

**POLITEKNIK
SULTAN SALAHUDDIN ABDUL AZIZ SHAH**

**DESIGN An ULTRASONIC OCCUPANCY COUNTER
WITH LCD**

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JABATAN KEJURUTERAAN ELEKTRIK

NOVEMBER 2021

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This report submitted to the Electrical Engineering Department in fulfillment of the requirement of Diploma in Electrical Engineering

JABATAN KEJURUTERAAN ELEKTRIK

NOVEMBER 2021

CONFIRMATION OF THE PROJECT

The project report titled “Design an Ultrasonic Occupancy Counter with LCD using Arduino” has been submitted, reviewed and verified as a fulfills the conditions and requirements of the Project Writing as Stipulated.

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“I acknowledge this work is my own work except the excerpts I have already explained to our source”

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DECLARATION OF ORIGINALITY AND OWNERSHIP

TITLE:	ULTRASONIS OCCUPANCY COUNTER WITH LCD
SESSION:	SESI 1 2021/2022

1. I, is a final year student of Diploma in Electrical Engineering, Department of Electrical, Politeknik Sultan Salahuddin Abdul Aziz Shah, which is located at Persiaran Usahawan, 40150 Shah Alam, Selangor.
2. I acknowledge that 'The Project above' and the intellectual property therein is the result of our original creation /creations without taking or impersonating any intellectual property from the other parties.
3. I agree to release the 'Project' intellectual property to 'The Polytechnics' to meet the requirements for awarding the Diploma in Electrical Engineering to me.

Made and in truth that is recognized by;	
a) MUHAMMAD HERIFCAN BIN ALIMUS (Identification card no.: 08DEU19F2015) MUHAMMAD HERIFCAN BIN ALIMUS
In front of me, PUAN NAGAAJOO THI A/P ADIN NARAINA, As a project supervisor, on the date: PUAN NAGAAJOO THI A/P ADIN NARAINA

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ABSTRACT

In this time of pandemic, physical distancing is very important to ensure and reduces the risk of the spread of this epidemic. This project is to limit the number of people entering the store to ensure physical incarceration is implemented. The project is based on the Bidirectional Visitor Counter as a case study where it counts and shows the number of people entering on an LCD and shows the number of peoples inside, but, the project does not have an efficient system in controlling entry. The Ultrasonic Occupancy Counter present a new system to ensure the number of people in the shop does not exceed the set limit with by using a motor driven bar system. The Arduino UNO is used as a microcontroller, ultrasonic sensor to detect people and Servo motor used to move the bar. This device will show the number of people who can enter on the LCD. The LED and buzzer are used as a warning system, and the motor is used to moves the crossbar as a barrier system which will be active when the number of people in the store is full. This device is successful in controlling the number of people entering the store and ensuring physical spacing.

Keywords: Room Limit Counter, Ultrasonic sensor, Counter system, Physical distancing, COVID-19

ABSTRAK

Pada masa pandemik ini, penjarakan fizikal amat penting bagi memastikan dan mengurangkan risiko penularan wabak ini. Projek ini adalah untuk menghadkan bilangan orang yang memasuki kedai untuk memastikan pemenuhan jarak fizikal dilaksanakan. Projek ini berdasarkan Kaunter Pelawat Dua Arah sebagai kajian kes di mana ia mengira dan menunjukkan bilangan orang yang masuk pada LCD dan menunjukkan bilangan orang di dalam, tetapi, projek itu tidak mempunyai sistem yang cekap dalam mengawal kemasukan. Kaunter Penghuni Ultrasonik mempersembahkan sistem baharu untuk memastikan bilangan orang di kedai tidak melebihi had yang ditetapkan dengan menggunakan sistem bar pacuan motor. Arduino UNO digunakan sebagai mikropengawal, sensor ultrasonik untuk mengesan orang dan motor Servo digunakan untuk menggerakkan bar. Peranti ini akan menunjukkan bilangan orang yang boleh masuk pada LCD. LED dan buzzer digunakan sebagai sistem amaran, dan motor digunakan untuk menggerakkan palang sebagai sistem penghalang yang akan aktif apabila bilangan orang di dalam kedai penuh. Peranti ini berjaya mengawal bilangan orang yang memasuki kedai dan memastikan jarak fizikal.

Kata kunci: Kaunter Had Bilik, Penderia ultrasonik, Sistem kaunter, Penjarakan fizikal, COVID-19

TABLE OF CONTENTS

CONFIRMATION OF THE PROJECT	3
DECLARATION OF ORIGINALITY AND OWNERSHIP	4
ACKNOWLEDGEMENTS	5
ABSTRACT	6
ABSTRAK	7
TABLE OF CONTENTS	8
LIST OF TABELS	10
LIST OF FIGURES	11
LIST OF ABBREVIATIONS	12
CHAPTER 1	13
1 INTRODUCTIONS	13
1.1 Introduction	13
1.2 Background Research	14
1.3 Problem Statement	14
1.4 Research Objective	15
1.5 Scope of Research	15
1.6 Project Significance	16
1.7 Chapter Summary	16
CHAPTER 2	17
2 LITERATURE REVIEW	17
2.1 Introduction	17
2.2 Literature Review 1	17
2.3 Literature Review 2	18
2.4 Literature Review 3	18
2.5 Literature Review 4	19
2.7 Chapter Summary	19
CHAPTER 3	20
3 RESEARCH METHODOLOGY	20
3.1 Introduction	20
3.2 Project Design and Overview	20
3.2.1 Block Diagram of the Project	21
3.2.2 Flowchart of the Project 2	22
3.2.3 Project Description	23
3.3 Project Hardware	23
3.3.1 Schematic Circuit	23
3.3.2 Description of Main Component	24
3.3.2.1 Arduino UNO	24
3.3.2.2 Ultrasonic sensor	24
3.3.2.3 LCD (16x2)	25
3.3.2.4 Servo Motor	25
3.3.2.5 Resistor (560Ω)	26
3.3.2.6 LED	26
3.3.2.7 Buzzer	26
3.3.3 Circuit Operation	27
3.4 Project Software	27
3.4.1 Flowchart of the System	29
3.4.2 Description of Flowchart	30

3.5	Prototype Development	30
3.5.1	Mechanical Design/Product Layout	31
3.6	Sustainability Element in The Design Concept	31
3.7	Chapter Summary	31
CHAPTER 4		32
4	RESULT AND DISCUSSION	32
4.1	Introduction	32
4.2	Result and Analysis	32
4.3	Discussion	33
4.4	Chapter Summary	33
CHAPTER 5		34
5	CONCLUSION AND RECOMMENDATION	34
5.1	Introduction	34
5.2	Conclusion	34
5.3	Suggestion for Future Work	34
CHAPTER 6		35
6	PROJECT MANAGEMENT AND COSTING	35
6.1	Introduction	35
6.2	Gant Chart and Activities of the Project	35
6.3	Costing and Budgeting	36
6.4	Chapter Summary	37
REFERENCES		38
7	APPENDICES	39
	APPENDIX A- PROGRAMMING	39
	APPENDIX B- PROJECT MANUAL/PROJECT CATALOUGE	44

LIST OF TABLES

TABLE	TITLE	PAGE
-------	-------	------

Table 4.1: Costing and Budgeting

32

LIST OF FIGURES

FIGURE	TITLE	PAGE
Figure 3.2.1:	Block Diagram of the Project	22
Figure 3.2.2:	Flowchart of the Project	23
Figure 3.3.1:	Schematic Circuit	24
Figure 3.4.1:	Flowchart of the System	30
Figure 3.5:	Prototype Development	31
Figure 3.5.1:	Mechanical Design / Product Layout	31
Figure 4.2:	Gant Chart and Activities of the Project	32

LIST OF ABBREVIATIONS

LCD – Liquid Crystal Display

LED – Light Emitting Diode

DC – Direct Current

IDE – Integrated Development Environment

CHAPTER 1

1 INTRODUCTIONS

1.1 Introduction

Physical distance is now highly encouraged and mandatory for everyone, especially in public areas. This is so that the spread of Covid 19 disease does not spread widely and causes an increase in daily cases. Therefore, 'Menteri Kesihatan Negara' (MKN) has prepared SOPs that can help in reducing cases. So, we need to follow the SOPs that have been set, because these SOPs will not be effective if not followed and implemented by everyone. As a rule-abiding society, we must follow them.

Next, to ensure that there is physical distance in enclosed areas such as shops, supermarkets and so on. The government has stipulated that each store limits the number of people who enter and are inside. This is so that there is no congestion in the area which has a bad effect and there may be contagion. With a limit on the number of people that can be in the store at one time, this can ensure that physical spacing can be applied and may be able to help reduce transmission.

Therefore, there are various ways that have been done by each store owner to ensure that physical distance is taken care of and done. There are stores that place their staff in front of the store entrance to limit the number of people that can be in the store. In addition, there is also a place that puts a number tag in front of the entrance and customers need to pick up the number tag before entering the store. If the number tag runs out, then the customer has to wait for the number tag from the customer in the store.

However, each way this is done may be able to ensure the number of customers can be controlled and physical spacing in the store is done, but there are drawbacks to each way that has been done. So, to keep the number of people in the store under control, we need something that can do just that. In other words, an innovation is needed to help solve this, which can control the number of people who enter the store.

1.2 Background Research

For this project, the original idea came about when he saw that there was a problem when people often ignored the physical distance in shops or public places that caused congestion. Ultrasonic Occupancy Counter is the most important safety device to ensure physical spacing that can prevent COVID-19 infection in enclosed public places such as shops. There have been several previous projects that using the same concept as counting numbers people who are in the store, but have a deficiency in ensuring that no one enters when the designated number of people in the store has been sufficient. Therefore, I have used 2 Ultrasonic sensors to increase efficiency in detecting people entering, the use of Servo motor that will move the bar and act as a barrier system when the limit in the store is enough to ensure no one enters.

1.3 Problem Statement

This project is made for the purpose of helping to limit and control the number of people who enter the store to ensure physical distance can be done. this can also reduce congestion in the store and can also prevent any physical contact from occurring. Moreover, with the advent of this project the workers needed to take care of the front door of the store are no longer needed. In fact, the employee can help in doing other things in the store. In addition, the use of workers in controlling the number of people entering has shortcomings. This is because, some of them forgot to count the number of people entering, which may be due to fatigue factor. Therefore, with this project, the number of people entering can be controlled in a more orderly manner. In other projects, they only control the entry of people without any system that can tell that the room is full, there are projects that use LEDs as an indication that the room is full. Next, there is no system that can ensure that no one will enter if the number of people in the store is enough. These are some of the shortcomings found on previous projects. So, in this project I have added an LCD that displays the number of people that can enter and a motor that will move the bar at the entrance. This bar will go down and prevent people from entering if the number of people in the store is sufficient, and will go up again if the number of people inside has decreased. With this, the control of the entry of people into the store will be more efficient and orderly.

1.4 Research Objective

The objective of this project is to help ensure that physical spacing can be done in public enclosed spaces such as shops to prevent Covid-19 infection. After learning that contact in public places due to no physical distance can cause the spread of an epidemic, I have acquired workable solutions to overcome problems and help people do their shopping activities throughout the day in a more comfortable environment.

1. To design a counter project by adding a barrier system that can better control the entry of people, by placing bars that will prevent people from entering when the number of people in the room has been sufficient.
2. The main purpose of the implementation of this project is to ensure that physical spacing can be implemented in the room so that the transmission of Covid 19 can be avoided.
3. To develop a control system that can count the number of people entering using Ultrasonic sensors as detectors that function to count the number of people inside. The Servo motor is used to moves the barrier bar.

1.5 Scope of Research

1. The project focuses on indoor public places that are frequented by the public such as grocery stores, banks and more.
2. The emphasis is on the number of people allowed to enter the store so that physical distance remains during the activity and ways to ensure people do not enter when the set number is full.
3. The main controller used in this device is Arduino UNO.

1.6 Project Significance

The importance of this project is to ensure that there is physical distancing done, so, that activities can be done comfortably and avoid the possibility of the spread of Covid-19 outbreak. So, in 2020, a group of students from the Faculty of Engineering at Baze University have produced this counter device that counts the number of people entering and displays it on an LCD. In the project, there were some shortcomings in the entry control of people as there was no efficient warning system if the space inside the store was full. In this time project, I have added some innovations that can make this device more perfect, by adding a warning system using buzzers and LEDs that can tell people that the room is full. In addition, I have also added a system that can prevent people from entering to ensure no one tries to enter when it is full. This is because I have placed a crossbar that will prevent people being driven by the motor.

1.7 Chapter Summary

In this first chapter, I have described about the background research of the original idea for the beginning of this project. Then, I have identified the problems that are happening nowadays. In addition, I have demonstrated the objectives in this project and I have removed the scope the study I obtained from the objective study. Finally, I came up with an important project.