Recognition of Human's Emotions By Facial Expression

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Abstract- In this paper focuses on a system of recognizing human's emotion detected from a human's face. The analyzed information is conveyed by the regions of the eye's and the mouth and the image is compared with the database created which consist of various facial expressions pertaining to six universal basic facial emotions. The methodology uses a classification technique of information into a new fused image which is composed of two blocks integrated by the area of the eyes and mouth, very sensitive areas to changes human's expressions. This system focuses on the facial expressions and by detecting them it helps to relieve the stress of the user by providing the various platforms such as the Chat Bot, Music Player, etc. this is based on the detected expressions of the user and the system uses the machine learning for this purpose.

Keywords: Desktop partner, stress relief, emotion detection

I. INTRODUCTION

Recognition of facial expressions results in identifying the basic human emotions like anger, fear, disgust, sadness, happiness and surprise. These expressions can vary in every individual. Mehrabian indicated that 7% of message is conveyed by spoken words, 38% by voice intonation while 55% of message is conveyed by facial expressions. Facial expressions are produced by movement of facial features. The facial expression recognition system consists of four steps. First is face detection phase that detects the face from a still image or video. Second is normalization phase that removes the noise and normalize the face against brightness and pixel position. In third phase features are extracted and irrelevant features are eliminated. In the final step basic expressions are classified into six basic emotions like anger, fear, disgust, sadness, happiness and surprise.

Facial expressions show the intention, affective state, cognitive activity, psychopathology and personality of a person. In face-to-face interactions facial expressions convey many important communication cues. These cues help the listener to understand the intended meaning of the spoken words. Facial expression recognition also helps in human computer interaction (HCI) systems.

II. FACIAL EXPRESSIONS DETECTION

In 1884, William James gives the important physiological theory of emotion that is in a person emotions are rooted in the bodily experience. First we perceive the object then response occurs and then emotions appear. For example, when we see a lion or other danger we begin to run and then we fear. Each emotion has its own characteristics and appearance figures. Six basic emotions i.e. fear, surprise, sadness, happiness, anger and disgust are universally accepted. Basic emotions can be distinguished as negative and positive emotions.

Happiness is a positive emotion and everyone wants to experience it. Happiness is an emotion or mood to attain a goal. It generally used as a synonym of pleasure and excitement. Fear, anger, disgust and sadness are negative emotions and most people do not enjoy them. Sadness can be described simply as the emotion of losing a goal or social role. It can be described as distraught, disappointed, dejected, blue, depressed, despairing, grieved, helpless, miserable, and sorrowful. Fear is a negative emotion of foreseen danger, psychological or physical harm.

Anger is the most dangerous emotion for everyone. During this emotion, they hurt other people purposefully. Although anger is commonly described as a negative emotion, some people often report feeling good about their anger but it can have harmful social or physiological consequences, especially when it is not managed. Surprise is neither positive nor negative. It is the briefest emotion triggered by unexpected events when you haven't a time to think about that event. Disgust is a feeling of disliking and is the emotion of avoidance of anything that makes one sick.

Disgust usually involves getting rid of and getting-away from responses. Recently a real time emotion recognition system deployed on a Microsoft's Windows desktop is purposed that work on still images of face as

well as in real time environment for feature extraction and emotion recognition. For an accurate and high speed emotion detection system edges of the image are detected and by using Euclidean distance Formulae edge distance between various features is calculated. This edge distance is different for every image and on the basis of these distances emotions are classified.

III LITERATURE SURVEY

A detailed study on the facial emotion recognition is discussed in which exposes the properties of dataset, facial emotion recognition study classifier. Visual features of image is examined and some of the classifier techniques are discussed in which is helpful in the further inspection of the methods of emotion recognition. This paper examined the prediction of the future reactions from images based on the recognition of emotions, using different classes of classifiers. Some of the classification algorithms like Haar cascade, Random Forest are applied in to classify emotions. Neural network arises tremendously which attempts to solve problems in data science. Deep RNN like LSTM, Bi-directional LSTM modelled for audio visual features are used in. Various range of CNN, modelled and trained for facial emotion recognition are evaluated. Facial emotion Recognition is drawing its own importance in the research field. Facial emotion recognition is inspected and analysed on all research areas. Emotion is identified from facial images using filter banks and Deep CNN which gives high accuracy rate with which we had an inference that deep learning can also be used for emotion detection. Facial emotion recognition can be also performed using image spectrograms with deep convolutional networks which is implemented. All the above methods mentioned used some of the conventional methods of feature selection from MFCC's, wave parameters such as pitch are used in the paper.

IV. PROPOSED METHODOLOGY

This section explains the proposed methodology, emotion database used for research, Inception model.

A. Emotion Database:

The datasets we have used in our work are the Kaggle's Facial Expression Recognition Challenge for frontal face datasets.. Since this data is rarely used, this work explores significantly on this dataset. Dataset consist of the images folder in which it consist of seven different folders which consist of 100 of images each of each category belonging to the different expressions such as Angry, Sad, Happy, Neutral, Surprised, Calm.

B. Transfer Learning:

Transfer learning is one of the machine learning methods which uses the knowledge obtained from solving one problem to solve another problem. It is true that Transfer learning solves problems within short duration of time. Transfer learning is implemented whenever the computation cost has to be reduced and to achieve accuracy with less training. Transfer learning is a frequently applied technique which works by taking the learned weights of a model (e.g. ImageNet) and implement those by fixing other layers and holding the rest of the layers in the network. In this project, we implement transfer learning by taking the learned weights from the Kaggle dataset, a larger dataset. This approach is chosen as Kaggle has similar data, images having one of the seven emotions.

C. Preparation of Training dataset:

Using the emotion identification report given in the database, various wav files are labeled and classified into seven range of emotions.

V. IMPLEMENTATION

This section explains about experimental setup, libraries used for Deep learning which helps in emotion recognition.

All emotions labeled images are trained for the model. The designed model was implemented using Tensor Flow. The dataset is trained with the help of the downloaded images from the internet with those images the training dataset is trained and the graph of the trained model is obtained with that graph the training model is all set for the further use.

After that the emotion detection program which is coded in the face crop.py code is run and the images are captured with the help of the web cam. this images are stored in the new database and further the the images are

labeled with the help of label program code and further when we run the labelled image program code the images are labelled with help of label image program code.

This labels are nothing but the emotions which are been observed on the face of the user. Further the user is help to get relief from his frustrated mood and to be happy. For example, if the user is sad then the system will fetch jokes for the user. if the user is happy then it will play songs to make his/her mood fresh,etc.

The system selects on its own what to take as the option to relief the user's particular mood.

VI. RESULTS

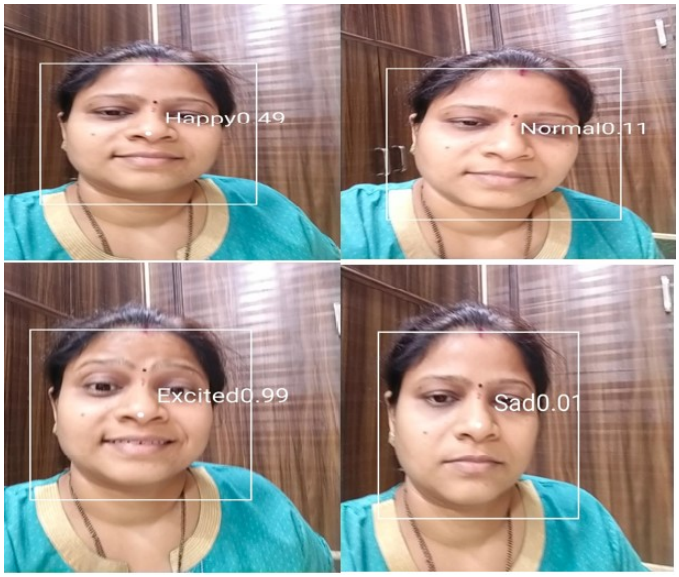

Fig 1.Experimental Results

VII. PROBLEMS

As we know that we can recognize human emotions using facial expressions without any effort or delay but reliable facial expression recognition by computer interface is still a challenge. An ideal emotion detection system should recognize expressions regardless of gender, age, and any ethnicity. Such a system should also be invariant to different distraction like glasses, different hair styles, mustache, facial hairs and different lightening conditions. It should also be able to construct a whole face if there are some missing parts of the face due to these distractions. It should also perform good facial expression analysis regardless of large changes in viewing condition and rigid movement. Achieving optimal feature extraction and classification is a key challenge in this field because we have a huge variability in the input data. For better recognition rates most current facial expressions recognition methods require some work to control imaging conditions like position and orientation of the face with respect to the camera as it can result in wide variability of image views. More research work is needed for transformation-invariant expression recognition.

VIII. CONCLUSION

In this paper the automatic facial expression recognition systems and various research challenges are overviewed. Basically these systems involve face recognition, feature extraction and categorization. Various techniques can be used for better recognition rate. Techniques with higher recognition rate have greater performance. These approaches provide a practical solution to the problem of facial expression recognition and can work well in constrained environment. Emotion detection using facial expression is a universal issue and causes difficulties due to uncertain physical and psychological characteristics of emotions that are linked to the traits of each person individually. Therefore, research in this field will remain under continuous study for many years to come because many problems have to be solved in order to create an ideal user interface and improved recognition of complex emotional states is required.

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