Abstract

This paper describes a novel Hybrid Emotional Neural Network (HENN) for classification of emotions from Facial expressions. The novelty of this work is that along with the parameters of
the feed forward neural network, i.e. the learning rate, momentum, new parameters such as anxiety and confidence is taken as emotional parameters are from Gabor Wavelet and are used to update emotional parameters of the network. An improved Back propagation algorithm is used for training of the proposed neural network. Features are extracted from facial expressions by applying Gabor wavelet and Discrete Cosine Transform (DCT). Both the feature sets are high dimensional so Principle Component Analysis (PCA) are used to reduce the dimensionality of features. Then Wavelet fusion technique is used to fuse the features. The fused features are used to train the neural network. The classification efficiency of the proposed method was tested on static images from the Cohn-Kanade database. The results of the proposed network were compared with the standard Feed Forward Neural Network and Radial Basis Neural Network. We also make a detailed comparison of different fusion techniques along with wavelet fusion, as well as different Neural Network classifiers. Extensive experimental results verify the effectiveness of our approach outperforms most of the approaches.

References

Index Terms

Computer Science  Pattern Recognition

Keywords

Hybrid Emotion Neural Network (HENN)  Gabor Wavelet

DCT

PCA

Wavelet fusion

RBF

FFNN