7459, 2015. DOI: 10.1007/s11042-014-1986-2

[3] McKeown, G.; Valstar, M.; Pantic, M.; Cowie, R.: The SEMAINE corpus of emotionally coloured character interactions, in Proc. IEEE Int. Conf. Multimedia & Expo, 2010, 1–6

[4] Haq, S.; Jackson, P.J.B.: Speaker-dependent audio-visual emotion recognition, in Proc. Int. Conf. Auditory-Visual Speech Processing, 2009, 53–58.

TODO :

-Convert LaTeX (Overleaf)

**CS 554 - Project Proposal**

Project Title: Facial Expression and Non-basic Emotion Recognition

Project Description: In this project we aim to use computer vision tools with an objective of recognizing emotions from the given images.

Datasets:

**Basic emotions:**

**Free datasets:**

<https://www.kaggle.com/sivlemx/facial-expression-of-emotion>

<https://research.google/tools/datasets/google-facial-expression/>

<https://www.kaggle.com/shawon10/ckplus>

<https://github.com/NVlabs/ffhq-dataset>

**Also has keypoints in it**

<https://www.kaggle.com/drgilermo/face-images-with-marked-landmark-points>