

DETECTOR SYSTEM FOR SLEEPY DRIVER

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This report is submitted as partial fulfillment of the requirements for the award of the
Bachelor of Electronic Engineering (Industrial Electronics) With Honours

**Faculty of Electronic Engineering and Computer Engineering
Universiti Teknikal Malaysia Melaka**

May 2009



UNIVERSITI TEKNIKAL MALAYSIA MELAKA
FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

BORANG PENGESAHAN STATUS LAPORAN
PROJEK SARJANA MUDA II

Tajuk : DETECTOR SYSTEM FOR SLEEPY DRIVER
Projek
Sesi : 2008/2009
Pengajian

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Dedicated especially to my father
and my beloved mother.

ACKNOWLEDGEMENT

Thanks to Allah S.W.T with His Compassion and Grace, I can manage to complete the project with a group of knowledgeable people while doing my project a pleasant and exciting experiences one. Their help and support throughout is greatly appreciated. I would like to give the highest gratitude to my supervisor, Prof Madya Muhammad Syahrir Bin Johal, for his help, advices and responsibilities throughout the project especially during hardest time. Also thanks to my beloved parents for their encouragement and moral support.

ABSTRACT

The purpose of this project is to design and construct a detector system for sleepy driver while driving. This detector system will be built on car dashboard without have to wear it. Input for this detector system is Passive Infrared sensor (PIR) and their outputs are buzzer and light emitting diode (LED). This detector system will be fully controlled by microcontroller type PIC16F876A. When the sensor (input) has detected head movement, microcontroller will function and send a signal to the buzzer (output). The main objective for this project is to construct a detector system that can give a signal or precaution to awake the driver from sleepiness.

ABSTRAK

Projek ini bertujuan merekabentuk dan membina sebuah sistem pengesan bagi pemandu yang mengantuk ketika memandu. Sistem pengesan ini akan dipasang pada dashboard kereta tanpa perlu memakainya. Input yang akan digunakan bagi sistem ini adalah sensor Pasif Infrared (PIR) manakala outputnya adalah pendering dan diod pemancar cahaya (LED). Sistem pengesan ini akan dikawal sepenuhnya menggunakan mikro pengawal jenis PIC16F876A. Apabila sensor (input) mengesan pergerakan kepala pemandu, mikro pengawal akan berfungsi dan menghantar isyarat kepada pendering (output). Objektif utama projek ini adalah untuk membina satu sistem pengesan yang mampu memberi isyarat atau peringatan untuk mengejutkan pemandu yang berada dalam keadaan mengantuk.

TABLE OF CONTENTS

| CHAPTER | CONTENT | PAGE |
|----------|-----------------------|------|
| | PROJECT TITLE | i |
| | VERIFICATION FORM | ii |
| | DECLARATION | iii |
| | VERIFICATION | iv |
| | DEDICATION | v |
| | ACKNOWLEDGEMENT | vi |
| | ABSTRACT | vii |
| | ABSTRAK | viii |
| | TABLE OF CONTENTS | ix |
| | LIST OF FIGURES | xiii |
| | LIST OF TABLES | xv |
| | APPENDICES | xvi |
| | LIST OF SHORTFORM | xvii |
| | | |
| I | INTRODUCTION | |
| | 1.1 Introduction | 1 |
| | 1.2 Objective | 2 |
| | 1.3 Problem Statement | 3 |
| | 1.4 Work Scope | 3 |
| | 1.5 Thesis Structure | 4 |

II RESEARCH BACKGROUND

| | | |
|-----|--|----|
| 2.1 | Literature Review | 5 |
| 2.2 | Technique For Detecting Drowsy Driver | 5 |
| | 2.2.1 Monitoring Physiological Characteristics | 6 |
| | 2.2.2 Other Methods | 6 |
| 2.3 | Past Project | 7 |
| | 2.3.1 The Prototype of The Drowsy Driver Detection System | 7 |
| | 2.3.2 Driver Alarm – Stay Awake Device | 8 |
| 2.4 | Microcontroller | 8 |
| 2.5 | Software Design | 10 |
| | 2.5.1 C Language | 10 |
| | 2.5.2 Assembly Language | 12 |

III RESEARCH METHODOLOGY

| | | |
|-----|--|----|
| 3.1 | Methodology | 14 |
| 3.2 | Project Framework | 14 |
| 3.3 | Detector System Research | 17 |
| | 3.3.1 Chassis/ Hardware Development | 17 |
| | 3.3.2 Electronics Development | 18 |
| | 3.3.3 Software Development | 19 |
| | 3.3.4 Alarm System for Sleepy Driver Development | 21 |
| 3.4 | Theory on Device | 22 |
| | 3.4.1 Passive Infrared Sensor (PIR) | 22 |
| | 3.4.2 PIC16F876A Microcontroller | 23 |
| | 3.4.3 Voltage Regulator LM7805 | 24 |

| | | |
|-------|----------------------------|----|
| 3.4.4 | Buzzer | 25 |
| 3.4.5 | Light Emitting Diode (LED) | 26 |

IV RESULT AND DISCUSSION

| | | |
|---------|--|----|
| 4.1 | Result | 27 |
| 4.2 | Expected Result | 27 |
| 4.2.1 | Circuit Selection | 28 |
| 4.2.2 | Component List | 29 |
| 4.2.3 | Interface PIC16F876A With PIR Sensor | 32 |
| 4.2.4 | Interface PIC16F876A With Buzzer | 32 |
| 4.2.5 | Power Supply For Circuit | 33 |
| 4.2.6 | ICSP for Programming PIC Microcontroller | 33 |
| 4.2.7 | Push Button as Input for PIC Microcontroller | 34 |
| 4.2.8 | LED as Output for PIC Microcontroller | 35 |
| 4.2.9 | Reset Circuit | 35 |
| 4.3 | EAGLE PCB Circuit Design | 36 |
| 4.4 | Final Circuit Assembly | 37 |
| 4.5 | Circuit Simulation | 37 |
| 4.6 | Programming Code | 38 |
| 4.6.1 | Using the MPLAB IDE v8.15a | 39 |
| 4.6.1.1 | Project Wizard | 39 |
| 4.6.1.2 | Select Device | 40 |
| 4.6.1.3 | Select a Language Toolsuite | 41 |
| 4.6.1.4 | Create the Project | 41 |
| 4.6.1.5 | Add Files | 42 |
| 4.6.1.6 | Creating/Updating any Project | 43 |
| 4.6.1.7 | Add Files | 44 |
| 4.6.1.8 | Create the Programming Code (.Hex) | 45 |
| 4.6.2 | Detector System for Sleepy Driver | |

| | | |
|-------|--|----|
| | Programming Code | 48 |
| 4.6.3 | Scanning Mode | 49 |
| 4.6.4 | Motion Detect Mode | 49 |
| 4.7 | Detector System for Sleepy Driver Circuit | 50 |
| 4.8 | Detector System for Sleepy Driver Overview | 51 |
| 4.9 | Discussion | 52 |

V CONCLUSION AND RECOMMENDATION

| | | |
|-----|----------------|----|
| 5.1 | Conclusion | 27 |
| 5.2 | Recommendation | 28 |

| | | |
|--|-------------------|-----------|
| | REFERENCES | 29 |
|--|-------------------|-----------|

LIST OF FIGURES

| NO. | TITLE | PAGE |
|---------|---|------|
| 1.1 | System's concept | 2 |
| 2.3.1 | The prototype of the drowsy driver detection system | 7 |
| 2.3.2 | Driver alarm | 8 |
| 2.4 | PIC16F876A 28-Pin | 9 |
| 3.4.1 | PIR sensor | 22 |
| 3.4.2 | PIC16F876A | 23 |
| 3.4.3 | Voltage regulator LM7805 | 24 |
| 3.4.4 | Buzzer | 25 |
| 3.4.5 | Light Emitting Diode (LED) | 26 |
| 4.2.1 | Main circuit | 28 |
| 4.2.5 | Power supply | 33 |
| 4.2.7 | Push button | 34 |
| 4.2.8 | LED | 35 |
| 4.2.9 | Reset circuit | 36 |
| 4.3 | PCB design circuit | 36 |
| 4.4 | Final circuit after soldering | 37 |
| 4.5 | Circuit simulation using Proteus software | 38 |
| 4.6.1.2 | Step 1 – selecting device | 40 |
| 4.6.1.3 | Step 2 – selecting a language | 41 |
| 4.6.1.4 | Step 3 – create a project file | 42 |
| 4.6.1.5 | Step 4 – summary of project wizard | 43 |

| | | |
|-------------|---|----|
| 4.6.1.7 | Adding the programming | 45 |
| 4.6.1.8 (a) | Create a .Hex File for PIC | 46 |
| 4.6.1.8 (b) | Debug the programming code | 47 |
| 4.6.1.8 (c) | Programming code in <i>.HEX</i> File | 47 |
| 4.6.2 | Programming code of sequence timing | 48 |
| 4.6.3 | Scanning mode programming code | 49 |
| 4.6.4 | Motion detect mode programming code | 49 |
| 4.7 | Detector system for sleepy driver circuit | 50 |
| 4.8 (a) | Inside a car overview | 51 |
| 4.8 (b) | Block diagram overview | 51 |

LIST OF TABLES

| NO. | TITLE | PAGE |
|------------|---------------------------------|-------------|
| 4.2.2 | Component List for Main Circuit | 29 |

APPENDICES

| NO. | TITLE | PAGE |
|------------|----------------------|-------------|
| A | PIC16F87XA Datasheet | 56 |

LIST OF SHORTFORM

| | | |
|------------|---|---------------------------------|
| PIR | - | Passive Infrared |
| LED | - | Light Emitting Diode |
| PIC | - | Peripheral Interface Controller |
| AC | - | Alternating Current |
| DC | - | Direct Current |
| GND | - | Ground |

CHAPTER 1

INTRODUCTION

1.1 Introduction

Drive or travel for long distance is very tough for every driver. Before start the journey, we should prepare and get the rest at sufficiently. So, the journey will become safe and we can reach at destination without any bad luck.

As we know, most of the accidents occurred because of the sleepiness on driving session. The detector system for sleepy driver is a system to prevent a drowsy driver from getting an accident. There are a lot of methods to avoid that things happen and one of the method is this detector system. In the market, we can see many products about alarm system but just a little bit can be used efficiently.

The idea to improve detector system to become more successful is by using motion sensor. PIR sensor will be used in this project. A Passive InfraRed sensor (PIR sensor) is an electronic device that measures infrared (IR) light radiating from objects in its field of view. PIR sensors are often used in the construction of PIR-based motion detectors. Apparent motion is detected when an infrared source with one temperature,

such as a human, passes in front of an infrared source with another temperature, such as a wall.

All objects emit what is known as black body radiation. It is usually infrared radiation that is invisible to the human eye but can be detected by electronic devices designed for such a purpose. The term passive in this instance means that the PIR device does not emit an infrared beam but merely passively accepts incoming infrared radiation.

This sensor will be the main component for the system that detects the sleepiness of the driver. This project will become more complete with other devices such as alarm, LED, LCD display and vibrating driver seat to awake the driver.

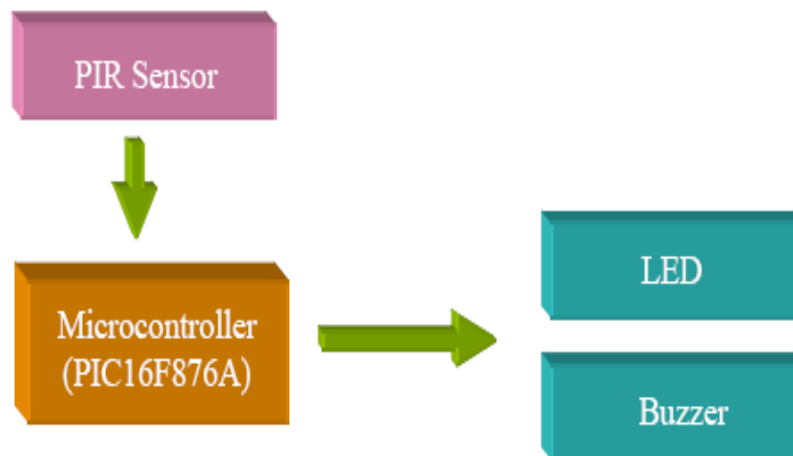


Figure 1.1: System's Concept

1.2 Objective

The main objective of this project is to design and fabricate a system that can give an alarm to drowsy driver which has happen during driving. That means, when the driver feel sleepy, it will be determine whether to give an alarm so that the driver notice that he/she is not in aware condition.

To achieve this, a PIR sensor will be use as a device to receive a signal input from the driver. Then, the sensor will be communicated with the PIC. This second objectives was to study the PIC programming for the timing of between the alarm and LED.

The last objectives of the thesis are to study a detector system that already been study by others and product in the market similar with this project. Even though there have been many researches done on this topic, the main aim is to control the timing time sequentially and effectively.

1.3 Problem Statement

As we all know, each year the cause of death for sleepy driving is increased. To drive a vehicle in aware condition are important to ensure the driver are safe enough to reach the destination.

There are a lot of factor for driver feel sleepy during driving session but the sleepy driving are more dangerous among all factor because the driver is not in an aware condition to control any vehicle.

Limitation of this project is when the driver move from the initial condition the detector system for sleepy driver will be not fully function or will not be accurate as usual.

1.4 Work scope

This project basically uses a sensor that detects the head movement. I will use a circuit that contains a PIC (Peripheral Interface Controller) as a brain to control all the system. Input for this system will be the human head where a sensor will detect the head movement and send a signal through to the PIC.

PIC will react after receive a signal and will make the LED and alarm gives a warning to the driver to stay aware to the driving session. Meanwhile alarms (audio) that will be use in this system are the buzzer. Initially, the system sounds a warning alarm and LED. This system will be applied on the dashboard in front of driver.

1.5 Thesis Structure

This report contains of five chapters that explain the details about this project. The first chapter is the project introduction. This chapter contain of project introduction, project objectives, project problem statement, and project work scope.

The second chapter is the literature review which contains the findings of the research regarding the topic of giving an alarm to driver. The project concept that will be done was explained briefly in this chapter such as the types of sensor, component use, microcontroller and others.

The third chapter is the Project Methodology. This chapter will explain the project framework from the beginning until it is completed. Flowchart for each of the development was attached for better understanding.

The fourth chapter will be on the current results of the project. This means that the project ware still not finish and are still in development. This chapter will show that what have been done for this project and what have not, possible problems and solution for the problems occurred and others.

The last chapter is about project application of the project, discussion and conclusion of the project. This chapter also contain of suggestion to improve this project for future works. The overall conclusion of this project showed.

CHAPTER 2

RESEARCH BACKGROUND

2.1 Literature Review

In order to execute this project, literature review must be done to comprehend the whole system and decide the best inputs, outputs and devices. From literature review, there will be an analysis concerning the advantage and disadvantage for each phase in this project. Equipment and part manuals include information such as dimension, operation and specification.

2.2 Technique For Detecting Drowsy Driver

Possible techniques for detecting drowsiness in drivers can be generally divided into the following categories:

- sensing of physiological characteristics
- sensing of driver operation
- sensing of vehicle response
- monitoring the response of driver

2.2.1 Monitoring Physiological Characteristics

Among these methods, the techniques that are best, based on accuracy are the ones based on human physiological phenomena. This technique is implemented in two ways:

- a) measuring changes in physiological signals
 - brain waves
 - heart rate
 - eye blinking
- b) measuring physical changes such as
 - sagging posture
 - leaning of the driver's head and
 - the open/closed states of the eyes.

The first technique, while most accurate, is not realistic, since sensing electrodes would have to be attached directly onto the driver's body, and hence be annoying and distracting to the driver. In addition, long time driving would result in perspiration on the sensors, diminishing their ability to monitor accurately. The second technique is well suited for real world driving conditions since it can be non-intrusive by using optical sensors of video cameras to detect changes.

2.2.2 Other Methods

Driver operation and vehicle behavior can be implemented by monitoring the steering wheel movement, accelerator or brake patterns, vehicle speed, lateral acceleration, and lateral displacement. These too are non-intrusive ways of detecting drowsiness, but are limited to vehicle type and driver conditions. The final technique for detecting drowsiness is by monitoring the response of the driver. This involves periodically requesting the driver to send a response to the system to indicate alertness. The problem with this technique is that it will eventually become tiresome and annoying to the driver.

2.3 Past Project

There are a lot of project for detect sleepiness in the market. I have survey that in website and journals to see more about this detector system. What i have found is mostly of the project are to detect eye blinking. So, i made decision for my project not to detect eye blinking but i want to detect head movement (sagging posture).

2.3.1 The Prototype Of The Drowsy Driver Detection System

This project was designed by Neeta Parmar from Ryerson University to fulfill her master education. She has studied about detected eye blinking.



Figure 2.3.1 The Prototype of The Drowsy Driver Detection System