

AUTOMATIC HUMAN EMOTION RECOGNITION BASED ON FACIAL EXPRESSION ANALYSIS

Major project submitted in partial fulfillment of the requirements for
the award of degree of

Master of Technology
in
Information Systems

Submitted By:

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(2013-2015)

CERTIFICATE

This is to certify that **Akhilesh Kumar (2K13/ISY/01)** has carried out the major project titled **“Automatic Human Emotion Recognition Based on Facial Expression Analysis”** in partial fulfillment of the requirements for the award of **Master of Technology** degree in **Information Systems** by **Delhi Technological University**.

The major project is bonafide piece of work carried out and completed under my supervision and guidance during the academic session 2013-2015. To the best of my knowledge, the matter embodied in the thesis has not been submitted to any other University/Institute for the award of any degree or diploma.

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ACKNOWLEDGEMENT

I take the opportunity to express my sincere gratitude to my project mentor **Dr. O. P. Verma, Prof. and Head of Department**, Department of Computer Science and Engineering, Delhi Technological University, Delhi, for providing valuable guidance and constant encouragement throughout the project. It is my pleasure to record my sincere thanks to him for his constructive criticism and insight without which the project would not have shaped as it has.

I humbly extend my words of gratitude to other faculty members of this department for providing their valuable help and time whenever it was required.

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Abstract

Understanding of facial expression is one of the most necessary components for effective personal communication besides speech comprehension. Facial expressions are well capable of displaying various messages like boredom, fatigue, stress, agreement, disagreement, pain etc while in communication. Moreover they are an immediate source of emotional state of the person. Thus in order to have an effective and efficient Human Computer Interaction (HCI), the machines must be able to understand the facial expressions and infer the message and emotions from it. As the application of HCI is gaining fame, the research on “Automatic Facial Expression Analysis” has grabbed the attention of people working in the domain of Computer Vision.

Automatic analysis of facial expression includes two main streams of research namely facial affect detection and facial muscle action detection. In case of Facial Affect detection, the displayed message is judged to infer the emotional state. Facial Muscle action detection is a sign judgment approach to measure the facial changes as displayed by the expression.

In this study, the effort were made on the research problem “Emotion Recognition from Facial Expressions”, which is mainly an affect detection problem. Various approaches were tried and some of the challenges faced and stated in literature were dealt with.

A novel and efficient approach for facial expression recognition using half faces (right half and/or left half) as input to various feature extractors has been studied and analyzed against full face. The performance results obtained from two standard texture analysis techniques: *LBP* and *LBP – TOP* over three standard databases: *Cohn-Kanade* database, *JAFFE* database and *FEI Face* database have been analyzed. It has been found that the proposed half-face approach is at-par in terms of recognition accuracy against the conventional full-face approach with a significant reduction at the level of feature extraction time, classification time and feature vector storage cost. This makes our proposed approach more suitable for real-time applications based on automatic facial expression analysis and emotion recognition.