Sana'a Khudayer Jadwa, Static Hand Gesture Recognition, University of Technology, Department of Computer Science, Ph.D, Supervisor : Dr. Jane J. Stephan, 2009 , 120 P.

Abstract

Hand gesture recognition offers untraditional medium for HCI (Human-Computer Interaction) that can be both efficient and highly intuitive. However, gesture recognition software is still in its infancy. While many researchers have documented methods for recognizing complex gestures from instrumented gloves at high levels of accuracy, these systems suffer from two notable limitations: device dependence and lack of extensibility.

A vision based static hand gesture recognition algorithm is proposed for Human-Computer Interaction based on neural network classifier. The goal of static hand gesture recognition is to classify the given hand gesture data, represented by some features, into some predefined finite number of gesture classes. In this thesis two methods have been presented for recognition of six specific static hand gestures namely: (Open, Close , Cut, Paste, Maximize and Minimize),these gestures define a vocabulary of commands used to interact with the computer.

The hand gesture image is passed in three stages: *preprocessing, feature extraction*, and *classification*. In preprocessing stage some operations are applied to extract the hand gesture from its background and prepare the hand gesture image for the feature extraction stage. In the first method the hand contour is used as a feature that treats scaling and translation problems (in some cases). On the other hand the complex moments are used to describe the hand gesture in the second method and treat the rotation problem in addition to the scaling and translation. The

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last stage of the proposed algorithm is the multi-layer neural network classifier that uses back-propagation learning algorithm.

The results showed that the first method has a performance of (70.83%) recognition rate, and the second method has a better performance of (86.38 %) recognition rate.

The proposed algorithm is implemented in (Visual Basic Programming Language ver. 6) .

Keywords : Gesture Recognition, Hand Gestures ,Artificial Neural Network,

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