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^ Tesis dimaksudkan sebagai Laporan Projek Sarjana Muda (PSM)

IDENTITY AUTHENTICATION THROUGH BIOMETRIC FINGERPRINT

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This report is submitted in partial fulfillment of the requirements for the
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KOLEJ UNIVERSITI TEKNIKAL KEBANGSAAN MALAYSIA
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DECLARATION

I hereby declare that this project report entitled

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is written by me and is my own effort and that no part has been plagiarized

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STUDENT   : _____ Date : 24/11/06
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ABSTRACT

The system developed for Projek Sarjana Muda (PSM) is entitled Identity Authentication through Biometric Fingerprint. Thai is a simulation stand-alone system that will facilitate Immigration Department at all entrance of Malaysia to detect the foreigner that come to Malaysia for any purpose. The problem, in its simplest form, is the identity authentication of foreigner that comes to Malaysia. This system used biometric as identification element. Biometric that has chosen is fingerprint. The significant of the project is the ability to detect the individual that has come to Malaysia with their individual and general record and criminal and health background through their fingerprint since every person has the unique and different fingerprint. This system also can update the foreigner data such as the latest address and the changes of passport number.

ABSTRAK

Sistem yang akan dibangunkan untuk Projek Sarjana Muda ini dikenali sebagai "Pengesahan Identiti melalui Biometrik Cap Jari". Sistem ini merupakan sebuah sistem simulasi yang akan membantu Jabatan Imigresen di semua pintu masuk Malaysia untuk mengesan warga asing yang datang ke Malaysia dengan pelbagai tujuan. Secara ringkasnya, masalah bagi kajian ini ialah pengesahan identiti warga asing yang datang ke Malaysia. Sistem ini menggunakan biometrik sebagai elemen pengenalan diri untuk mengesahkan identity warga asing yang datang ke Malaysia. Biometrik yang dipilih untuk projek ini ialah cap ibujari. Kepentingan projek ini adalah kebolehan sistem untuk mengesan individu yang pernah datang ke Malaysia berserta rekod peribadi dan asas serta latarbelakang jenayah dan kesihatan melalui cap ibu jari memandangkan cap ibujari setiap orang adalah unik dan berbeza. Sistem ini juga boleh mengemas kini data warga asing seperti alamat terbaru dan perubahan nombor passport.

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IAS	Identity Authentication System
DFD	Data Flow Diagram
ERD	Entity Relationship Diagram
KUTKM	Kolej Universiti Kebangsaan Malaysia
PSM	Projek Sarjana Muda
RAD	Rapid Application Development

CHAPTER I

INTRODUCTION

1.1 Project Background

This project is to study about identity authentication through biometric fingerprint. From nearby, a human individual is mainly identified by his or her face. Other differences in appearance may also impede recognition usually most of the body is covered with clothing, which varies from day to day; body parts other than the face that are uncovered, such as hands, are not as easy to use to tell people apart; the arrangement of the hair also helps identifying people, but, like clothing, a person may vary this, and it may also be covered by headgear.

People can also fairly well be recognized by voice. The combination of visual and auditive recognition is even more effective and often removes any doubts. From longer distances, people can be recognized by their body size and shape and their gait.

Biometrics is the study of automated methods for uniquely recognizing humans based upon one or more intrinsic physical or behavioral traits. Biometric authentication refers to technologies that measure and analyzes human physical and behavioral characteristics for authentication purposes. Examples of physical characteristics include fingerprints, eye retinas and irises, facial patterns and hand measurements, while examples of behavioral characteristics include signature and gait. (Maltoni *et al.*,2003)

There are two different ways to resolve a person's identity namely verification and identification. Verification (*Am I whom I claim I am?*) involves confirming or denying a person's claimed identity. In identification, one has to establish a person's identity (*Who am I?*). Each one of these approaches has its own complexities and could probably be solved best by a certain biometric system. (Maltoni *et al.*,2003)

Authentication is the act of establishing or confirming something (or someone) as authentic, that is that claims made by or about the thing are true. Authenticating an object may mean confirming its provenance, whereas authenticating a person often consists of verifying their identity. Authentication depends upon one or more authentication factors. In a web of trust, "authentication" is a way to ensure users are who they say they are that the user who attempts to perform functions in a system is in fact the user who is authorized to do so.

Among all the biometric techniques, fingerprint-based identification is the conventional method which has been proven and successfully used in numerous applications. Everyone is known to have unique, immutable fingerprints. So the researcher would like to use fingerprint as the biometrics identifiers.

This project is to develop a system that can retrieve foreigners that had visit Malaysia using their passport number or full name and authenticate the individual by their fingerprint. The system will use a database that store the foreigner data. The database will contain foreigner details such as their name, address, NIRC, nationality, the fingerprint code and so on. The system will store the foreigner data in the database and use the data to search the foreigner details for the next visit to Malaysia. The system also can store the foreigner criminal background and health background. .

1.2 Problem Statements

There are no appropriate computerized systems that record the foreigner data that has come to Malaysia. Basically, foreigners just fulfill the form to apply visitor pass when they come to Malaysia and there are such no appropriate way to keep the application of the visitor pass.

Besides record the particulars of applicant, particulars of passport or travel document, particulars of sponsor in Malaysia, and detail of application, it's also records the criminal background and health background in case if the foreigners has the infection details. There are problems where a foreigner came to Malaysia and they have a criminal background at their former country or have done a criminal at Malaysia. This system will take a note if the foreigner came to Malaysia again or the Immigration Department can take a appropriate way such avoid this person enter Malaysia.

Before this there are such no systems at Immigration organization that can record the entry of foreigner with their biometric data. The common system is keep the record of the foreigner with their passport photo and the recognition of the foreigner will based on the face recognition through the photo and other data such as the foreigner height and colour of iris.

There are such a weakness of the organization and the system because without biometric there are no persistent of identification. There are many way to make a trick about their identity but the biometric data has never change. Other problem arising is the foreigner use other person's passport in the way to change their identity or to trick the immigration.

1.3 Objectives

The objectives of this system are as following

- To identify the foreigner that visit to Malaysia.
- To record the foreigner history at Malaysia such as they have a criminal background or infection disease.
- To use biometric as identification element.
- To maintain data integrity of biometric database.

1.4 Scopes

The scope of this project is to identify the foreigner that visit Malaysia using their fingerprint. This system is a stand alone application as it is a simulation of the actual system. The purpose of this system is to simulate the actual system and will be used by Malaysian Immigration at all of entrance to Malaysia. It will use Windows as a platform to build and to use this system.

The system will scan the fingerprint, analysis and representation the fingerprint, storing and compressing fingerprint images, and matching the fingerprint. This system also has the ability to store the foreigner data the visit Malaysia and view the data by searching using their passport number or their full name. This system also can delete the unused foreigner data but the process required password as authorization to delete the data.

1.5 Project Significance

This project will benefit Malaysia Immigration and also Malaysia government in many ways. It will detect the foreigner that had visit Malaysia and recognize if the foreigner have make a trouble to Malaysia such as a criminal or infected disease. This system also will reduce a lot of problems such as terrorist, criminal, drug peddlers and groups that are causing instability and problems.

1.6 Expected Output

Researcher hopes that systems that can recognize the foreigner that has visit Malaysia using their biometric element that is fingerprint. The system can store all the data of foreigner including their fingerprint code, their criminal background and their health background. If the Immigration Department of Malaysia can detect the foreigner that has such the background, they can avoid the foreigner from entering Malaysia. This system also has the constraints where it will take such a long time in the biometric identification process where the system must search the entire template database for a match. The crowdedness may happen at the immigration at the Malaysia-entrance.

1.7 Conclusion

A biometric system is essentially a pattern recognition system which makes a personal recognition by determining the authenticity of a specific physiological or behavioral characteristic possessed by a user. An important issue in designing a practical system is to determine how an individual is identified. Depending on the context, a biometric system can be either a verification (authentication) system or an identification system.

The target of this project is to detect the entry of foreigner to Malaysia. There are problem where the foreigner will often cross over the border to seek refuge after staging attacks or they do any criminal. Hopefully, this system will solve the entire problem that occurred at the Malaysia that involved the foreigner.

Literature review and project methodology will be discussed in the next chapter. This part will review the previous project and make a comparison with project that has been proposed. Besides, the chapter will explain about the software development methodology that will be used in this project.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1   Introduction

This chapter focuses on literature review and project methodology. For the first section; fact and finding, it will discuss and review about approach and related research, reference and other findings about this system. Besides, it also states other approaches that will be used in this project after comparison with previous approaches. In project methodology section, selected approach or methodology will be described the activities that may do in every stage.

The requirements that are requisite in this system will be explained in high level project requirements. Software development tools or software tools and hardware requirement to be used for software development or project management purposes will be stated in this chapter. The actions plan prior to the end of the project also will be explained. This chapter will be continued with conclusion whereby it will conclude about this chapter and also gives an overview about the next chapter.

2.2   Fact and finding

2.2.1 Domain

Body characteristics such as face, voice, gait, etc. has been used for thousands of years to recognize each other. Alphonse Bertillon, chief of the criminal identification division of the police department in Paris, developed and then practiced the idea of using a number of body measurements to identify criminals in the mid 19th century. Just as his idea was gaining popularity, it was obscured by a far more significant and practical discovery of the distinctiveness of the human fingerprints in the late 19th century. (Jain *et al.*, 2004)

Soon after this discovery, many major law enforcement departments embraced the idea of first "booking" the fingerprints of criminals and storing it in a database. Later, the leftover fingerprints at the scene of crime could be "lifted" and matched with fingerprints in the database to determine the identity of the criminals. Although biometrics appear from its extensive use in law enforcement to identify criminals such as illegal aliens, security clearance for employees for sensitive jobs, fatherhood determination, forensics, positive identification of convicts and prisoners, it is being increasingly used today to establish person recognition in a large number of civilian applications. (Jain *et al.*, 2004)

Everyone is known to have unique, immutable fingerprints. Fingerprint-based identification is the oldest method which has been proven and successfully used in numerous applications. A fingerprint is made of a series of ridges and furrows on the surface of the finger. The uniqueness of a fingerprint can be determined by the pattern of ridges and furrows as well as the minutiae points. In the over 100 years that fingerprints have been examined and compared, no two areas of friction ridge skin on any two fingers or palms (including between identical twins) have been found to have the same friction ridge characteristics.

There are many problems such as terrorist, criminal, drug peddlers and so on at the Malaysia. Most of the problems are cause by foreigner that came to Malaysia. Malaysia has upgraded the security at the Malaysia border and entrance to hinder foreigner from entering into Malaysia illegally. There are Thai Muslims crossed the border illegally and claimed they fear of Thai military's crackdown on the insurgency.

2.2.2 Project Existing

Fingerprint-embedded smart ID cards

Continuity to dual citizenship issue at Malaysia-Thailand border, both Malaysia and Thailand government has made several meeting to solve this problems. In the first step toward ending this problem, Thailand has issued fingerprint-embedded smart ID cards to 1.2 million residents. The smart card is seemed like Malaysian Mykad. The details about resident such as name, address, date of birth, NIRC, fingerprint, face image and so on will be stored in the smart ID cards. [1]

Immigration and Naturalization Service's Passenger Accelerated Service System

Immigration and Naturalization Service's Passenger Accelerated Service System (INSPASS), currently in place at Kennedy, Newark, Los Angeles, Miami, San Francisco, Vancouver and Toronto airports has used the biometric identification system. The system is based on hand geometry verification technology develop by Recognition System Inc. and significantly reduces the immigration processing time. The system can be classified as a cooperative, overt, non-attended, non-habituated, standard environment, public, closed application.

The system is cooperative because those wishing to defeat the system will attempt to be identified as someone already holding a pass. It will be overt because everyone is required to give a biometric measure as a condition of enrollment into this system. It will be non-attended and in a standard environment because collection of the biometric will occur near the passport inspection counter inside the airports, but not under the direct observation of an INS employee. It will be non-habituated because

most international travelers use the system less than once per month. The system is
public because enrollment is open to any frequent traveler into the United States. It is
closed because INSPASS does not exchange biometric information with any other
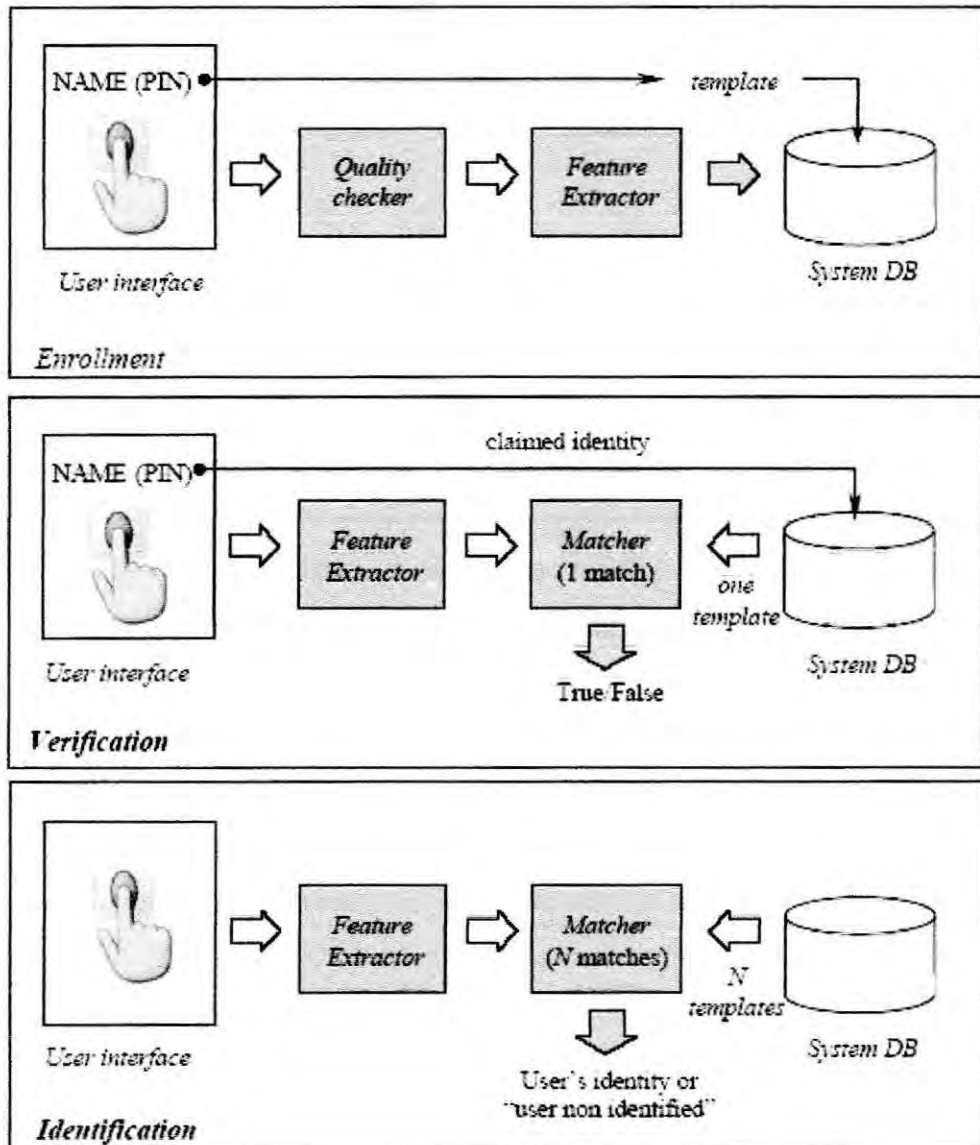system.[2]

2.2.3 Technique

**Figure 2.1. Block diagrams of enrollment, verification and identification tasks.
(Maltoni *et al.*,2003)**