Chapter 6: Genetic Algorithm And Fitness Function-based Human Face Emotions Recognition

6.1 INTRODUCTION

In recent years, there has been a growing interest in improving all aspects of interaction between humans and computers especially in the area of human emotion recognition by observing facial expression. Ekman and Friesen developed the most comprehensive system for synthesizing facial expression based on what they call as action units [59]. In the early 1990's, the engineering community started to use these results to construct automatic methods of recognizing emotion from facial expression in still or video images [90]. Human being possesses an ab.ility of communication through facial emotions in day to day interactions with others. Some emotions attracted most of the interest in human computer interaction environments. The universally accepted categories of emotion, as applied in human computer interaction are: Sad, Anger, Joy, Fear, Disgust (or Dislike) and Surprise. In this chapter a suitable preprocessing, filtering, edge detection and fitness function using GA methods are presented as suitable for face emotion recognition. Two subjects have been used for emotion detection (South East Asian (SEA) and Japanese) as shown in Fig.49 and Fig.50. The images are considered for edge detection, feature extraction and for GA processes. The process flow for the image processing sequence is shown in Fig.51.

6.2 HUMAN FACE IMAGE PROCESSING

The Region of Interest (ROI) has been selected manually in the acquired image. The ROI image is converted into grayscale image (0-255 range).

Before applying the filter to the grayscale image, histogram equalization method has been applied. Histogram equalization [121] improves contrast and the goal of histogram equalization is to obtain an uniform histogram. The histogram equalization method also will help the image to redistribute the intensity distributions as shown in Fig.52. New intensities will not be

introduced into the image. Existing values will be mapped to new values but the actual number of intensities in the resulting image will be equal or less than the original number of intensities.

Fig.49 The Angry Emotion SEA.

Fig.50 The Angry Emotion Japanese.