

DEVELOPMENT OF BABY CAR SEAT WITH UNFASTENED ALERT



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2020



**DEVELOPMENT OF BABY CAR SEAT WITH
UNFASTENED ALERT**



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**BACHELOR OF COMPUTER ENGINEERING
TECHNOLOGY (COMPUTER SYSTEMS) WITH
HONOURS**

2020



Faculty of Electrical and Electronic Engineering Technology



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ALERT**

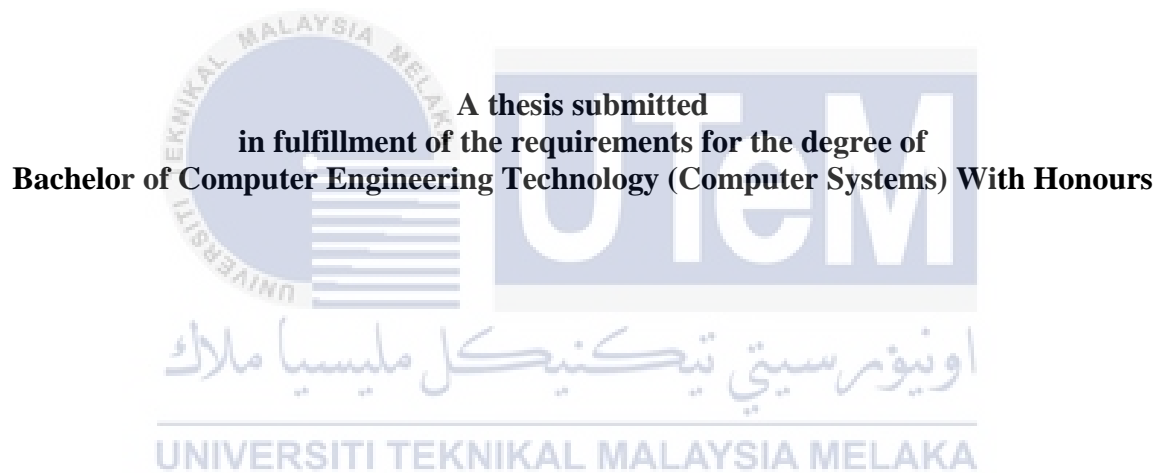
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Bachelor of Computer Engineering Technology (Computer Systems) With Honours

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DEVELOPMENT OF BABY CAR SEAT WITH UNFASTENED ALERT

NORJULIANA BINTI ABDUL FATTAH



**A thesis submitted
in fulfillment of the requirements for the degree of
Bachelor of Computer Engineering Technology (Computer Systems) With Honours**

Faculty of Electrical and Electronic Engineering Technology

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2020

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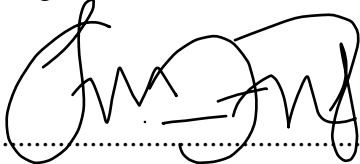
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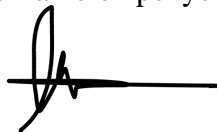
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APPROVAL

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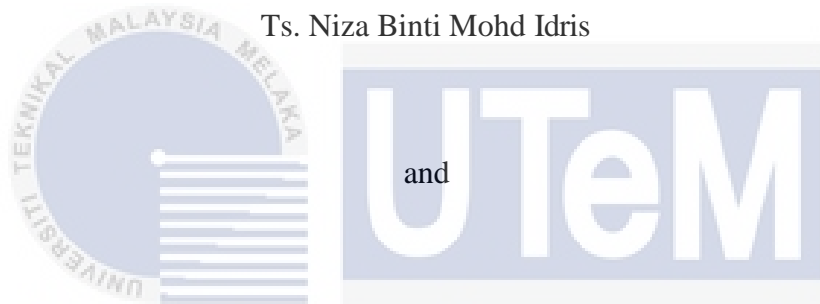
DEDICATION

To my beloved parents

Mr. Muhammad Taha Bin Mustapa & Mrs. Salawati Binti Andi Hamid

My best supervisor

Ts. Niza Binti Mohd Idris



اونيورسيتي تيكنيكيا ملانك
My helpful friends

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ABSTRACT

The “Development of Baby Car Seat with Unfastened Alert” project is designed with a device and system that suitable to produce an alert system to the parents when their child is unfastened the seat belt of baby car seat which can cause their child is in risk of danger. This is why “Development of Baby Car Seat with Unfastened Alert” designed. This system contains a few modules such as reed switch sensor to be mounted inside seat belt buckle of baby car seat, force sensing resistor to be installed under the seat of baby car seat and voice alert to warn the parents if the seat belt is unfastened. Arduino Uno used in this project as a main controller for this system that will communicate each other with other components such as reed switch sensor that detect the position of seat belt buckle, force sensing resistor to detect the presence of child on baby car seat, LCD display to show the information of the baby car seat and the speaker to produce voice alert.



ABSTRAK

Projek “Development of Baby Car Seat with Unfastened Alert” direka cipta bersama peranti dan sistem yang bersesuaian dalam menghasilkan sistem peringatan kepada ibu bapa apabila anak mereka membuka tali pinggang keledar pada tempat duduk kereta bayi yang boleh menyebabkan berada dalam bahaya. Inilah sebabnya "Development of Baby Car Seat with Unfastened Alert" direka cipta. Sistem ini mengandungi beberapa modul seperti ‘reed switch sensor’ yang dipasang di dalam tali pinggang keledar pada tempat duduk kereta bayi, ‘force sensing resistor’ yang dipasang di bawah tempat duduk kerusi kereta bayi dan amaran suara untuk memberi amaran kepada ibu bapa sekiranya tali pinggang keledar telah dibuka. Arduino Uno digunakan di dalam projek ini sebagai pengawal utama untuk sistem ini yang saling berkomunikasi dengan komponen lain seperti ‘reed switch sensor’ untuk mengesan posisi tali pinggang keledar, ‘force sensing resistor’ untuk mengesan kehadiran kanak-kanak di tempat duduk kereta bayi, paparan LCD untuk menunjukkan maklumat tempat duduk dan pembesar suara untuk menghasilkan amaran suara.

اونيورسيتي تيكنيكل مليسيا ملاك

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LIST OF SYMBOLS AND ABBREVIATIONS

LCD	-	Liquid crystal display
IR	-	Infrared
DC	-	Direct current
GPS	-	Global positioning system
LED	-	Light-emitting diode
RF	-	Radio frequency
UART	-	Universal asynchronous receiver-transmitter
RPM	-	Revolutions per minute
GPIO	-	General-purpose input/output
NPN	-	National producer number
GSM	-	Global system for mobile communications
USB	-	Universal serial bus
IC	-	Integrated circuit
V	-	Volt
mW	-	Milliwatt
W	-	Watt
cm	-	Centimeter
s	-	Second
kg	-	Kilogram
GND	-	Ground

CHAPTER 1

INTRODUCTION

1.1 Background

The protection for children from injury and death during car accident is called baby car seat. Baby car seat also can be called child seat, baby safety seat, toddler restraint system and more. Mostly, parents bought and mounted their baby car seat by themselves. Nowadays, car manufacturers often design baby car seats that fit their car's condition and designed an anchor to secure the baby car seat to fit in their car. Baby cars seat is defined by children's age, weight and height when using in a car. Baby car seat needs to be installed properly before using it to be effective.

Recent years, there are many cases where a toddler is injured or killed because the factor being hit in front of sit and thrown out from the car due to accident even if the toddler already seat in baby car seat. However, the factor of this problem still occurs because the belt actually is unfastened. As a driver and parent, it's their responsibility to make sure that their child is securely buckled on their seat. However, the parents sometimes face their child always keep unfastened their own seat belt without realizing it while driving a car. If their child works out how to unfastened the baby car seat buckle or escape from their car seat, this can be frustrating and dangerous to them if involve any accident.



Figure 1.1 Baby keep trying unfastened their seat belt

So, to prevent this problem occurs, the baby car seat needs to be designed with a device and system that suitable to produce an alert system to their parents when their child is unfastened the seat belt of the baby car seat. This is why “Development of Baby Car Seat with Unfastened Alert” designed. This system contains a few modules such as reed switch sensor to be mounted inside the seat belt buckle of the baby car seat, force sensing resistor to be installed under the cover seat of baby car seat and speaker as voice alert to warn the parents if seat belt is unfastened.

1.2 Problem Statement

There are many cases where a toddler is injured or killed because the factor being hit in front of sit and thrown out from the car due to accident even if the toddler already sits in baby car seat. This problem happened is caused by the seat belt of baby car seat is unfastened even the parents already checked and be sure the seat belt already securely fastened. This is because their children keep unfasten their seat belt and trying to escape from their car seat without their parents realizing it.

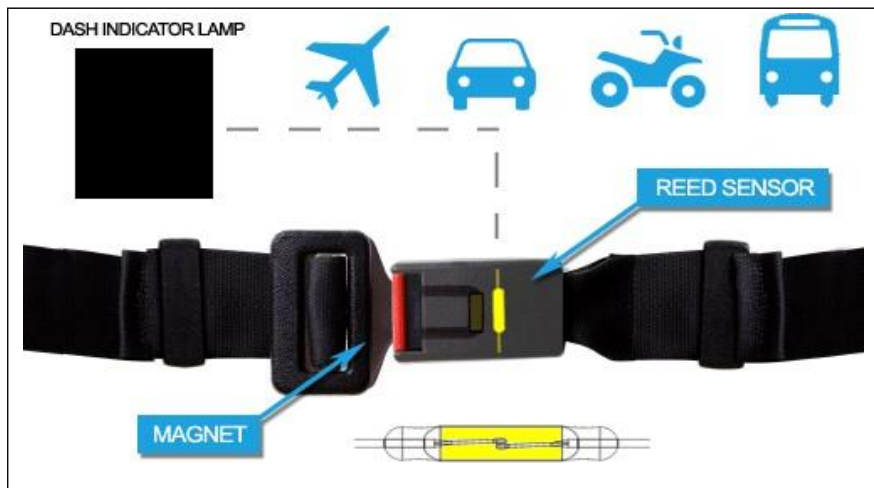


Figure 1.2 The concept of the belt of baby car seat system

In this case, to avoid any tragic event that will happen to their child, the development of baby car seat with unfastened alert system is designed with device to warn their parents by using voice alert while driving a car to tell that their child is in the risk of danger. Besides that, the reed switch sensor inside the seat belt buckle will not triggered if the force sensing resistor is not detected or there is no presence child on baby car seat even the seat belt is unfastened. The concept of this system is much like the adult seat belt system as shown in Figure 1.2 above.

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1.3 Research Objective

The main objectives for this project are:

- a) To design the circuit system to detect unfastened belt of the baby car seat by using Arduino Uno.
- b) To create alarm system by using voice alert if the baby unfastened the seat belt.
- c) To produce development of baby car seat with unfastened alert with reed switch sensor, force sensing resistor and speaker.

1.4 Scope of Research

The aim of this project is to design a development of baby car seat with unfastened alert system that detect if the seat belt of baby car seat is unfastened. Furthermore, this project is invented especially for parents to use baby car seat for their child in vehicle. This project also designed to help parents to get notice from the alert system by using voice alert when the seat belt of baby car seat unfastens which can cause the child face high risk anytime. Moreover, this project used Arduino Uno as a main controller or as “brain” in this system that will communicate each other with other components such as reed switch sensor to detect the seat belt buckle, force sensing resistor to detect the presence of toddler on baby car seat, LCD display to show the information of the baby car seat and speaker to produce voice alert.

1.5 Thesis Outline

This project is focusing on the system of development of baby car seat with unfastened alert. There are five chapters are covered from this project’s report below:

- Chapter 1. Introduction. This chapter described about the outline of this project containing the background, objectives, problem statement and scope.
- Chapter 2. Literature review. This chapter studies and discusses about the previous researches, project and journal that related with this project. The theoretical concepts and some useful ideas will implement in this project.
- Chapter 3. This chapter describes about the design of this project and how the project planned such as what components to be used and how the method represents in this project. Whole project from initially until the project finished includes on this chapter.