



Faculty of Electrical and Electronic Engineering Technology



**DEVELOPMENT OF SOCIAL DISTANCING DEPARTMENTAL
STORE TROLLEY (SODIT) USING ARDUINO.**

MUHD IKMAL HAFIZ BIN ABIDIN

Bachelor of Electrical Engineering Technology (Industrial Power) with Honours

2021

**DEVELOPMENT OF SOCIAL DISTANCING DEPARTMENTAL STORE
TROLLEY (SODIT) USING ARDUINO.**

MUHD IKMAL HAFIZ BIN ABIDIN

**A project report submitted
in partial fulfillment of the requirements for the degree of
Bachelor of Electronics Engineering Technology with Honours**



Faculty of Electrical and Electronic Engineering Technology

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DECLARATION

I declare that this project report entitled “Development of Social Distancing Departmental Store Trolley (SODIT) using Arduino “was the result of my own research except as cited in the references. The project report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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APPROVAL

I hereby declare that I have checked this project report and in my opinion, this project report is adequate in terms of scope and quality for the award of the degree of Bachelor of Electrical Engineering Technology (Industrial Power) with Honours.

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Date :

.....
.....

DEDICATION

First of all, I would like to express my gratitude to Allah SWT for giving me the opportunity, space, time and energy to complete the task given. Not forgetting, the unceasing support given by family and classmates. Thanks also to Sir Ts. Zaihasraf bin Zakaria who helped a lot in giving advice and guidance throughout this task. In the situation of this pandemic country, it is certainly difficult for students to face it both physically and mentally. All of them played a big role in supporting me to complete this Bachelor Degree Project



ABSTRACT

Development of Social Distancing Departmental Store Trolley (SODIT) using Arduino is a device that was built to help in fighting Pandemic Covid-19. Pandemic Covid-19 have changed our life style accordingly to meet the standard operating procedure for avoiding virus spread. The hardware and software components of this project are distinct. This division was formed for the purpose of assisting with the overall design and development of the system in this project. The trolley's design and circuit modelling are the two primary components of development. To construct the application system, this project uses the Arduino UNO as the main controller. Ultrasonic Sensor for determining consumer social distance and Passive Infrared (PIR) Sensor for determining object motion by detecting their temperature were the two key components of the project. By combining these hardware and software key element will lead to Development of Social Distancing Departmental Store Trolley (SODIT). If PIR sensor detect a person it will triggered high and will go to Ultrasonic sensor to check condition either the distance is less than 100cm or not, if less than 100cm the sensor will trigger the output. These two conditions for each sensor must be met each other in order to produce the output, either one is not met, the output signal cannot be produced. For output require a simple electronics device such as LED or Buzzer to warn or alarm the user. In order to reduce power consumption used by this trolley, a 5V DC power supply (powerbank) will be used to generated the trolley. This because, the development of this SODIT Trolley does not required a complex and high used of power in this system such as servo motor, automatic breaking system and so on. All this features will effected the power consumption of this departmental trolley. By this implementation, in this pandemic situation the development of Social Distancing Departmental Store Trolley (SODIT) will be develop with technological developments.

ABSTRAK

Pembangunan Troli Gedung Penjarakan Sosial (SODIT) menggunakan Arduino adalah alat yang dibina untuk membantu memerangi Pandemic Covid-19. Pandemic Covid-19 telah mengubah gaya hidup kita, untuk memenuhi prosedur operasi standard bagi mengelakkan penyebaran virus. Projek ini terbahagi kepada dua bahagian perkakasan dan perisian. Bahagian ini dibuat dalam projek ini untuk membantu keseluruhan reka bentuk dan pembangunan sistem. Reka bentuk troli dan litar simulasi adalah bahagian utama pembangunan. Untuk membina sistem aplikasi, projek ini menggunakan Arduino UNO sebagai pengawal utama. Sensor Ultrasonik untuk menentukan jarak pengguna dan Sensor Pasif Inframerah (PIR) untuk menentukan pergerakan objek dengan mengesan suhu mereka adalah dua komponen penting dalam projek ini. Dengan menggabungkan perkakasan dan perisian ini, akan membawa kepada Pembangunan Troli Gedung Penjarakan Sosial (SODIT). Sekiranya sensor PIR mengesan seseorang, ia akan membacanya sebagai 'tinggi' dan akan pergi ke sensor Ultrasonik untuk memeriksa keadaan sama ada jaraknya kurang dari 100cm atau tidak, jika kurang dari 100cm sensor akan mencetuskan output. Kedua-dua syarat untuk setiap sensor mesti dipenuhi antara satu sama lain untuk menghasilkan output, jika salah satu tidak dipenuhi, isyarat output tidak dapat dihasilkan. Untuk output, hanya memerlukan peranti elektronik yang mudah seperti LED atau Buzzer untuk memberi amaran atau penggera kepada pengguna. Untuk mengurangkan penggunaan tenaga yang digunakan oleh troli ini, bekalan kuasa DC 5V (powerbank) akan digunakan untuk menghasilkan troli. Ini kerana, pengembangan Troli SODIT ini tidak memerlukan penggunaan kuasa yang kompleks dan tinggi dalam sistem ini seperti motor servo, sistem brek automatik dan sebagainya. Semua ciri ini akan mempengaruhi penggunaan kuasa troli gedung ini. Dengan pelaksanaan ini, dalam situasi pandemik ini, pengembangan Troli Gudang Jarak Jauh Sosial (SODIT) akan dikembangkan dengan perkembangan teknologi.

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First and foremost, I would like to express my gratitude to my supervisor, Mr. Ts Zaihasraf bin Zakaria for his precious guidance, words of wisdom and patient throughout this project. I am also indebted to Universiti Teknikal Malaysia Melaka (UTeM) for the financial support which enables me to accomplish the project. Not forgetting to all my fellow colleague, classmates and family member for giving me all support during complete this Bachelor Degree Project. In addition, I also like to acknowledge with much thanks to my Bachelor Degree Project panel Encik Ts Adlan bin Ali and Encik Dr Ts Zikri Abadi bin Baharudin for good opinion and suggestion for my Bachelor Degree Project.

I would like to express my gratitude to Allah SWT for giving me the opportunity, space, time and energy to complete the task given. Not forgetting, the unceasing support given by family and classmates. In the situation of this pandemic country, it is certainly difficult for students to face it both physically and mentally. all of them played a big role in supporting me to complete this Bachelor Degree Project. Thank you very much.



TABLE OF CONTENTS

	PAGE
DECLARATION	
APPROVAL	
DEDICATIONS	
ABSTRACT	i
ABSTRAK	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	i
LIST OF TABLES	iv
LIST OF FIGURES	v
LIST OF SYMBOLS	vii
LIST OF ABBREVIATIONS	viii
LIST OF APPENDICES	ix
CHAPTER 1 INTRODUCTION	1
1.1 Background	1
1.2 Problem Statement	2
1.3 Project Objective	3
1.4 Scope of Project	3
CHAPTER 2 LITERATURE REVIEW	4
2.1 Introduction	4
2.2 Technical Research	4
2.2.1 Hardware	5
2.2.2 Software	5
2.3 First Review: Review on Intelligent Shopping Trolley	5
2.4 Second Review: Automatic Human Guided Shopping Trolley with Smart Shopping System	6
2.5 Third review: Social Distancing Helmet	7
2.6 Fourth review: Arduino Social Distancing Device with PIR Sensor	8
2.7 Fifth review: Social Distancing tool using Ultrasonic sensor and Arduino	9
2.8 Sample formulas	10
2.9 Summary	12
CHAPTER 3 METHODOLOGY	15
3.1 Introduction	15
3.2 Methodology	15

3.2.1	Process flowchart	18
3.2.2	Experimental setup	20
	3.2.2.1 Parameters	20
	3.2.2.2 Moving object detection for different distance	21
3.3	Equipment	23
3.3.1	Arduino Uno R3	23
3.3.2	Passive Infrared (PIR) sensor	25
3.3.3	Ultrasonic Sensor	27
3.3.4	(IR) Infrared Sensor	29
3.3.5	LED	30
3.3.6	Piezo Buzzer	31
3.3.7	Power bank	32
3.4	Software	33
3.4.1	PIR Sensor coding program using Arduino IDE	34
3.4.2	Ultrasonic Sensor coding program using Arduino IDE	35
3.4.3	Proteus 8 Professional Software	36
3.4.4	Circuit design of PIR Sensor	38
3.4.5	Circuit design of Ultrasonic Sensor	38
3.4.6	Design of trolley and social distancing device on SolidWorks.	39
3.5	Summary	41
3.6	Gantt Chart for BDP 1 and BDP 2	42
CHAPTER 4	RESULTS AND DISCUSSIONS	45
4.1	Introduction	45
4.2	Results and Analysis	45
4.2.1	Development of Electronic Circuit	45
4.2.2	Arduino Programming	47
4.2.3	Arduino full program coding	50
4.3	Experimental result	52
4.3.1	Power consumption analysis for ultrasonic sensor	52
	4.3.1.1 Current reading for distance 0cm	52
	4.3.1.2 Current reading for distance 50cm	53
	4.3.1.3 Current reading for distance 100cm	54
	4.3.1.4 Voltage value for distance 0cm	55
	4.3.1.5 Voltage value for distance 50cm	56
	4.3.1.6 Voltage value for distance 100cm	57
	4.3.1.7 Analysis of Result	58
4.3.2	Analysis for PIR sensor	60
	4.3.2.1 Voltage reading for PIR at HIGH state	60
	4.3.2.2 Voltage reading for PIR at LOW state	61
4.4	Project analysis method	62
4.4.1	Reading of current and voltage when distance is 100cm	62
4.4.2	Reading of current and voltage when distance is 50cm	63
4.4.3	Reading of current when distance is 1cm	64
4.5	Project Development process	65
4.6	Discussion	67
CHAPTER 5	CONCLUSION AND RECOMMENDATIONS	68
5.1	Conclusion	68

5.2	Future Works	68
5.3	Project Potential	69
	REFERENCES	70
	APPENDICES	72



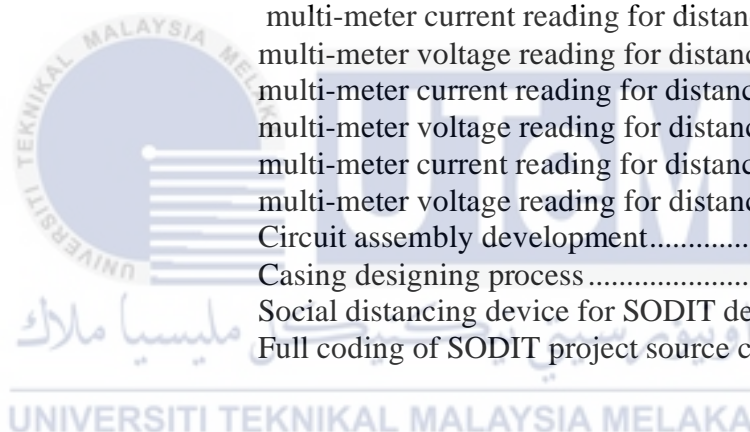
LIST OF TABLES

TABLE	TITLE	PAGE
Table 4. 1:	Average current of 0cm distance detection	53
Table 4. 2:	Average current of 50cm distance detection	54
Table 4. 3:	Average current of 100cm distance detection	55
Table 4. 4:	Average voltage of 0cm distance detection	56
Table 4. 5:	Average voltage of 50cm distance detection	57
Table 4. 6:	Average voltage of 100cm distance detection	58
Table 4. 7:	Table of current, distance and power consumed by ultrasonic	60
Table 4. 8:	Table voltage if PIR state is HIGH	61
Table 4. 9:	Table voltage if PIR state is LOW	61

LIST OF FIGURES

FIGURE	TITLE	PAGE
Figure 2.1 :	Intelligent Shopping Trolley	6
Figure 2.2:	Automatic Human Guided Shopping Trolley	7
Figure 2.3 :	Social distancing helmet	8
Figure 2.4 :	Social distancing device	9
Figure 2.5 :	Social distancing tool	10
Figure 3.1:	Flowchart of system	17
Figure 3.2 :	Block diagram of system.....	18
Figure 3.3 :	Process flowchart.....	19
Figure 3.4 :	distance between sensor and moving object is 1cm	21
Figure 3.5 :	distance between sensor and moving object is 50cm ..	22
Figure 3.6:	distance between sensor and moving object is 100cm	22
Figure 3.7:	distance between sensor and moving object is more than 100cm	22
Figure 3.8 :	Arduino Uno R3 Board	24
Figure 3.9:	Arduino Uno pin layout.....	25
Figure 3.10 :	Passive Infrared (PIR) Sensor overview	26
Figure 3.11 :	PIR Sensor working principle	27
Figure 3.12 :	Ultrasonic sensor overview	28
Figure 3.13 :	Ultrasonic Sensor Working Principal.....	28
Figure 3.14 :	IR Sensor.....	30
Figure 3.15 :	IR Sensor working principle	30
Figure 3.16 :	Red Led	31
Figure 3.17 :	Piezo Buzzer	32
Figure 3.18 :	10,000 mAh power bank	33
Figure 3.19 :	Arduino IDE software	34
Figure 3.20 :	PIR Sensor program in Arduino IDE	35
Figure 3.21 :	Ultrasonic sensor program in proteus 8.....	36
Figure 3.22 :	Proteus 8 Professional Software	37
Figure 3.23 :	Circuit design of PIR Sensor in Proteus 8.....	38
Figure 3.24 :	Circuit design of Ultrasonic sensor in Proteus 8	38
Figure 3.25 :	isometric view of trolley	39
Figure 3.26 :	side view of trolley	39
Figure 3.27 :	front view of trolley	40
Figure 3.28 :	top view of trolley.....	40
Figure 4.1 :	Circuit design simulation above 100cm.....	46
Figure 4.2 :	Simulation for distance below 100cm.....	46
Figure 4.3 :	Integrated circuit implementation.....	47
Figure 4.4 :	Declaration coding in Arduino IDE	47
Figure 4.5 :	Void configuration in Arduino IDE	48
Figure 4.6 :	Void loop Arduino coding program	48
Figure 4.7 :	Duration and distance formula Arduino coding	49

Figure 4.8 :	Statement and condition command in Arduino IDE ...	50
Figure 4.9 :	Current reading graph and average current for distance	53
0cm	
Figure 4.10 :	Current reading graph and average current for distance	54
50cm	
Figure 4.11 :	Current reading graph and average current for distance	55
100cm	
Figure 4.12 :	Voltage reading graph and average voltage distance 0cm	56
	
Figure 4.13 :	Voltage reading graph and average voltage distance	57
50cm	
Figure 4.14 :	Voltage reading graph and average voltage distance	58
100cm	
Figure 4.15 :	Graph of current and power consumed against distance	59
for ultrasonic sensors	
Figure 4.16 :	graph of voltage if PIR detect motion	60
Figure 4.17 :	graph of voltage if PIR not detect motion	61
Figure 4.18 :	multi-meter current reading for distance 100cm	62
Figure 4.19 :	multi-meter voltage reading for distance 100cm	63
Figure 4.20 :	multi-meter current reading for distance 50cm	63
Figure 4.21 :	multi-meter voltage reading for distance 50cm	64
Figure 4.22 :	multi-meter current reading for distance 1cm	64
Figure 4.23 :	multi-meter voltage reading for distance 1cm	65
Figure 4.24 :	Circuit assembly development	65
Figure 4.25 :	Casing designing process	66
Figure 5.1 :	Social distancing device for SODIT development	72
Figure 5.2 :	Full coding of SODIT project source code	72



LIST OF SYMBOLS

μ	-	micro
	-	
	-	
	-	
	-	
	-	
	-	
	-	
	-	



LIST OF ABBREVIATIONS

V	-	Voltage
I	-	Current
P	-	Power
μA	-	microAmpere
	-	
	-	
	-	
	-	



LIST OF APPENDICES

APPENDIX	TITLE	PAGE
Appendix 1	Social distancing device for SODIT development	71
Appendix 2	Full coding of SODIT project source code	71



CHAPTER 1

INTRODUCTION

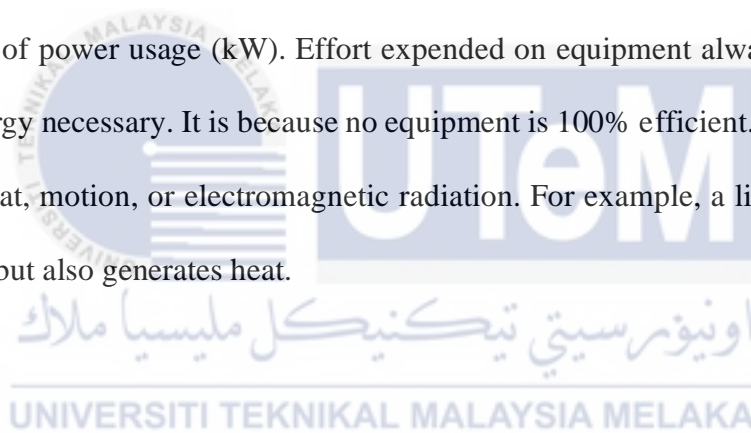
1.1 Background

Humans have advanced by leaps and bounds in every area of their lives in the 21st century. The healthcare industry is undeniably a vital aspect and sector. More vaccines, techniques, and herbal remedies have been established in the last century than ever before, allowing us to treat more plagues, save more lives, and heal more blights than ever before. This is critical because human happiness and well-being are dependent on good health. It also contributes significantly to global growth.

Humans and their healthcare services were forced to the limit at the start of the new decade, when a highly infectious novel virus originated from Wuhan, China in December 2019. (Corona Virus). It then started to grow worldwide in the early months of 2020, at which point it was declared a "pandemic.". Many countries are already imposing a state of lockdown or a managed travel order on their citizens in order to prevent the epidemic from spreading.

Malaysia has also imposed the Movement Control Order (MCO) on its residents, authorising only basic services to continue to operate. Some businesses are impacted, but many more are able to adapt to the current standard by innovating. Online industry, or e-commerce, is particularly booming in these days, transforming a traditional corporate job into a work-from-home practise. Strict standard operating procedures (SOP) were also applied around the board.

Shopping malls, for example, have been subjected to rules and simple preventative steps, allowing only a limited number of customers to visit at any one time for a set period of time. Hand sanitizer preparation and body temperature recording were also included. Despite this, social distancing laws were applied. As a result, a smart scheme, such as a smart shopping trolley, may be introduced to allow people to follow the rules. Many advantages can be offered to the citizens and shopping malls in control thanks to the trolley's various protective measures and sensors. This is unquestionably a step in the right direction in terms of public hygiene regulations. Despite this, in electrical engineering, electrical energy supplied to run a residential appliance is referred to as power consumption. These terms are used more frequently in everyday language: Watts (W) or kilowatts (kW) are the most common units of power usage (kW). Effort expended on equipment always outweighs the amount of energy necessary. It is because no equipment is 100% efficient. Wasted energy is any kind of heat, motion, or electromagnetic radiation. For example, a light bulb not only provides light but also generates heat.



1.2 Problem Statement

The government has enforced stringent controls throughout the world as the latest virus has taken hold. These rules are implemented quickly and with full effect. Strict SOPs and legislation were implemented into the public's everyday lives, transforming the standards of people from all walks of life. Also, with the rules in place, there are still some bottlenecks to be tackled, including the fact that some members of the general population are still unaware of the Covid-19 virus's dangers. These citizens not just lack the required knowledge, but they often disobey the government's rules on social distancing steps which is (1-2 meters) between people. In this case, people are often observed to be overwhelmed

when shopping for basics in a shopping mall because it is difficult to maintain a safe space between them. This resulted in a significant time delay for those in queue, exacerbating an increasingly difficult situation and increasing in crowd. This may lead to spreading of the virus high.

1.3 Project Objective

This integrated development initiative has three objectives:

- a) To develop a trolley that can alert user of social distancing.
- b) To develop a trolley that can alert user of body temperature.
- c) To analyse the trolley in term of functionality and power consumption.

1.4 Scope of Project

There are a few aspects that are needed to be considered during the design and development of the SODIT Trolley:

- a) Build a trolley device that can be used into a standard shopping cart to make it safe and affordable for the general public.
- b) Setup a functional and easy to handle trolley (SODIT) for all customers from all ages level.
- c) Construct a portable trolley that would provide simple preventative services to the general public with correct social distancing application.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This section will discuss the conceptual foundations for the project's structure, requirements, theory, and other data. This is based on study and examination of closely comparable past initiatives, publications, and research papers. There is a comparable project and associated paper in this project. The purpose of this research is to develop and manufacture a trolley using creative approaches. There are a few clever trolleys and autonomous trolleys on the market now. Aside from that, there is a form of trolley that follows the consumer. The consumer is no longer required to push the cart. As a result, the consumer only needs to find and choose the items they want to purchase, then place them in the cart without having to push it. However, for this project development it will focus on remind the consumer about social distance, this SODIT Shopping Trolley can help the client go shopping in supermarkets and be in safe distance during these Pandemic COVID-19 circumstances.

2.2 Technical Research

Before the project is officially underway, a literature review and technical analysis will be undertaken. The literature review revolves around a previous effort of a similar kind. Meanwhile, scientific studies will focus on computer components, programming languages, and other devices seen on blogs, papers, and books. All of this material can be used to assist and direct the completion of this undertaking. This project's analysis can be split into two categories, as follows:

2.2.1 Hardware

- Research on Arduino Uno, Motion Sensor, PIR Sensor, Microwave Sensor, Infrared (IR) Sensor, Ultrasonic Sensor, Trolley, Piezo buzzer.

2.2.2 Software

- Learning Arduino IDE Software and Proteus 8 Professional operation and applications.

2.3 First Review: Review on Intelligent Shopping Trolley

In these new century, people are forced to live with the virus unofficially and unexpectedly. So Intelligent Shopping Trolley is a device that was built to help in fighting Pandemic Covid-19. This Intelligent Shopping Trolley is equipped with a RFID and timer system, Indoor Positioning System (IPS) and Microwave Sensor Detection system to determine the distance and to alert the customer when they go shopping in a supermarket. This Intelligent Shopping Trolley will also use the Internet of Things (IoT) to control the functionality. The Intelligent Shopping Trolley will help customers to determine the distance between other customers in implementing social distancing that is recommended by the Ministry of Health Malaysia and manage time of customer for shopping. Besides that, it helps supermarkets to monitor their customers after the time limit given to the customers ends. This explains the details on this Intelligent Shopping Trolley project. This project to some extent helps in making the community aware of the importance of social distancing.[1]



Figure 2.1 : Intelligent Shopping Trolley

2.4 Second Review: Automatic Human Guided Shopping Trolley with Smart Shopping System

Shopping trolleys are essential when shopping in supermarkets or grocery stores. However, abandoned shopping trolleys are scattered everywhere inside supermarkets. In addition, there are escalator/shopping trolley concerns, such as falling down escalators. Customers spend considerable time searching for products in a supermarket while in a hurry. Thus, an autonomous human and line following shopping trolley is built to overcome these issues. The portable robot is hooked up to the trolley and follows along, directing customers to their groceries. This paper discusses the design of the portable robot. The employed sensors like ultrasonic and line sensors' tests are revealed. Lastly, the graphical user interface of Android applications when in use is explained.[2]