CHAPTER 1

INTRODUCTION

1.1 Overview

Nowadays, numbers of theft cases had been increased quite aggressively. The recent advances of information technologies and the increasing requirements for security have led to a rapid development of automatic personal identification systems based on biometrics.

The recent advances of security system technology have resulted in getting more demand by customers. Instead of memorizing thousands of passwords, we can only use our physical traits as the input or password in order to unlock certain information or valuable things.

Biometrics refers to accurately identifying an individual based on his or her distinctive physiological trait such as fingerprints, face, retina and iris or behavioral such as gait and signature characteristics. It is inherently more reliable and more capable in distinguishing between an authorized person and a fraudulent imposter than traditional token-based or knowledge-based methods. Among all the biometrics, fingerprint recognition is one of the most reliable and promising personal identification technologies.

Fingerprint biometrics is the most widely used and accepted among all other distinctive physiological traits. The fingerprint images is sampled by using optical scanners composed of complementary metal-oxide semiconductor (CMOS) and charge-coupled device (CCD) technology and also silicon scanners which consist of capacitive, thermal and radio frequency.

Fingerprint matching techniques can be placed into two categories, minutiae-based and correlation based. Minutiae-based techniques first find minutiae points and then map their relative placement on the finger. However, there are some difficulties when using this approach. It is difficult to extract the minutiae points accurately when the fingerprint is of low quality. Also this method does not take into account the global pattern of ridges and furrows. The correlation-based method is able to overcome some of the difficulties of the minutiae-based approach. However, it has some of its own shortcomings. Correlation-based techniques require the precise location of a registration point and are affected by image translation and rotation.

The pre-processing and post-processing of the fingerprint extraction will be shown via GUI (graphical user interface) in the final stage. With the extraction of the fingerprint minutiae, the next step in matching techniques will hopefully be a reality in the near future.

1.2 Objective

At the end of this project, I should be able:

- To enhance and skeletonize the fingerprint image
- To extract the minutiae from the fingerprint input images which is from an offline database
- To be able to create a user interface system via a Graphical User Interface (GUI) using MATLAB

The important part of this project is to be able to extract the minutiae of the fingerprint images and to interface the programming with the GUI system.

1.3 Scope of project

1. Input fingerprint images for the system are taken from an offline image database on the host computer.

2. The system will be able to extract the minutiae (ridge end & ridge bifurcation) from the fingerprint images.