FILTER-BASED FINGERPRINT FEATURE EXTRACTION

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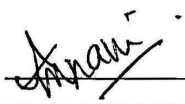
Signature: 

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Specially dedicated to my beloved parents, sister, brother and friends.Also to my supervisor. I'm nothing without them.

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ABSTRACT

In the modern world, biometric has become more important in secure way. Modern applications like online banking or online shopping use techniques that depend on personal identification numbers, keys or passwords. Nevertheless, these technologies imply risk of data being forgotten, lost or even stolen. A secure and confidential biometric authentication method is the utilization of fingerprints. Fingerprint were one of the first biometric to be widely use. The lines that flow in various patterns across fingerprint are called ridges and the spaces between ridges are valleys. As the person ages, the fingers do get larger. However ridges stay the same. Usually a technique called minutiae features extraction is used in extracting the fingerprint features to be able to handle automatic fingerprint recognition with computer system. This project proposes a different fingerprint features extraction technique, which uses the features extraction of Gabor filter-based method. There are two important parts in this project which are image pre-processing and feature extraction. The Gabor filter will be used in the image pre-processing process. A system that able to extract the fingerprint features will be built in this project using MATLAB software.

ABSTRAK

Pada zaman moden ini, biometric telah menjadi satu kaedah penting dalam mengenalpasti seseorang individu itu. Aplikasi-aplikasi moden seperti perbankan secara online atau pembelian secara online banyak menggunakan teknik kata laluan, nombor pengenalan dan juga kunci. Namun begitu, technologi seperti ini mempunyai banyak kelemahan kerana teknik seperti ini mudah terdedah kepada kehilangan. Oleh yang demikian, teknologi bimetrik menjanjikan kaedah yang unik dalam proses pengenalpastian. Kaedah biometric yang paling selamat dan sulit adalah menggunakan cap jari. Cap jari adalah salah satu kaedah biometric yang digunakan secara meluas. Cap jari mengandungi jalur-jalur unik yang dikenali sebagai rabung dan lembah. Walaupun seseorang manusia itu meningkat dewasa, corak cap jari tidak akan berubah. Kebiasaannya teknik yang digunakan untuk mengekstrak jalur-jalur atau corak yang terdapat pada cap jari adalah teknik mencari titik-titik pengenalan "minutiae". Projek ini mencadangkan proses mengekstrak corak cap jari menggunakan teknik yang lain iaitu teknik tapisan Gabor. Projek ini terbahagi kepada dua bahagian iaitu proses pra-pemprosesan dan pengekstrakan corak cap jari. Penapis Gabor akan digunakan dalam proses pra-pemprosesan. Sistem yang mampu mengekstrak corak cap jari akan dibangunkan dlm projek ini menggunakan perisian MATLAB.

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LIST OF ABBREVIATIONS

PIN	-	Personal Identification Number
MATLAB	-	MATLAB software
2-D	-	Two Dimensional
ADD	-	Average Absolute Deviation
dpi	-	Dots per inch
GUI	-	Graphical User Interface

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CHAPTER 1

INTRODUCTION

1.1 Overview

Traditional knowledge based identification such as password or personal identification number (PIN) and token based identification such as identity card, driving license and passport are exposing to fraud because this types of identification may be guessed by imposter, lost or be stolen, and maybe be forgotten [1]. Biometric identification is more reliable in comparison to traditional verification because the person has to be physically present at the time of identification. Biometrics, which refers to identifying an individual based on her or his physiological characteristics, has the capability distinguished between an authorized person and an imposter. Reliable personal identification is important in everyday transactions ranging from ATM withdrawal to high security access.

Among all the biometrics such as face, hand, fingerprints, iris, retina and so forth, fingerprint based authentication is one of the most mature and proven technique and has gained immense popularity due to the high level of uniqueness attributed to fingerprints. .Fingerprint were one of the first biometric to be widely use. Fingerprint can be distinguished based on the ridge characteristic. However, the feature extraction can be very unreliable and the quality of the image is low.

This project presents a filter- base fingerprint feature extraction that focused on thumb using MATLAB software. The image will go through an image pre-processing to extract the fingerprint features. This fingerprint extraction used a Gabor filter in order to create a more reliable and concise image to be easily compared to database values. In the image that we obtained has noise. There are two typical kinds of noise in fingerprint feature extraction such as false ridgeline connection and gaps in ridges. By using Gabor filter, we can remove noise, removing unnecessary ridge structure and filling in the gaps within a time ridgelines. This will produce a more accurate result and more time efficiency.

1.2 Objective

The objective of this project is to;

i. Extract global features of a fingerprint using filter-based image extraction method.

ii. Apply Gabor Filter in fingerprint feature extraction.

iii. Build program in MATLAB, which work in fingerprint feature extraction image pre-processing.

1.3 Scope of Project

i. This project only concentrates on thumb.

ii. The image used is an offline greyscale image fingerprint as a database.

iii. The filter used is 2D Gabor filter.

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