



UNIVERSITI TEKNOLOGI MARA

**CAR POST-LOCKING CHILD DETECTION
SYSTEM BASED ON IMAGE PROCESSING**

MOHD ISYRAQ B. MOHD YUSSOF

A dissertation submitted in partial fulfillment of the
requirements for the degree of

Bachelor of Engineering (Hons.) Electronics

Faculty of Electrical Engineering

Universiti Teknologi MARA

July 2014

ACKNOWLEDGMENT

In the name of Allah S.W.T, the Most Merciful with the deepest sense of gratitude who the strength and ability to complete this thesis. All perfect praises belong to Allah S.W.T.

The project forms the group MY080, a participant in the Altera track, Innovate Malaysia Design Competition 2014, representing UiTM at national level in the semifinals. The authors would like to thank (i) Dr. Wan Fazlida Hanim Abdullah, project supervisor, (ii) Dr. Sukreen Hana binti Herman and Puan Tuan Norjihhan binti Tuan Yaakub, project co-supervisors (iii) Niche Research Grant Scheme [Ref. No. 600-RMI/NRGS5/3(2013)] for project funding and (iv) Altera Corporation (M) for technical advice.

I would like to share my greatest appreciate to my parents who always give their support to me. I also want to thanks to all my friends for their support to complete this thesis.

Thank you.

ABSTRACT

This project presents a real Car PostLocking Child Detection System Based on Image processing which implement on field programmable logic array (FPGA) which is applied for child's monitoring surveillance system technology, which use a camera as a sensing unit. Nowadays, there have been many reported cases of babies being left unattended in cars. Due to the carelessness, babies left in vehicles often suffocate to death. The objective of this project is to detect the presence child in a car after a car has been locked. To achieve the objective, scope of work involve will be on Digital System Design and image processing. This project uses Altera DE2-70 FPGA board as a platform. The system was designed using Quartus II software as a medium to analyze and synthesis a HDL design. Sobel edge detection technique and background subtraction was taking place in the image processing field. The result shows that two images can be compared by applying Sobel edge detection technique. The efficiency of the edge detection depended on the light intensity of the environment. High intensity lighting gives average 80% efficiency to get the optimum edge detection image. The benefit of this project is to bring awareness and prevent children from suffocating inside vehicles. After all these matters, all cars nowadays should be outfitted with some kind of safety measure or alert device to prevent a child or someone being left in a car. The benefit of this project is to bring awareness and prevent babies from suffocating inside vehicles.

TABLE OF CONTENTS

CHAPTER	PAGE
DECLARATION	II
ACKNOWLEDGEMENT	III
ABSTRACT	IV
TABLE OF CONTENT	V
LIST OF FIGURES	VII
LIST OF TABLES	IX
LIST OF ABBREVIATION	X
CHAPTER 1	1
1. INTRODUCTION	1
1.1 Overview	1
1.2 Problem Statement	2
1.3 Objectives	4
1.4 Scope of work	5
1.5 Thesis Organization	6
CHAPTER 2	7
2. LITERATURE REVIEW	7
2.1 Introduction	7
2.2 Embedded System: Project Platform	7
2.2.1 Software	8
2.2.2 Hardware	8
2.3 Image processing Algorithm	9
2.3.1 Convolution and Image Filtering	9
2.3.2 Edge Detection	10
2.4 Human Detection Method	10
2.4.1 Skin Detection	11
2.4.2 Face Detection	11
2.4.3 Comparison Two Images	11

CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

There are so many safety awareness regarding child in a car, especially referred to the current issues which is more children are dying in a hot car. Engineers are working hard to ensure that cars are designed to keep children as safe as possible. The existing sensors that have been used to detect the presence of a child in a car such as motion detection and thermal sensor have a limited features such as having a limited range detection region. Use a camera as a sensor to detect presence of child is such a new approach to these issues.

After all these things, this project requires a knowledge regarding image processing and Digital Design and Computer Architecture. To perform image processing, it is important to understand which algorithm that suitable to perform a particular digital image processing. Since the hardware of this project was based on Field Programmable Logic Array to perform image processing, it is important to deeply understand the behavior of the board and taking design architecture into a consideration.