Emotion Recognition Using Neural Network Approaches:

A Review

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Abstract— It is very interesting to recognize the human gesture for general life applications. For example, observing the gesture of a driver when he/she is driving and alerting him/her when in sleepy mood will be quite useful. Human gestures can be identified by observing the different movements of eyes, mouth, nose and hand. There are number of techniques which we use for recognizing the facial expression. Facial expressions are generated by contractions official muscles, which results in temporally deformed facial features such as eye lids, eye brows, nose, lips and skin texture, often revealed by wrinkles and bulges. The term face recognition refers to identifying, by computational algorithms, an unknown face image. Facial expressions give us information about the emotional state of the person. Moreover, these expressions help in understanding the overall mood of the person in a better way. Facial expressions play an important role in human interactions and non-verbal communication. Classification of facial expressions could be used as an effective tool in behavioral studies and in medical rehabilitation. Facial expression analysis deals with visually recognizing and analyzing different facial motions and facial feature changes. This operation can be done by comparing the unknown face with the faces stored in database. Face recognition has three stage , face location detection, feature extraction and facial image classification.
In this research, we carry out a study to recognize basic emotions (sadness, surprise, happiness, anger, and fear). Also, we propose a methodology and Neural Network for classification of emotions based facial features extraction.
The aim of this research is to develop an efficient identification algorithm based on computational intelligence approaches, with accuracy similar to that achieved by experienced Analyst.

Keywords— Emotion, expressions, identification, communication, analyzed, Recognition, behavioral.

INTRODUCTION

Humans belong to various ethnic groups with different attributes of facial features (shape, color and size). Also, they have diverse emotion expressions, depending on culture, age and gender. A system for facial emotion expression has become an active research filed in different areas such as: human robot interaction, marketing analysis, facial nerve grading in medicine, social network control and new computer game. Facial expressions reflect of physiological signals and mental activities in social interaction. Facial expressions are one of the important ways in humans and animals to conveying social information in nonverbal communication. Each emotion expression corresponds to a different motion of the facial muscles. Humans can adopt a facial expression and different emotion in each case. There are two brain pathways associated with facial expression namely: involuntarily (neural in the brain) or voluntarily (socially conditioned in the brain). But in the brain neural mechanisms and muscles are responsible for controlling the different expression in each emotion.

Facial emotion expression have been considering as one of the universal and prompt methods for human communication. People view and understand facial expressions in the social situations around them. Face Recognition generally involves two stages: firstly, is searched to find any face in the image (face Detection) and secondly, is detected, processed face and compared the results to a database of known faces (face Recognition). Finally, system decided base on sets of information and rules. Facial expressions are generate by contractions of facial muscles such as: eyebrows, eyes, eye lids, lips, mouth and wrinkles of the noise. In facial expressions the lips and eyes are often as an important component for emotion recognition. Typical changes of muscular activities are

brief, lasting for a few seconds, but rarely more than 5s or less than 250ms.The reasons for this interest in facial research and analysis are multiple that namely: face tracking, face detection and face recognition in different area of the sciences.

Literature Review

Till Date What is the status of the related research work has been given:

Zhengjun Pan, Alistair G.Rust and Hamid Bolouri (2000) research on image redundancy reduction for Neural Network Classification Using Discrete cosine Transforms, Outcome of research was The available DCT features, our DCT based approach produces a recognition rate comparable to the best results reported to date from this 77% Faces identification in MLP network.

Meng Joo Er, Shiqian Lu and Hock Lye Toh (2002) Design the system achieves excellent performance both in terms of error rates of classification and learning efficiency in Face Recognition with Radial Basis Function (RBF) Neural Network. Using Kernel Direct Discriminant Analysis Algorithms Juwei Lu,Konstantinos N. Plataniotis And Anastasios N. Venetsanopoulos (2003) found a system which used for recognize facial expressions, Average Percentages Of The Error rate of KDDA is reduce in RBF and RBF polynomial 47.765%

L. Ma and K. Khorasani (2004) use Two-dimensional (2-D) discrete cosine transform (DCT) for Facial Expression Recognition Using Constructive Feedforward Neural Networks. Outcome is 83.65% Facial identify.

Meng Joo Er, Weilong Chen, and Shiqian Wu(2005) research on High-Speed Face Recognition Based on Discrete Cosine Transform and RBF Neural Networks. The Outcome of research is High Training and recognition speed, high recognition rate as well as very good illumination robustness.75.53% face identification in cosine transform and RBF Neural Network.

Mohammed Yeasin, Baptiste Bullot, and Rajeev Sharma (2006) research on Recognition of Facial Expressions and Measurement of Levels of Interest from Video. Using Visual data which is based on computer level of interest Outcome of research is recognizing six universal facial expression.The proposed approach achieved in average recognition rate of 70.9%

From the Rigorous review of the related work on Face recognized technique, it is noticed that:

1. Deciding to adopt, install, operate, and maintain accuracy in Face recognized technique

2. Facial recognition research is a subfield in a larger field of pattern recognition research and technology. Pattern recognition technology uses statistical techniques to detect and extract patterns from data in order to match it with patterns stored in a database.

3. It is very important for these systems to be able to locate or detect a face in a field of vision so that it is only the image pattern of the face (and not the background "noise") that is processed and analyzed. This problem, as well as other issues, will be discussed as the report proceeds.

4. In these discussions we will attempt to develop the reader's understanding of the technology without going into too much technical detail. This obviously means that our attempts to simplify some of the technical detail might also come at the cost of some rigor.

Research Methodology

i) Statistics

ii) Signal & Image processing

iii) Learning Machines such as neural network.

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iv) Transformed domain techniques such as FFT, DCT, WHT etc.

For choice of suitable classifier following configuration will be investigated.

i) Multilayer perceptron Neural network.

ii) Radial Basis function Neural network.

iii) Kohonen's Self organizing feature map Neural network

For each of the architecture, following parameters are verified until the best performance is obtained.

i) Train-CV-Test data

ii) Variable split ratios

iii) Retraining at least five times with different random initialization of the connection weights in every training run.

iv) Possibility different learning algorithms such as Standard Back-Propagation, Conjugate gradient algorithm , Quick propagation algorithm, Delta Bar Delta algorithm,Momentum etc.

v) Number of hidden layers

vi) Number of processing elements of neurons in each hidden layer.

Vii) Value of step size and momentum term in each layer.

After regions training & retraining of the classifier, it is cross validated & tested on the basis of the following performance matrix.

i) Mean Square Error

ii) Normalized Mean Square Error

iii) Classification accuracy

iv) Sensitivity

v) Specificity

In order to carry out the proposed research work, Platforms/Software's such as Matlab, Neuro solutions, Microsoft Excel will be used.

Research Objectives

- To maintain the correctness & accuracy in the Face images even though the input images are contaminated by known or unknown noise.
- To increase the classification accuracy for the identification of Face emotion.

Acknowledgment

Conclusion

This research is useful to increase the classification accuracy for the identification of Face emotion and with the help of this we can avoid many accidents.

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