

Automated Facial Expression Recognition using Artificial Neural Networks

Team project

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project idea and overview:

Facial expression recognition is the task of classifying the expressions on face images into various categories such as anger, fear, surprise, sadness, happiness and so on. Emotional facial expressions can inform researchers about an individual's emotional state.

Applications:

That project applied many applications in the real world like

- 1-interactive robots.
- 2-Robots detect human emotional
- 3- Azura cloud
- 4-Human computer interaction

A Literature Review of Academic publications:

paper 1: Face Expression Recognition: a Brief Overview of the Last Decade

abstract of this paper: The huge research effort in the field of facial expression recognition (FER) technology is justified by the potential applications in multiple domains: computer science, engineering, psychology, and neuroscience, to name just a few. Obviously, this generates an impressive number of scientific publications. The aim

of this paper is to identify key representative approaches for facial expression recognition research in the past ten years (2003-2012)

paper 2: ANN-based Human Facial Expression Recognition in Color Images

abstract of this paper: This paper describes an ANN based human facial expression recognition method. An automatic technique is generated for detecting 22 most important facial feature point and generation of facial feature vector by finding the Euclidian distances between some particular points. Here the key facial regions are found based on a defined face model. The face model is generated by the detection of the eyes and mouth points. Skin color detection is done by 2D Color Space Skin Clustering Method and face detection is done by connected component analysis followed by a set of face heuristics. Feed forward back Propagation neural network is used as the network classifier to classify the facial expression from a set of seven basic expressions like happy, sad, surprise, fear, anger, disgust and neutral. The experiment is done on Color FERET Database and got an accuracy of 100% for trained dataset and 85% accuracy for test set.

paper 3: Facial Expression Recognition using Gabor filter and Multi-layer Artificial Neural Network

abstract of this paper: This paper deciphers the Facial Expression Recognition (FER) using Gabor Filter and Artificial Neural Network (ANN), extracts the facial expression using Gabor filter and then classify the facial expressions using the multi-layer artificial neural network. Recognizing facial expressions of human beings in an image processing by a computer is an interesting and challenging research work. This paper is based on detection and classification of facial emotion expressions. At first, we design an algorithm to detect the face region image in the whole image using Viola-Jones detection algorithm, then by using Gabor filter extracts the facial

features in the spatial domain. The Gabor filter is used to capture the whole frequency spectrum in all directions. And then extract meaningful facial features using Gabor Filter. Finally, they have been successfully classified the facial expressions using the extracted Gabor features of face image used as an input to the Artificial Neural Network classifier. The experimental results on database images of JAFFE show the robustness and better recognition rates of the proposed approach

paper 4: A Survey Paper on Facial Expression Recognition System

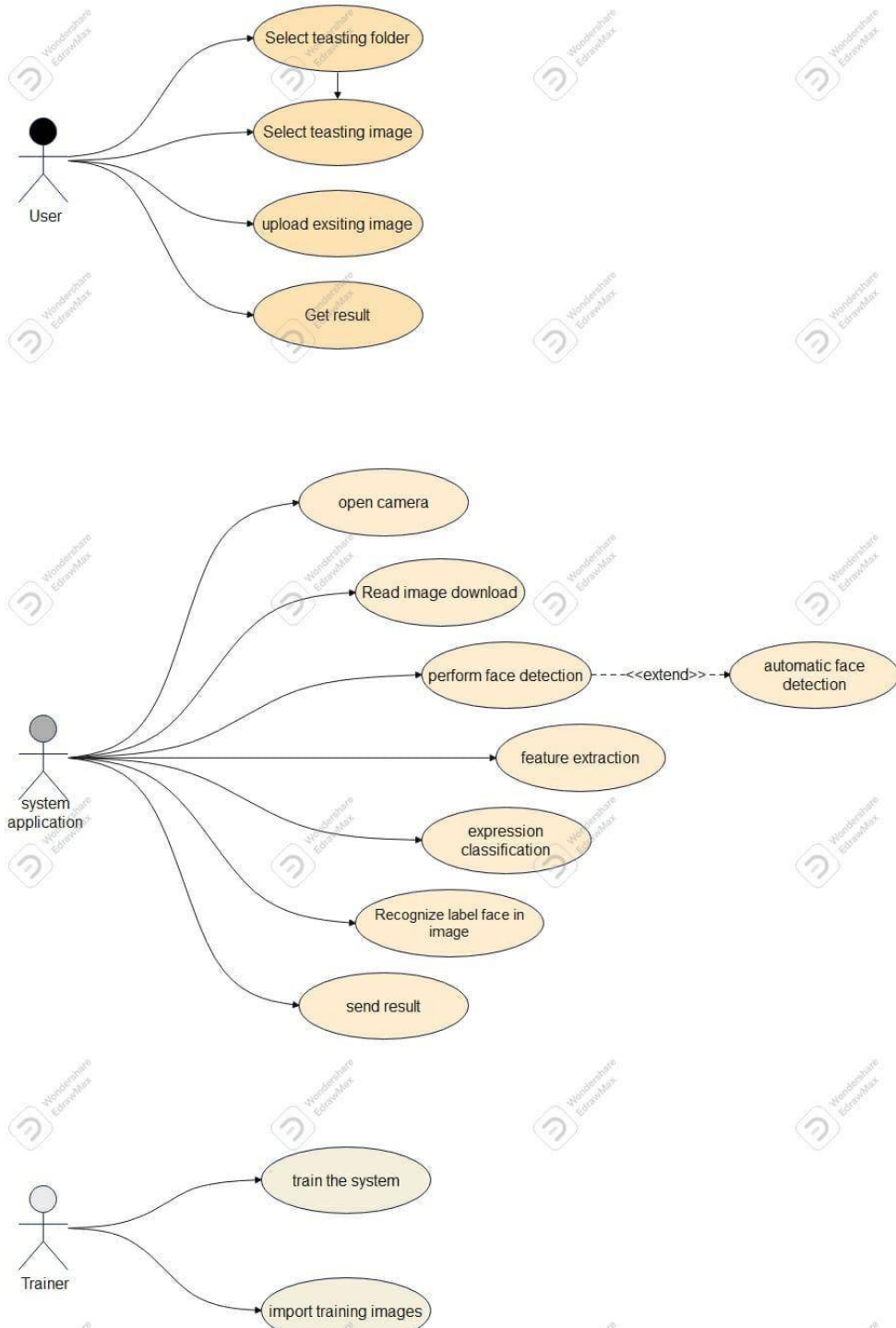
abstract of this paper: Facial expression recognition has many potential applications which have attracted the attention of researchers in the last decade. Feature extraction is one important step in expression analysis which contributes toward fast and accurate expression recognition. Happy, surprise, disgust, sad, anger and fear facial expressions Emotion are of facial recognition. Facial expressions are most commonly used for interpretation of human emotion. There is a range of different emotions in two categories: positive emotion and non-positive emotion. There are four types of generally using system: Face detection, extraction, Classification and recognition. In Existing system it is not so much identify exact emotion of a person . In this proposed taking the large scale image, hybrid extraction feature and ANN classification of frame based expression recognition try to detect facial expression detection and emotion detection for positive and non-positive images also design robust.

paper 5: Automatic Facial Expression Recognition in Standardized and Non-standardized Emotional Expressions.

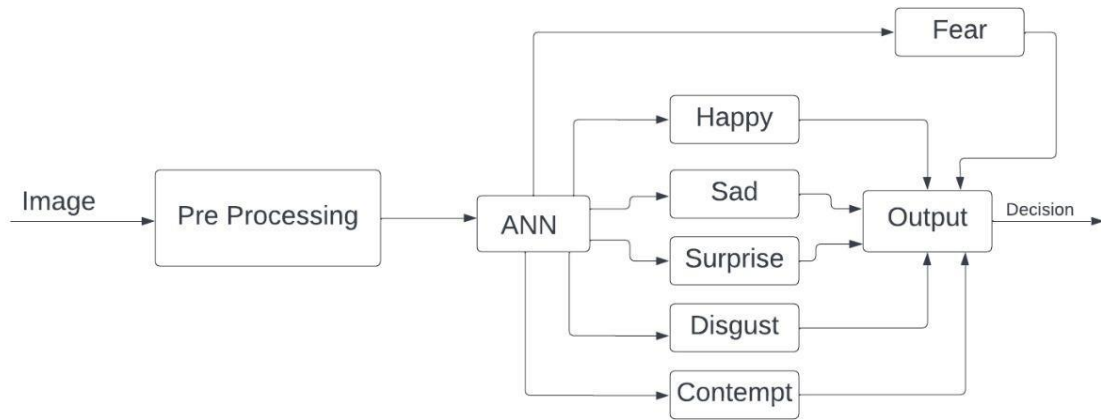
abstract of this paper: Emotional facial expressions can inform researchers about an individual's emotional state. Recent technological advances open up new avenues to automatic Facial Expression Recognition (FER). Based on machine learning, such technology can tremendously increase the amount of processed data. FER is now easily accessible and has been validated for the classification of standardized prototypical facial expressions. However, applicability to more naturalistic facial expressions still remains uncertain. Hence, we test and compare performance of three different FER systems (Azure Face API, Microsoft; Face++, Megvii Technology; FaceReader, Noldus Information Technology) with human emotion recognition (A) for standardized posed facial expressions (from prototypical inventories) and (B) for non-standardized acted facial expressions (extracted from emotional movie scenes). For the standardized images, all three systems classify basic emotions accurately (FaceReader is most accurate) and they are mostly on par with human raters. For the non-standardized stimuli, performance drops remarkably for all three systems, but Azure still performs similarly to humans. In addition, all systems and humans alike tend to misclassify some of the non-standardized emotional facial expressions as neutral. In sum, emotion recognition by automated facial expression recognition can be an attractive alternative to human emotion recognition for standardized and non-standardized emotional facial expressions. However, we also found limitations in accuracy for specific facial expressions; clearly there is need for thorough empirical evaluation to guide future developments in computer vision of emotional facial expressions.

Main functionalities/features:

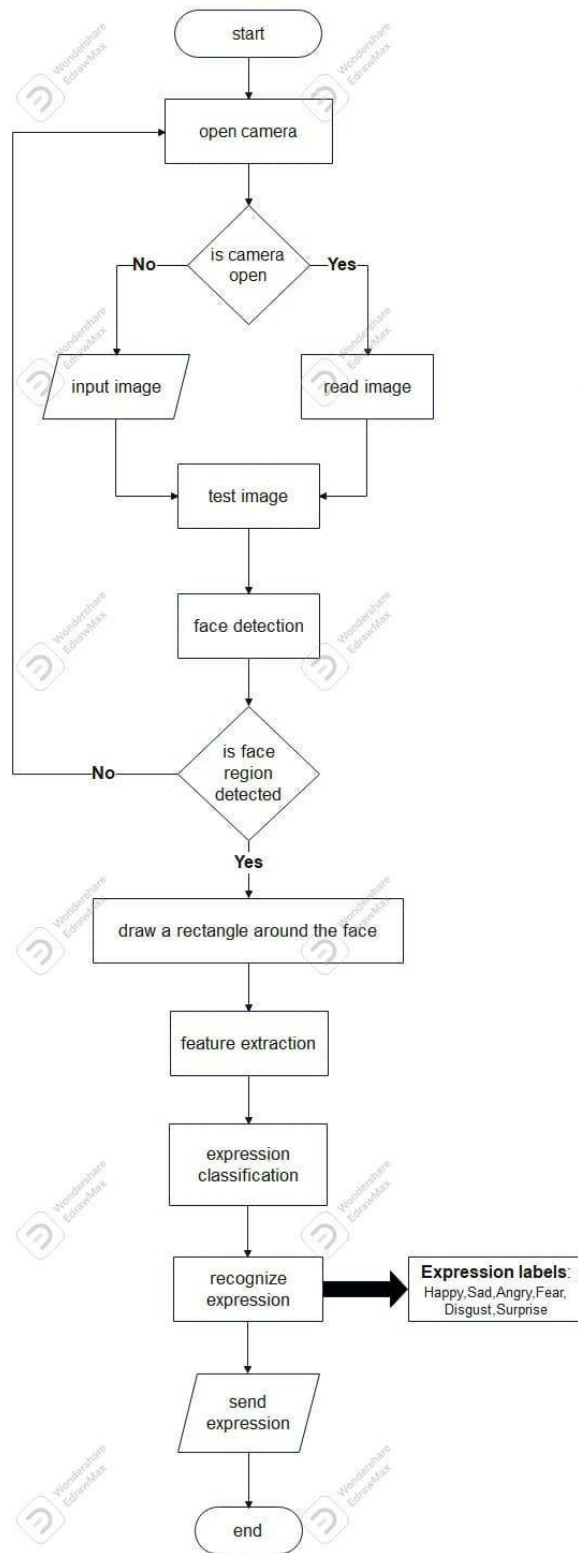
use case diagram:



All the details of the AI/Machine-Learning algorithm(s)/approach(es) used to develop your project:



Flow Chart to model and algorithm:



the Dataset employed:

<https://www.kaggle.com/datasets/msambare/fer2013>

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