

CS766 - PROJECT PROPOSAL

Emotion detection from a given image using Convolutional Neural Networks

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Problem that we are trying to solve ?

This project detects the emotion (Angry, Happy, Neural, Fear, Sad and Surprise) of each face detected in a given image. Later, we will extend this project to detect Micro Expressions that gives very accurate detection of the emotions.

Why we want to solve this problem ?

With the increase in research in Robotics and AI, it is essential for the systems to understand human emotions so that they can react accordingly which will bring them a step closer to humanity. There are various ways of perceiving human emotions - touch, speech, and visual gestures. In this project, we will focus on facial expressions to predict a person's emotion.

Further, humans are very good at hiding these macro expressions to conceal their emotions. However, there are involuntary micro expressions which reveal a person's emotions even when he is trying to hide it.

Ways of approaching the solution

We will train a Convolutional Neural Network (CNN) for face detection and emotion detection using labelled database of face images.

The image pixels are converted to Local Binary Pattern (LBP) codes as grayscale values, which are mapped to a 3-D metric space and it is used as input for CNN models.

We will use Image Processing and Machine Learning libraries for implementation.

Timeline

Date	TASK
22nd Feb	Further Research
4th Mar	Implement Convolution Neural Network
18th Mar	Implement Face Detection to detect Multiple faces in an image
28th Mar	Implement Emotion Detection
8th Apr	Research on Micro Expression Detection
18th Apr	Implement Micro Expression Detection
25th Apr	Implement UI and Prepare Presentation
7th May	Improve UI, optimize the code and prepare the final report

References

- [1] Xiaobai Li, Xiaopeng Hong, Antti Moilanen, Xiaohua Huang, Tomas Pfister, Guoying Zhao, and Matti Pietikainen " *Towards Reading Hidden Emotions: A Comparative Study of Spontaneous Micro-expression Spotting and Recognition Methods* "
- [2] Ming-Hsuan Yang, Member, IEEE, David J. Kriegman, Senior Member, IEEE, and Narendra Ahuja, Fellow, IEEE " *Detecting Faces in Images: A Survey* "
- [3] Gil Levi and Tal Hassner " *Emotion Recognition in the Wild via Convolutional Neural Networks and Mapped Binary Patterns* "
- [4] Caifeng Shan, Shaogang Gong, Peter W. McOwan " *Facial expression recognition based on Local Binary Patterns: A comprehensive study* "