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ANALYSIS OF FACIAL EXPRESSION RECOGNITION THROUGH FUZZY OBSERVATION APPROACH

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ABSTRACT

This paper presenting automatic facial expression recognition based on hand gesture. In this Facial image with hand posture trade as an input to recognize human facial expressions. Through feature extraction techniques, hand gesture features and facial action units are extracted. This paper introduces a method to extract features. This method focuses the reduction of partial influences of shadows and oases which generally part of an image. After extracting all features put into classification techniques. Major contributions for recognizing facial expression through gesture is soft computing techniques. Since it is a vast field which have many subfield]ds such as fuzzy logic, neural network, Genetic Algorithm, rough set theory and so on. This paper contributing to understand the concept of Elman-Neural Network classification, Fuzzy Observer based approach, Fuzzy Neural Network and Gabor Wavelet Neural Network.

Keywords-an automatic facial expression recognition, feature extraction, hand gesture, Elman-Neural Network classification, Fuzzy Observer based approach, Fuzzy Neural Network and Gabor Wavelet Neural Network

INTRODUCTION

During Communication, humanunderstand. belief, react on the other human being based on many parameters such as his or her facial expressions, body language etc. These all parameters must be most strong, efficienteffected for machine learning. The HCI is a major part of machine learning whereresearcheristrying to make machine as a human being. These all parameters of communications are coming under the category of non-verbal communication which is more effective than the verbal communication.

The analysis of all parameters are used to judge the emotion or expressions of human being is a hot research topic in many fields such as computer vision medical sciences, videoconferencing, airport-railways-bus stand security systems, access control systems, surveillance or monitoring systems, HVCI and so on. Ekman and Frieren has given six-basic emotions for the human face. These are Happy, Sad, Disgust, Surprise, Anger and Fear, all these emotions have some basic or say standardcharacteristics on the face s that machine can react accordingly to user. Throughanalysis, the study says that Soft Computing Techniques are more promising than the other filed of computerscience. Since Soft Computing Techniques are say to understand, implement and mapped on to a human space.

To recognize and judge for communications a very complex and challenging task.so design such machine with considering all the parameters again a challenge and complex task for any human being. Taking parameters to design a system are structure of bones, postures, gestures, clot=r. size, shape etc. Many smart and intelligent techniques are introduced for the same issues such as Artificial Neural Network, Fuzzy Modelling, Action units based techniques, motion based techniquesetc but still it becomes a very challenging due to unpredicted behavior of human being, its expressions and so on.

This paper is organizing into a number of sections such as in section II standard related work is shown. Section-III is used to describe Elman Neural Network Classifications, Fuzzy Observer Based Approach, Fuzzy Neural Network Last section shows the conclusions with future plans.

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RELATED WORK: A SURVEY

Survey says that ANN is used in many places due to its learning capabiliybecause its structure terminologies are very much similar to Human Beings.2-D image has been taking as an input for neural network.it Contains 40 hidden neurons for experiment of classification but during study, it was low in performance[16].In [7] taken Geometric positions andGabor Wavelet Coefficient as an input for 2-layers –Neural Netork.The success rate of recognition of facial image was 90.1%.[18][19] used to classify Facial Action Unite(FAU) which was the part of Neural Network Based System. Here 2 Parts recognized one for upper part and other is lower part.

CMU –DB with NN [6] [7] present good recognition rate than the [8] [9]. Complete Facial Expression recognition through modular –expert system was introduced in [20] where it was organized through independent classifiers. Here all action units of face are combined to get different expressions. The success rate of this approach is 86.3%.

Multilayer perceptron and radial basis function network were used in [1]. for recognition of facial expressions. features of vectors are used as an input. Since it has taken too many features to get accurate facial expressions but at the same time it slows down the performance of the system.

Convolution Neural Network (CNN) was more precise and progressive Neural Network structure for classification purpose. Here learned weights on convolutional layers are used to extract relevant features. It takes care the robustness of the system where lots of variations occur due to face location and scale [2]. So, the CNN approach is used to recognize various facial expressions with the different pose styles. It does not require any normalization process or any feature tracking initialization.

CNN is basically used to detect face and to get local features use rule based process [2]. So it is efficient to detect face and cparitively classification result is better result. In [4], Support Vector machine(SVM) is basically uses for classification purpose. Similarly, PCA is used for extracting the features.

Soft Computing Techniques are used to deal with different types of challenges, uncertainty during recognition of expressions. These techniques are used to handle the issues of efficiency and effectiveness for recognition.

FUZZY OBSERVER BASED NEURAL NETWORK

In this study, Fuzzy observer and fuzzy subsystem are replacing the job of human' decision and human observer. here, human face has many emotions and if it has with particular emotion called 'x' behaves as an input. Then Human through its linguistic value create fuzzy set with the help of fuzzy observer. Generally human judge the facial expressions of other through its knowledge, experience. These all are represented by some linguistic values. Analysissays that the fuzzy subsystems are used to find fuzzy approximate reasoning. These all done by some fuzzy rules. The challenge is to measure or calculated the actual values of linguistic value which store trough human expressions. The role of fuzzy observer to estimate linguistic variables value with the help of some standard parameters or based on some measurements.

In this paper, for experiments purpose, Fuzzy observer takes 2-hidden layers for face image sequence. This experiment performs on 7-nodes and 7-samples are chosen. A fuzzy system designs one set fuzzy rule to get expression value. Since these rules are set for machine so priority or challenge to get accurate value of expression. During the study of fuzzy theory, Fuzzy sensors is a devil=cue to produce electrical signal based on temperature or pressure. Fuzzy sensors are a type of Fuzzier whose output is a fuzzy set. In fuzzification, fuzzy symbolic sensor is used to provide some standard symbol based on numerical values. Fuzzy sensors are used to with expert knowledge system to develop effective system without any learning system. The study of facial expression recognitions computer vision plays a very important role based on many factors. All these measurement techniques should consider the tolerance, vagueness and uncertainty parameters to recognize expressions of human effectively. In this paper Fuzzy Observer is used to calculate Linguistic values through learning process.

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CONCLUSION & FUTURE WORK

Since Facial expressions is used to convey the emotional state of a humane being so fuzzy observer provides an efficient and effective method for recognizing a facial expression though body is proposed in this paper. The facial features are extracted through the deep convolutionalneural network (CNN). The proposed method is evaluated and conduct the experiment. In which the time required to extract a features are significantly reduced. This paper is used to recognize static images. There no preprocessing techniques are required to work on this technique. The future work involves exploring other DCNN and advanced fuzzy observer based technique. Further works is compulsory for automatic and fast recognition for various facial expressions using other prompts that human frequently uses for facial expression recognition.

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