Mood Detection by Image Processing

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Abstract **- Facial emotion recognition will definitely become vitally important in the coming future. However, the recognition of facial emotions is mainly addressed by computer vision, based on facial display and image. Also, detection of vocal expressions of emotions can be found in research works done by acoustic research workers. Most of these research paradigms are purely visual or purely to auditory emotion detection. However, we found that it is very interesting to consider these auditory and visual information together, for processing and providing results, since we hope this kind of multi-modal information processing will become a datum of information processing in future era. And by several intensive subjective evaluation studies we found that human beings recognise anger, happiness, surprise and dislike by their visual appearance, compared to voice only detection. When the audio track of each emotion clip is dubbed with a different type of auditory emotional expression, anger, happiness and surprise were dominant. In both studies we found that sadness and fear emotions were all audio dominant. As a conclusion, we propose a method of facial emotion detection by using a approach, which uses multi-modal information for facial emotion recognition.**

Index Terms **- Computer Vision, Deep Learning, Face Recognition, Emotion Recognition.**

I.INTRODUCTION

Facial emotion recognition is the process of detecting emotions from facial expressions. The human brain can recognize emotions automatically, and softwares that can detect facial emotions has now been developed that can recognize emotions. This technology is becoming more accurate all the time and will eventually be able to read emotions exactly as our brains do. Artificial intelligence can detect emotions by learning and responding to what each facial expression means and applying that knowledge to the new information and data presented to it. Emotional artificial intelligence, or emotion AI, is a technology that is capable of behaving like humans learning, reading, imitating, interpreting, and responding to human facial expressions. The facial expression is for identifying the basic human emotions such as anger, fear, happiness, sadness, and surprise. Firstly, the face detection task in which first prominent features are extracted and then face is identified from the sample dataset used. The second stage where the facial feature extraction and then the recognition of facial expressions to the overall features are detected. Then at the last step classification is done. Facial expressions of input image are then recognized through the set of data provided to it.

This technique mainly consists of detecting emotion through various kinds of input taken from different human behavior and conditions. A technology namely neural network that detects emotion through deep learning. For its complications that were mentioned earlier, an emotion recognition system with better efficiency and accuracy is needed.

II.LITERATURE REVIEW

The main aim of this research work is to classify the emotional expression from the mouth region of the human face. As the initial task is to extract the mouth region from the facial image, a survey on various existing research works to segment the face expression images is reviewed and discussed.

Samples are a match or a non match Face recognition technology helps in analyzing the unique shape, pattern and positioning of the facial features. Face recognition is extremely complex technology and is essentially software based. This Biometric Methodology establishes the framework with tailored algorithms for every type of biometric device. Face recognition starts with an image, attempting to seek out an individual within the image. This will be accomplished using several methods including movement, skin tones, or blurred human shapes.

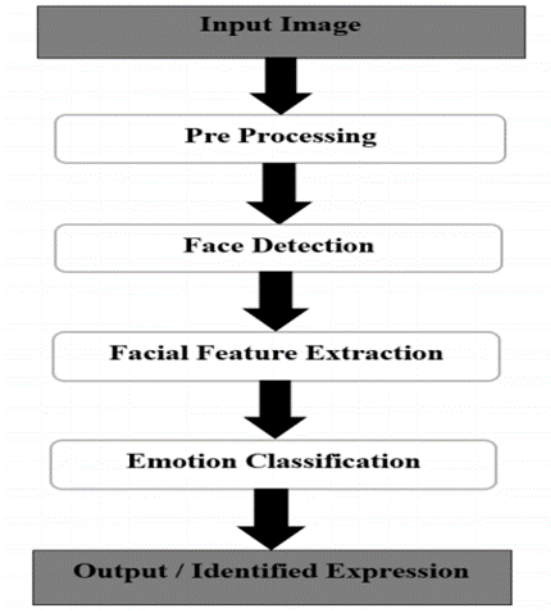
A definition is both important and difficult because the everyday word “emotion” is a notoriously fluid term in meaning. Emotion is one of the most difficult

concepts to define in psychology. In fact, there are different definitions of emotions in the scientific literature. In everyday speech, emotion is any relatively brief conscious experience characterized by intense mental activity and a high degree of pleasure or displeasure. Scientific discourse has drifted to other meanings and there is no consensus on a definition. Emotion is often entwined with temperament, mood, personality, motivation, and disposition. In psychology, emotion is frequently defined as a complex state of feeling that results in physical and psychological changes. That becomes the base on which it will be classified.

Artificial intelligence is used in simulating the human interpretation of faces and emotions. In order to increase the accuracy, some of the machine learning algorithms have to be implemented. There are essentially two methods of capture data. One is video imaging and the other way to capture is thermal imaging. Video imaging is more common. The precise position and therefore the angle of the top and the surrounding lighting conditions may affect the system performance. The complete facial image is typically captured and variety of points on the face can then be mapped, the mappings are helpful in classification these can be position of the eyes, mouth and therefore the nostrils as a example. More advanced technologies make the 3-D map of the face that multiplies the possible measurements that can be made. Thermal imaging has better accuracy because it uses facial temperature variations caused by vein structure as the distinguishing traits and is more useful. As heat pattern is emitted from the face itself without the source of external radiation, these systems can capture photos despite the lighting condition, even in the dark. The drawback is high cost. They are more expensive than standard video cameras.

III.METHODOLOGY

There are two main methods that are used in both of the above approaches. Cohn and Kanade later on tried geometrical modeling and tracking of facial features by claiming that each Action Units are presented with a specific set of facial muscles. The disadvantages of this method are the contours of these features and components have to be adjusted manually, the problems of robustness and difficulties come out in cases of pose and illumination changes while the tracking is applied on images, as actions & expressions tend to change, it becomes hard to estimate general parameters for movement and displacement. Therefore, ending up with robust decisions for facial actions under these varying conditions become difficult. The facial expression recognition system is implemented using convolutional neural networks. The diagram of the system is shown in following figures:



As per various literature surveys it is found that for implementing this project four basic steps that are required to provide detection and classification of emotions.

1. Preprocessing
2. Face registration
3. Facial feature extraction
4. Emotion classification

Information about all these processes are given below-

3.1Preprocessing

It is a common name for operations with images at the lowest level of abstraction, both in input and in output images are intensity images.But here fer-2013 dataset is used. Most preprocessing steps that are implemented are –

a. Reduce the noise
b. Convert The Image To Binary/Grayscale.
c. Pixel Brightness Transformation.
d. Geometric Transformation.

3.2. Face Registration

Face Registration is a technology being used in a variety of applications in this modern world that identifies human faces in digital images. In this face registration step, faces are first located in the image using some set of landmark points called action units or "face localization" or "face detection". These detected faces are then geometrically normalized to match some template image in a process called "face registration", after face registration comes out the final step of classification.

3.3. Facial Feature Extraction

Facial Features extraction is an important step in face recognition and is defined as the process in which there are different specific regions, points, landmarks, or curves/contours in a given 2-D image or a 3D range image. In this feature extraction step, a feature vector is generated from the resulting registered image and features are extracted from them. Common features that can be extracted are-

a. Lips
b. Eyes
c. Eyebrows
d. Nose tip

3.4. Emotion Classification

In the third step of classification, the algorithm attempts to classify the given faces portraying one of the seven basic emotions from anger, sad, fear, happy, disgust, surprise.

3.5. Dataset

The dataset of Facial Expression Recognition Challenge (FER2013) is used for the training and testing of this project is obtained by kaggle. It comprises images that are cropped beforehand that is they are pre-cropped, 48-by-48-pixel grayscale images of faces each labeled with one of the 7 emotion classes: anger, disgust, fear, happiness, sadness, surprise, and neutral. Dataset has a training set around 35000 facial images with facial expression labels on them. The dataset has class imbalance issue but that is not a major problem to be taken care of, since some classes have large number of examples while some have very less. The dataset is balanced using oversampling, by only increasing numbers in minority classes. The balanced dataset contains around 40000 images, from which around 29000 images are used for training, 6000 images are used for testing, and 5000 images are used for validation processes.

IV.CONCLUSION

Face recognition technologies are associated generally with very costly top secure applications. Today the core technologies have evolved and therefore the cost of equipment goes down dramatically thanks to the integration and the increasing processing power. Many applications of face recognition technology are now cost effective, reliable and highly accurate. As a result there are not any technological or financial barriers for stepping from the pilot program to widespread deployment.

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