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Emotion Identification of Human Face from Video Using Neural Network

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ABSTRACT: Emotion identification plays significant role for human beings to communicate their emotions. Automatic facial expression analysis is a flourishing area of research and it is also challenge .this paper discuss the application of neural network based emotion identification of human face feed forward neural network used as a classifier for classifying the emotions. the accuracy of system performance have evaluate on a public database. The experimental result shows the effectiveness of our scheme. The best average of emotion identification rate achieves 90.30%

KEYWORDS: Emotion identification, Matching, Neural Network, Image, Correlation

I. INTRODUCTION

Facial expression is one of the most natural and direct means for humans to communicate their emotions. Emotion identification means finding the expressions of an image and recognizes which expression it is such as happy, sad, angry and neutral. Some application area related to face and its expression includes personal identification, access control, video calling and teleconferencing and human computer interaction.

Automatic emotion identification has been used in various real life applications such as security systems, interactive computer simulations and computer vision. Face detection and face localization is the primary problem in the automatic identification system of facial expression, including the face into simple background and complex background. In 1971, Ekman and Frisen discovered six different facial emotions that are universally accepted as basic emotion include happiness, sadness, fear, disgust, surprise and anger along with neutral face.

Emotion identification system solves the problem of face detection and feature extraction. Commonly three main steps are followed for expression recognition. First, detection of face boundary, second feature extraction and the last is emotion identification. Feature extraction referred to facial expression information. It is often useful to have a machine perform pattern recognition. In particular, machines which can read face images are very cost effective. A machine that reads passenger passports can process many more passports than a human being in the same time.

This operation can be done by comparing the unknown face with the faces stored in database. Face recognition has three stages a) face location detection b) feature extraction c) facial image classification. Various face recognition algorithm exits and each has advantages and limitation. Lots of research work has been published on face recognition. In the field of neural network, back propagation method mostly used for recognizing the facial expression.

II. RELATED WORK

Surbhi, MrvishalAroraet.al.[1] Introduce recognizing meaningful expression like angry, happy, sad, disgust, fear & neutral. The approach for facial expression recognizing system is based on neural network. The approach of facial expression recognition method involves the optical flow method, active shape model technique, principle component analysis (PCA) algorithm & neural network technique. DamirFilko, GoranMartinovi´et.al.[2]This authors proposes a system for human emotion recognition by analyzing key facial regions using principal component analysis and neural networks. The proposed system has been trained and tested on the FEEDTUM database where it achieved a relatively high average score of correct recognition and therefore showed promise for future development. HayetBoughraraMohamed,ChtourouChokri Ben Amar Liming Chen et.al.[3]This authors presents a constructive training algorithm for Multi Layer Perception (MLP) applied to facial expression recognition applications. The

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developed algorithm is composed by a single hidden-layer using a given number of neurons and a small number of training patterns.NishaSoni, GarimaMathur, Mahendra Kumaret.al.[4] they introduces the system of intelligence by removing redundant data from face images through image compression using Sobel Edge Detection (SED) and comparing this with the two-dimensional discrete cosine transform (2D-DCT) method for the better speed and efficiency. SED which is a popular edge detection method is considered in this work. NupurChoudhury, RupeshMandal, SmritiPriyaMedhiet. al [5]This authors introduce the face recognition algorithms & process of developing a SOM in order to carry out the process of face recognition in case of human. In this paper we used the unsupervised algorithm as well as combination of SOM and Hirarchical SOM along with the aid of gabor filter were discussed in order to carry out efficient process of facial recognition It provides mechanism for reduction of dimension and extraction of features in case of a face recognition algorithm.Deepthi.S, Archana.G.S, Dr.JagathyRaj.V.Pet.al [6] this paper has briefly overviewed automatic facial expression.2-D monochrome facial images are the most popular type of pictures used for automatic expression recognition. In this project expression recognition is done using neural networks. Neural networks tend to be black box, they will train and achieve a level of performance but we cannot easily determine how they are making the decision. Neural networks are invaluable for applications where formal analysis would be difficult or impossible, such as pattern recognition and nonlinear identification and control.KeertiKeshavKanchiet.al[7] this authors are introduced the system for face recognition is one of the biometric information processing systems. In this paper we have developed and illustrated a recognition system for human faces using a novel self organizing map based retrieval system.

III. METHODOLOGY

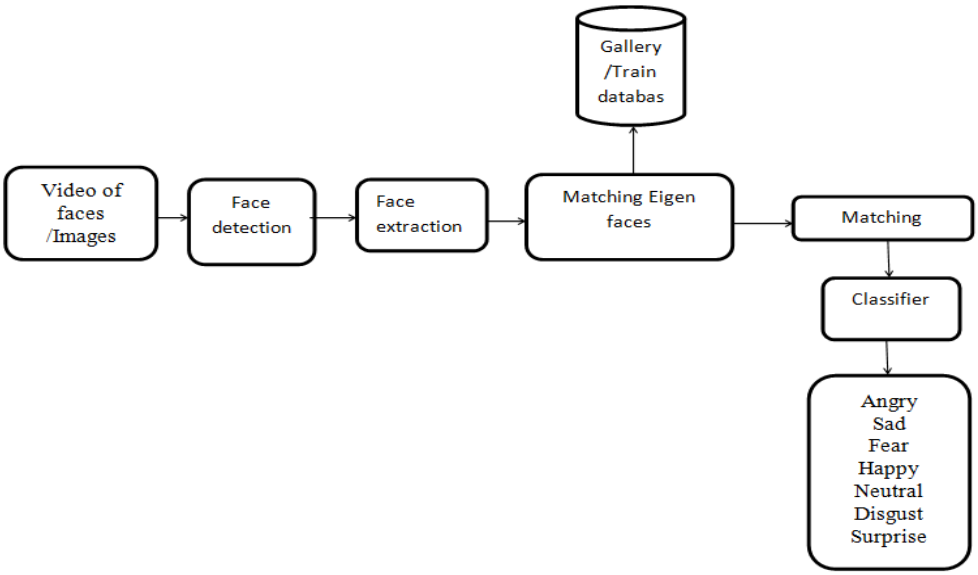

Figure.1: block diagram of emotion identification of human face

The term face recognition includes several sub-problems. Among the different classification methodologies, we will try to explain some of them, finally proposing a general and unified classification strategy will be proposed.

A. *A generic face recognition system:*

An Emotion identification of human face system always takes input as video or image stream. The corresponding output is an identification or verification of the subject or subjects that appear in the video. The face detection step has many parts/processes under it such as face tracking, pose estimation or compression etc. The step following face detection is feature extraction wherein the relevant facial features are extracted from the face so identified. The features so obtained can be certain face regions, variations, angles or measures which can be taken as human relevant (e.g. eyes spacing) or not. The probable applications of this process can be like facial feature tracking or emotion recognition. Finally, the system does recognize the face. In the identification task, the system would eventually report an identity

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from a database. A comparison method is adopted with the help of a classification algorithm and an accuracy measure. This comparison and classification strategy so adopted is similar to other classification based tasks in some popular domains such as determining, sound engineering.

B. *Face detection:*

In the present days, some of the applications related to face recognition don‘t require the face detection process. The databases with the face images stored in it are already in normalized form. The facial samples stored pertain to be of a particular standard. So the detection step can be eliminated. The criminal database can be thought of a probable example. There are many challenges that the face detection process has to encounter. These are seen usually to be present in images captured in uncontrolled environments, such as surveillance video systems. These challenges can be attributed to some factors:

C. *Feature Extraction:*

The humans are gifted the capability of recognizing faces from the age of 4-5 years. Being a much debated issue, our identification seems to be an automated and dedicated process in our brains. There are different steps in the feature extraction process. In any pattern recognition system, dimensionality reduction is the most essential task. However the performance of a classifier highly depends upon the amount of sample images, number of features extracted and the complexity of the classifier.

IV. SYSTEM ALGORITHM AND FLOW CHART

A. *Algorithm:*

Step 1: Give video as an input.
Step 2: Captured the image.
Step 3: Read all images.
Step 4: Check for input image, if RGB convert to Gray .
Step 5: Now create a database it converts all 2d images into 1D and makes on concatenate all 1D image into 1 matrix complete file as T.
Step 6: Find the Eigen faces for the database images, Eigen faces (M*Nx(P-1))Eigen vectors of the covariance matrix of the training database
Step 7: Calculate mean of all images, m = (M*Nx1) Mean of the training database.
Step 8: Calculate deviation of each image from mean image. A= (M*NxP) Matrix of centered image vectors.
Step 9: Compute the difference imagefor each image in the training set Ai=Ti-m.
Step 10: Merging all centered images.
Step 11: Recognize the nearest Eigen faces for the test image.
Step 12: Then matched the image from train database, detect the emotion.
Step 13: Show the test image as well as identified image.
Step 14: Shows the result.

B. *4.2 Flowchart*

The human skin color is distributed in the RGB color space. But, in the chromatic color space, the colordistribution of skin colors of different people is found to be clustered in a small area. Although skin colors of different people appear to vary over a wide range, they differ much less in color than in brightness. Here we adopt the graycolor space. Since it is perceptually uniform, is widely used in video compression standards (e.g., TIFF and JPEG), and it is similar to the TSL (Tint, Saturation and Luma) space in terms of the separation of luminance and chrominance as well as the compactness of the skin cluster.
In order to segment human skin regions from non-skin regions based on color, we need a reliable skin color model that is adaptable to people of different skin colors and to different lighting conditions.We generate a statistical skin-color model by means of a supervised training, using a set of 140 skin-color regions of size 256 x 256, obtained from a color face database. Such images were obtained from people of different races, ages and gender. Thus, a skin color distribution can be represented by a Gaussian model.

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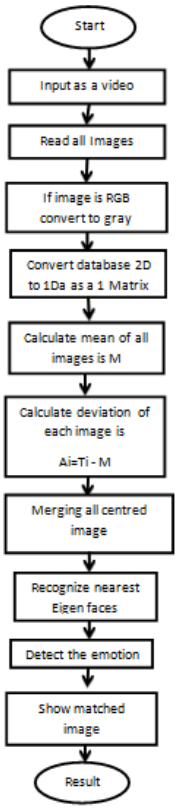

Figure.2: Flow chart of emotion identification of human face

V. RESULTS

The final result of the project is shown as below procedure wise, for comparative analysis we compare video images to train database. The proposed method is tested on different databases. Each database has more than one face images with different conditions. In this chapter we are going to present the results from the training and the testing procedure of the algorithm and also the performance of the neural network that was designed for facial expression recognition. We can show the different emotions like sad, fear, angry, happy, neutral, disgust and surprise. This emotion can show in our project as an output.

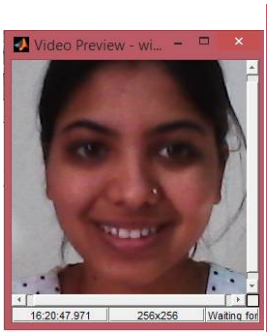

Figure3: video as an Input.

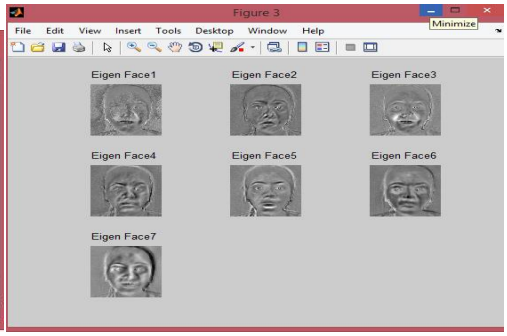

Figure4: Eigen faces of image samples.

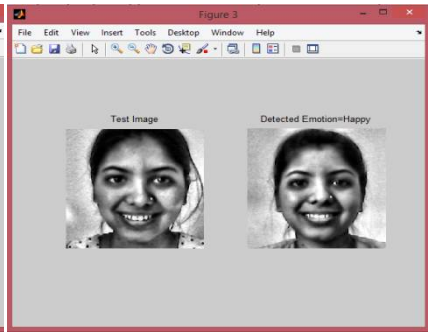

Figure 5: Result of Matched Image "HAPPY

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VI. CONCLUSION AND FUTURE WORK

The system is partially in variant to changes in the local image samples, scaling, translation and deformation by design. Face recognition is a both challenging and important recognition technique. Among all the biometric techniques, face recognition approachpossesses one great advantage. In this project, we have given an introductory survey for the face recognition technology.

Face recognition systems used today work very well under constrained conditions, although all systems work much better with frontal images and constant lighting. All current face recognition algorithms fail under the vastly varying conditions under which humans need to and are able to identify other people. Next generation person recognition systems will need to recognize people in real-time and in much less constrained situations. It is believed that identification systems that are robust in natural environments, in the presence of noise and illumination changes, cannot rely on a single modality, so that fusion with other modalities is essential Technology used in smart environments has to be unobtrusive and allow users to act freely. The system is re-trained, and the process repeated until the number of false detections falls below a threshold. This technique is thought to construct a representative set of non-face examples, and would certainly offer performance improvements for this system.

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