

DESIGNING GABOR-FILTER FOR IMAGE TEXTURE USING VHDL



**RESEARCH MANAGEMENT INSTITUTE (RMI)
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR
MALAYSIA**

BY :

**MOHD FAIZUL MD IDROS
ADIZUL AHMAD
ABDUL HADI ABDUL RAZAK**

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Contents

- 1. Letter of Report Submission iii
- 2. Letter of Offer (Research Grant)..... iv
- 3. Acknowledgements v
- 4. Enhanced Research Title and Objectives..... vi
- 5. Report 1
 - 5.1 Proposed Executive Summary 1
 - 5.2 Enhanced Executive Summary 2
 - 5.3 Introduction 3
 - 5.4 Brief Literature Review 4
 - 5.5 Methodology 9
 - 5.6 Results and Discussion 13
 - 5.7 Conclusion and Recommendation..... 17
 - 5.8 References/Bibliography 18
- 6. Research Outcomes 19
- 7. Appendix 20

1. Letter of Report Submission

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Penolong Naib Canselor (Penyelidikan)
Research Management Institute (RMI)
Universiti Teknologi MARA
40450 Shah Alam, Selangor
Malaysia

Ybhg. Prof.,

LAPORAN AKHIR PENYELIDIKAN "DESIGNING GABOR FILTER FOR IMAGE TEXTURE USING VHDL"

Merujuk kepada perkara di atas, bersama-sama ini disertakan 2 (dua) naskah berserta 'Softcopy' dalam bentuk CD Laporan Akhir Penyelidikan bertajuk "Designing Gabor Filter for image texture using VHDL".

Sekian, terima kasih.

Yang benar,



MOHD FAIZUL MD IDROS
Ketua
Projek Penyelidikan

5. Report

5.1 Proposed Executive Summary

Just as an idea from image sensing technology, we can clarify any type of image after digitized it. Possibility, in the future we can determine the colour, material and size of the real image. This technology mainly can be applied in forensic and biometric for investigation such as finger print and face identification. In real world, the investigation of finger prints and face identification takes a long time because of our limited technology. There are a lot of software can be use to build a new system of fingerprint and face identification like Matlab, Neural Network, Fuzzy logic and many others. But the software can't stand alone and need to connect to computer. Because of this problem, we propose to implement the image texturing by using Garbor filter and implement it on the FPGA. Soon after this research completed, we can produce a new Integrated Circuit that can be use in forensic and also biometric area.

This project aim is to design Gabor Filter in image recognition system segment the texture. Texture segmentation is the process of partitioning an image into regions based on their texture. The reason using Gabor filter is due to it characteristic. This system design is intended to enhance the efficiency of existing technology. The scope of this research is to make the system know the different type of image and it can be expand until can determine the material of the real image. The applications of this image sensing are user convenience (e.g. money withdrawal without ATM card and PIN), better security and automotive industry also can use this image sensing technology as the security or comfort purpose. As a conclusion the number of biometric products on the market is multiplying rapidly

5.3 Introduction

The increasing demand for reliable human large scale identification in governmental and civil applications has boosted interest in scientific testing of biometric systems. Biometric is an emerging technology that is used to identify people by their physical and/or behavioural characteristic that inherently requires that one to be identified is physically present at the point of identification. Fingerprint is one of an image identification that most used and important biometrics. It offers advantages when compared with other biometrics. For instance, iris reader fail when one wears contacts lenses or cannot maintain either their eyes open for a while or in front of intense luminosity. Gait and voice recognition can be imitated and there are similar patterns. Because of its uniqueness, the fingerprint has been used widely.

The most important measurement element in image recognition process is the texture of the image itself. Image enhancement is a necessary process for practical image verification. The main reason is because the imperfect live-scan image with the current technology[1]. As an example in live-scan image touch sensors are optical and capacitive devices. However, these kinds of touch sensor need to be cleaned periodically. So image enhancement technique employs contextual filter which their characteristics adapted depending on local text need to be implemented.

Image enhancement using Gabor filter is one of highly computational complexity in image verification process[1]. Gabor filter have a complex valued convolution kernel and a data format with complex values is used. So implementing Gabor filter is very significant in image verification process[2]. Designing Gabor filter will help enhancing the quality of image. In image recognition, Gabor filter optimally capture both local orientation and frequency information from an image. By tuning a Gabor filter to specific frequency and direction, the local frequency and orientation information can be obtained. Thus, they are suited for extracting texture information from images.