**A Review Paper on Recognition of Facial Expression**

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Abstract— Humans are better in various aspects like in the field of the recognition. But as automation is increasing day by day there is need of the efficient machine recognition system. So, there are lot of research going on to machine recognition. In this project we are dealing with the unique method to sort the emotion of test objects for psychology study. In this project we sort various emotion components in order to attain very high efficiency. Feature extraction tools are used for feature extraction of the input object. Artificial neural network the popular artificial intelligence technique is used for recognising the wavelet component object. There is also a special error function for increasing the efficiency of the system .Matlab 7.10 is used for the simulation of the object.

Keywords— **Emotion, feature extraction, MATLAB 7.10, recognition, wavelet transform, artificial neural network**

1. Introduction

There are things at which humans are still way ahead of the machines in terms of efficiency one of such thing is the recognition especially pattern recognition. There are several methods which are tested for giving the machines the intelligence in a efficient way for pattern recognition purpose. The artificial neural network is one of the most optimization techniques used for training the networks for efficient recognition.

Computer vision is the science and technology of machines that can see. The machine is made by integration of many parts to extract information from an image in order to solve some task. As a scientific discipline, computer vision is concerned with the theory behind artificial systems that extract information from images. Each of the application areas described above employ a range of computer vision tasks; with more or less well defined measurement or processing problems, which can be solved using a variety of methods. Some examples of typical computer vision tasks are presented below. Recognition is the classical problem in computer vision, image processing, and machine vision. It is related to the determination of whether or not the image data contains some specific object, feature, or activity. This task can normally be solved robustly and without effort by a human, but is still not satisfactorily solved in computer vision for the general case, involving arbitrary objects in arbitrary situations. The existing methods for dealing with this problem can at best solve it only for specific objects, such as simple geometric objects, human faces, printed or handwritten characters, or vehicles, and in specific situations, typically described in terms of well-defined illumination, background, and pose of the object relative to the camera.

1. Survey of Existing Methods

The importance of facial expression system is widely recognized in social interaction and social intelligence. The system analysis has been an active research topic since 19th century. The facial expression recognition system was introduced in 1978 by Suwa et. al. The main issue of building a facial expression recognition system is face detection and alignment, image normalization, feature extraction, and classification. There are number of techniques which we use for recognizing the facial expression.

Some of the researchers introduced the system based on Real time face detection and facial expression recognition which has development and applications to human computer interaction. The technique used was MR-SVM Algorithm (Multi Resolution Support Vector Machine), the basic idea is to decompose signals by orthogonal wavelet basis function and get useful information [8]. The conclusion drawn was that the algorithm suffering from much noise effects that is why the performance was downgraded.

In the field of neural network, When images has been chosen by using an ANN method via MATLAB software then this approach is useful in real peak recognition since it provides valuable information to automotive industry regarding spares hence there is first evaluation study of a database of kinetic facial expressions (dafex). Here image has been chosen by using neural network method via mat lab software [6]. Neural network pattern recognition is suitable software with high ability to classify input patterns into a corresponding output target with high efficiency. The real peak of images can be identified by training the network accordingly.

In an efficient algorithm for motion detection based facial expression recognition, recognizing action units for facial expression analysis were developed where Artificial Neural Network (ANN) is a functional pattern classification technique which is trained all the way through the error Back-Propagation algorithm [11]. This conclude that Principal classification of input data of neural network has been increased by using Principal Component Analysis with neural network and using other soft computing techniques like Fuzzy logic.

Algorithm would be improved so that it can run on any type of image signal for these Foundations of human computing: facial expression and emotion was the outcome. Technique used the average filter Matlab code is used; filter consists to remove a linear trend of the vector using Fourier transform [4].

Soft computing techniques are used for image classification; Features are extracted using Discrete Cosine Transform (DCT). Radial Basis Function (RBF), Multi-layer Perceptron Neural Network (MLP-NN), Multi-layer Feed Forward Network (FF-NN) which provides additional weights between the input layer and the output layer [5]. Using proposed method, the classification accuracy is improved up to some extent. Further work needs to be done in the area of optimization to select the best learning rate and momentum.

If compared the use of two types of features extracted from face images for recognizing facial expressions. The first type is the geometric positions of a set of fiducial points on a face. The second type is a set of multi-scale and multi-orientation Gabor wavelet coefficients extracted from the face image at the fiducial points. By developing an architecture based on a two-layer perceptron. Comparison of the recognition performance with different types of features shows that Gabor wavelet coefficients are much more powerful than geometric positions [6].

1. Data Collection

Data required for experimentation is collected from JAFFE database for neural network training and testing. JAFEE stands for The Japanese Female Facial Expression (JAFFE) Database. The database contains 213 images of 7 facial expressions (6 basic facial expressions + 1 neutral) posed by ten different Japanese female models. Sixty Japanese subjects have rated each image on 6 emotion adjective: happy, sad, nervous, surprise, anger, disgust, fear.

 Fig. The Japanese Female Facial Expression (JAFFE) Database.

1. Methodology

In this article the system proposed three stages: pre-processing, feature extraction and artificial neural network training and simulation as shown in Figure 2

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START



PREPROCESSING

FEATURE

EXTRACTION

ANN TRAINING

&

SIMULATION

STOP

Fig. 2. The Methodology to be used.

A software framework will be designed using the MATLAB which is more suited for the image processing application due to its basic matrices. The process start with image acquisition where image will be capture using the high resolution camera, follow by pre-processing of the images captured to reduce the image for its unified size. Images are then converted to gray scale and double precision image for the analysing process. After the images have been pre-processed, the wavelet transform analysis is determined. Lastly according to the parameter of wavelet transform, the status of a TRAINING process can be determined by using neural network and action can be taken to follow up this result. At the last stage of architecture the neural network trained the function in various field of application. The Artificial Neural Network (ANN) can be used for the database in which the face descriptors are used as a input to train the network. For all positive result the network shows 1 in output and for all negative result 0 is present in output. If the new database is obtained for training then first the neural network match all the new result to the pre-built dataset and match the maximum threshold values and provide the output. Then it is confirmed that the new facial expression is belong to the recognized person with the maximum output.



Fig. 3 The Artificial Neural Network.

1. CONCLUSION

In this paper a facial expression recognition systems are overviewed. The neural network approach is based on face recognition, feature extraction and categorization. The approach of facial expression recognition method involve feature extraction by enhancing the image and by using wavelet transform and neural network technique. The approach does provide a practical solution to the problem of facial expression recognition and it can work well in constrained environment.

REFERENCES

[1] Pushpaja Saudagare and Devendra Chaudhari ‘Facial Expression Recognition using Neural Network-A Overview’ International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Volume-2, Issue-1, March 2012

[2] S.P.Khandait, Dr. R.C.Thool and P.D.Khandait “Automatic Facial Feature Extraction and Expression Recognition based on Neural Network” (IJACSA) International Journal of Advanced Computer Science and Applications,Vol. 2, No.1, January 2011

[3] Devi Arumugam and Dr. S. Purushothaman “Emotion Classification Using Facial Expression” (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 2, No. 7, 2011

[4] George Caridakis, Lori Malatesta, LoicKessous,Noam Amir, Amaryllis Raouzaiou, and Kostas Karpouzis. Modeling naturalistic affective states via facial and vocal expressions recognition. In ICMI ’06: Proceedings of the 8th international conference on Multimodal interfaces, pages 146–154, New York,NY, USA, 2006. ACM

[5] Jeffrey F. Cohn. Foundations of human computing: facial expression and emotion. In ICMI ’06: Proceeding sof the 8th International Conference on Multimodal interfaces, pages 233–238, New York, NY, USA, 2006. ACM.

[6] Alberto Battocchi, Fabio Pianesi, and Dina Goren-Bar.A first evaluation study of a database of kinetic facial expressions (dafex). In ICMI ’05: Proceedings of the 7th international conference on Multimodal interfaces, pages 214–221, New York, NY, USA, 2005.ACM.

[7] Manfred Eckschlager,Regina Bernhaupt, and Manfred Tscheligi. Nemesys - neural emotion eliciting system. In CHI 05 extended abstracts on Human factor sin computing systems CHI 05, 2005.

[8] Marian Stewart Barlett, Gwen Littlewort, Ian Fasel,and Javier R. Movellan. Real time face detection and facial expression recognition: Development and applications to human computer interaction. In Proceeding of the 2003 Converence on Computer Vision and Pattern Recognition Workshop, 2003.5

[9] Ira Cohen, NicuSebe, Fabio G. Cozman, and Thomas S.Huang.Semi-supervised learning for facial expression recognition. In Proceedings of the 5th

ACM SIGMM, 2003

[10] Jeffrey F. Cohn,Karen Schmidt, Ralph Gross, and Paul Ekman. Individual differences in facial expression: Stability over time, relation to self-reported

emotion,and ability to inform person identification. In IEEE International Conference on Multimodal Interfaces(ICMI 2002), 2002.

[11] Jeffrey F. Cohn By Ying-li Tian, Takeo Kanade. Recognizing action units for facial expression analysis. In 2000 IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR’00) -Volume 1, June 2000

[12] C.Izard, L.M Doughtery, and E.A Hembree. A System for Indentifying Affect Expressions by Holistic Judgments.University of Delaware, 1983

[13] C.Izard. The maximally descriminative facial movement coding system (max).Available from Instructional Resource Center, 1979.