

POLITEKNIK UNGKU OMAR

**AUTOMATIC GATED PARKING FOR DISABLED
PERSON**

MUHAMMAD QUSYAIRI BIN ASRI

(01DKA21F1133)

TAUFIQ BIN MUDOFIN

(01DKA21F1134)

MUHAMMAD IMAN NAJMI BIN MOHAMMAD

NASIR

(01DKA21F11360)

JABATAN KEJIURUTERAAN AWAM

JUN 2023

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MUHAMMAD IMAN NAJMI BIN MOHAMMAD NASIR

(01DKA21F11360)

**Laporan ini dikemukakan kepada Jabatan Kejuruteraan Awam
sebagai memenuhi sebahagian syarat penganugerahan
Diploma Kejuruteraan Awam**

JABATAN KEJIURUTERAAN AWAM

JUN 2023

AKUAN KEASLIAN DAN HAK MILIK

AUTOMATIC GATED PARKING FOR DISABLED PERSON

1. Saya, **MUHAMMAD QUSYAIRI BIN ASRI (NO KP: 030716-03-1003)** adalah pelajar **Diploma Kejuruteraan Awam, Politeknik Ungku Omar**, yang beralamat di **Jalan Raja Musa Mahadi, 31400 Ipoh, Perak**.
2. Saya mengakui bahawa 'Projek tersebut di atas' dan harta intelek yang ada di dalamnya adalah hasil karya/reka cipta asli saya tanpa mengambil atau meniru mana-mana harta intelek daripada pihak-pihak lain.
3. Saya bersetuju melepaskan pemilikan harta intelek 'Projek tersebut' kepada 'Politeknik tersebut' bagi memenuhi keperluan untuk penanugerahan **Diploma Kejuruteraan Awam** kepada saya.

Diperbuat dan dengan sebenar-benarnya diakui
oleh yang berikut:

MUHAMMAD QUSYAIRI BIN ASRI	(.....)
(NO. KAD PENGENALAN: 030716-03-1003)	MUHAMMAD
	QUSYAIRI BIN ASRI

Di hadapan saya, ROZINA BT MOHAMMAD (781029-08-6536)
sebagai Penyelia Projek pada tarikh: (.....)

ROZINA BT
MUHAMMAD

AKUAN KEASLIAN DAN HAK MILIK

AUTOMATIC GATED PARKING FOR DISABLED PERSON

1. Saya, **TAUFIQ BIN MUDOFIN (NO KP: 030129-08-0863)** adalah pelajar **Diploma Kejuruteraan Awam, Politeknik Ungku Omar**, yang beralamat di **Jalan Raja Musa Mahadi, 31400 Ipoh, Perak**.
2. Saya mengakui bahawa 'Projek tersebut di atas' dan harta intelek yang ada di dalamnya adalah hasil karya/reka cipta asli saya tanpa mengambil atau meniru mana-mana harta intelek daripada pihak-pihak lain.
3. Saya bersetuju melepaskan pemilikan harta intelek 'Projek tersebut' kepada 'Politeknik tersebut' bagi memenuhi keperluan untuk penanugerahan **Diploma Kejuruteraan Awam** kepada saya.

Diperbuat dan dengan sebenar-benarnya diakui
oleh yang berikut:

TAUFIQ BIN MUDOFIN	(.....)
(NO. KAD PENGENALAN: 030129-08-0863)	TAUFIQ BIN MUDOFIN

Di hadapan saya, ROZINA BT MOHAMMAD (781029-08-6536)	
sebagai Penyelia Projek pada tarikh:	(.....)
	ROZINA BT MUHAMMAD

AKUAN KEASLIAN DAN HAK MILIK

AUTOMATIC GATED PARKING FOR DISABLED PERSON

1. Saya, MUHAMMAD IMAN NAJMI BIN MOHAMMAD NASIR (NO KP: 030504-02-0417) adalah pelajar Diploma Kejuruteraan Awam, Politeknik Ungku Omar, yang beralamat di Jalan Raja Musa Mahadi, 31400 Ipoh, Perak.
2. Saya mengakui bahawa 'Projek tersebut di atas' dan harta intelek yang ada di dalamnya adalah hasil karya/reka cipta asli saya tanpa mengambil atau meniru mana-mana harta intelek daripada pihak-pihak lain.
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Diperbuat dan dengan sebenar-benarnya diakui
oleh yang berikut:

MUHAMMAD IMAN NAJMI BIN	(.....)
MOHAMMAD NASIR	MUHAMMAD IMAN
(NO. KAD PENGENALAN: 030504-02-0417)	NAJMI BIN
	MOHAMMAD NASIR

Di hadapan saya, ROZINA BT MOHAMMAD (781029-08-6536)
sebagai Penyelia Projek pada tarikh: (.....)
ROZINA BT
MOHAMMAD

PENGHARGAAN

Penulis ingin merakamkan penghargaan ikhlas kepada penyelia projek, diatas bimbingan, tunjuk ajar, perbincangan, dan kesabaran yang diberikan sepanjang tempoh projek ini dilaksanakan.

Perhargaan ini juga diberikan kepada sesiapa sahaja yang samaada secara langsung atau tidak langsung membantu dalam penghasilan projek ini.

Penulis sekali lagi ingin merakamkan ribuan terima kasih kepada penyelia, penal, ketua pensyarah bagi program ini, dan pensyarah jemputan atas bimbingan dan tunjuk ajar yang telah dicurahkan sepanjang pelaksanaan kajian projek ini. Tanpa dorongan dan bimbingan kemungkinan projek kajian ini tidak akan sampai ke tahap ini.

ABSTRAK

Projek ini diterapkan berdasarkan pemerhatian terhadap cara moden yang kini digunakan, iaitu 'Automatic Gated for Disabled Person'. Objektif utama projek ini adalah untuk merancang tempat letak kenderaan berpagar automatik khusus untuk orang kurang upaya. Tambahan lagi, terdapat beberapa skop kajian yang ditetapkan, termasuk memberi tumpuan kepada tempat letak kereta OKU di pintu utama pusat membeli-belah di UTC Ipoh Perak, bertujuan memudahkan orang kurang upaya mendapatkan tempat letak kereta pada waktu puncak, serta merancang sistem khas untuk kegunaan orang kurang upaya sahaja. Semua ini ditetapkan untuk menangani beberapa masalah yang timbul dengan penggunaan reka bentuk sedia ada, seperti pencurian atau penyalahgunaan tempat letak kereta orang kurang upaya (OKU) oleh orang awam yang bukan daripada golongan OKU, dan penggunaan pelekat palsu kenderaan OKU untuk mendapatkan tempat letak kenderaan dengan mudah. Hal ini boleh meningkatkan risiko kemalangan bagi warga OKU kerana mereka terpaksa meletakkan kereta di tempat letak awam yang jauh dari pintu utama. Bahan untuk projek ini juga perlu mempunyai ciri-ciri khas, seperti keupayaan berfungsi secara automatik, tindak balas terhadap kesahihan data kad OKU, dan tindak balas terhadap keberadaan kereta OKU. Berdasarkan kajian literatur, Pengawal Suara, Pengesanan Sensor Ultrasonik, dan Operasi Pintu Automatik dianggap paling sesuai untuk projek ini. Bagi proses pembentukan komponen, kajian metodologi digunakan untuk merancang proses penghasilan projek dengan menggunakan carta alir sebagai panduan untuk perancangan penghasilan dan pengujian projek. Secara keseluruhan, projek penambahbaikan ini dapat mengurangkan kes penyalahgunaan tempat letak kereta OKU oleh orang awam berbanding reka bentuk sebelum ini. Berdasarkan analisis dan perbincangan, dapat disimpulkan bahawa 'Automatic Gated for Disabled Person' berjaya mencapai objektif-objektif yang ditetapkan dan memberikan perlindungan yang lebih baik terhadap hak keistimewaan dan keselamatan golongan orang kurang upaya (OKU) berbanding reka bentuk sebelumnya.

ABSTRACT

This project is applied based on the observation of the modern way that is currently used, which is 'Automatic Gated for Disabled Person'. The main objective of this project is to design an automatic gated car park specifically for the disabled. In addition, there are several research scopes set, including focusing on disabled parking at the main entrance of the shopping centre in UTC Ipoh Perak, aiming to make it easier for people with disabilities to get parking during peak hours, as well as designing a special system for the use of people with disabilities disabled only. All this is set to deal with some of the problems that arise with the use of existing designs, such as theft or abuse of disabled parking spaces (OKU) by members of the public who are not from the OKU group, and the use of fake stickers for disabled vehicles to get parking with easy. This can increase the risk of accidents for people with disabilities because they have to park their cars in public parking lots that are far from the main entrance. The material for this project also needs to have special features, such as the ability to function automatically, response to the validity of OKU card data, and response to the presence of OKU cars. Based on the literature review, Voice Control, Ultrasonic Sensor Detection, and Automatic Door Operation are considered the most suitable for this project. For the component formation process, methodological studies are used to plan the project production process by using flow charts as a guide for production planning and project testing. Overall, this improvement project can reduce cases of misuse of OKU parking by the public compared to the previous design. Based on the analysis and discussion, it can be concluded that 'Automatic Gated for Disabled Person' successfully achieved the set objectives and provided better protection for the privileges and safety of disabled people (OKU) compared to the previous design.

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SENARAI SIMBOL

Simbol

<i>cm</i>	Centimetre
<i>mm</i>	Milometer
<i>m</i>	Meter

SENARAI SINGKATAN

IR	Revolusi Industri
IT	Information Technology
JKR	Jabatan Kerja Raya
OKU	Orang Kurang Upaya
JKM	Jabatan Kebajikan Masyarakat
PWSs	Persons With Disabilities

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

In Malaysian society, there is a segment that faces greater challenges compared to other societal groups, known as individuals with disabilities (OKU). These individuals are entitled to equal rights and opportunities to lead a life comparable to other members of society. Therefore, they require specialized services to facilitate independent living within the community. Employing a rights-based approach and protection is essential to ensure the interests and well-being of people with disabilities [8]. As outlined in the Disabled Persons Act of 2008, "Disabled persons" encompass those with long-term physical, mental, intellectual, or sensory impairments that, when encountering various barriers, may impede full participation and have adverse effects on their societal engagement [9].

1.2 PROJECT BACKGROUND

In recent times, the number of individuals with disabilities has been consistently increasing each year. According to statistics released by the Department of Social Welfare (JKM) in 2022, there is a recorded total of 637,537 registered persons with disabilities under JKM, in contrast to the previous year's total of 587,608 individuals. These statistics unequivocally indicate a rising trend in the number of people with disabilities in Malaysia [10, 11]. Furthermore, there has been an increase in facilities dedicated to individuals with disabilities, such as special parking areas.

However, there is a growing issue of misuse of these special facilities, particularly disabled parking spaces. Some individuals who do not have disabilities disregard the use of OKU (Orang Kurang Upaya) parking spaces, providing

unjustifiable reasons such as temporary parking, absence of other available parking spaces, reluctance to park farther away, and similar excuses. The abuse of OKU parking is not only unethical and illegal but also poses the risk of accidents that could potentially endanger the lives of individuals with disabilities (OKUs) [5, 7].

While Malaysia has numerous disabled parking lots, the construction and design of these lots do not sufficiently safeguard the privileges of disabled individuals, making them susceptible to theft or misuse by the general public [8]. In response to this issue and to ensure the protection of the privileged rights of individuals with disabilities, an improvement to existing OKU parking facilities is proposed – the creation of an "AUTOMATIC GATED PARKING FOR DISABLED PERSON." This improvement project is presented as a proactive solution to address the prevailing problems. It aims to foster a responsible society capable of contributing to the development of a sustainable nation and competing on the global stage with renowned countries.

1.3 PROBLEM STATEMENT

Recording to the research in REDSCARZ.com. Found that disabled parking space (OKU) has been used by irresponsible people on the grounds that there are no disabled people using the parking lot, used the disabled parking lot temporarily, the public parking lot (regular) is full and only the disabled parking lot remains [4]. This problem causes people with disabilities to park their vehicles far from the main entrance. At the same time, it will create the risk of accidents for disabled people because it is quite difficult for disabled people in wheelchairs to move in narrow areas such as public parking and cause them to be easily hit by public vehicles. This often happens in the parking area of a building, whether it is an indoor or outdoor parking area.

Recording to the research in REDSCARZ.com. There are a few communities that use fake disabled vehicle stickers for the purpose of using disabled parking lots easily during peak hours [4]. This is because the stickers should be given and used only to disabled people, who do have special needs and need them to access parking lot

designed specifically for them. For those who wear these fake stickers, this action not only violates the law, but also robs the disabled person of their privileges (OKU). In addition, this action can also cause difficulties and problems for disabled people who need access to the parking lot at certain times.

Therefore, the construction of the 'Automatic Gated for Disabled Person' project can help to solve these problems among the community in order to further strengthen the relationship between each other.

1.4 PROJECT OBJECTIVES

In the context of improving the accessibility and well-being of individuals with disabilities (OKU) in society, this project discusses the development and testing of an "Automated Gated Parking System for Persons with Disabilities." The need for infrastructure that supports PWDs, especially in terms of parking, is becoming increasingly important with the increasing number of PWDs in Malaysia. This introduction aims to introduce the importance and background of the project, highlighting the challenges faced by the disabled in terms of access to parking. To understand more deeply, the three main objectives of the project are stated as follows:

- i. to design an automatic gated parking for disabled person.
- ii. to develop an automatic gated parking system for disabled person.
- iii. to test the function of automatic gated parking system for disabled person.

Through the achievement of these objectives, it is hoped that this project will have a positive impact on the disabled, helping them in their daily lives, as well as supporting efforts to provide a more disabled-friendly infrastructure in our society.

1.5 RESEARCH QUESTIONS

There are several questions in study as follows:

Question 1: Why do you want to develop an automatic gated disabled person parking?

Question 2: Is this machine help disabled person?

Question 3: How you want to build this machine?

Question 4: How this machine work?

1.6 PROJECT SCOPE

- i. This project focuses on the development of automatic gated parking in buildings.
- ii. The target of this project is in the disabled parking area of the UTC Ipoh shopping centre.
- iii. This project is intended to be used by People with Disabilities during peak hours.
- iv. This project aims to make it easier for disabled person around Ipoh to get their rights in their special parking areas.
- v. Be able to determine the materials that will be used to develop this project including HC-06 Wireless Data Transfer, Micro Servo 9g, Ultrasonic Sensor, and Arduino Board.

1.7 THE IMPORTANCE OF THE PROJECT

The importance of automatic gated parking for disabled person is to ensure that they have equal access to public spaces and facilities. By providing disabled parking lots, we create a more inclusive and accessible environment for people with disabilities, allowing them to participate fully in society [8].

Automatic gated parking for disabled person, are specifically designed to accommodate disabled individuals who may require additional space to maneuverer mobility devices or need a closer proximity to a building's entrance. These designated parking spots make it easier for people with disabilities to access businesses, public

buildings, and other facilities, promoting independence and increasing their quality of life [2, 3].

1.8 RESULTS OF THE PROJECT

The expected result of an automatic gated parking system for disabled persons would be a reliable and user-friendly parking solution that makes it easier for disabled persons to park their vehicles safely and efficiently. The system would need to be designed to accommodate a range of disabilities and be accessible to people with mobility impairments, as well as those with vision or hearing impairments.

Some specific project outcomes that could be expected from such a system might include:

- i. **Increased Accessibility:** An automatic gated parking system would make it easier for disabled persons to access parking spaces, which could increase their mobility and independence.
- ii. **Improved Convenience:** The automated system would eliminate the need for disabled persons to search for parking spots, which can be challenging in crowded or busy areas.
- iii. **User-Friendly Interface:** The interface would be easy to use and understand, with clear instructions and feedback to guide users through the parking process.

Overall, an automatic gated parking system for disabled persons would be expected to improve accessibility, safety, convenience, and usability for disabled persons, enhancing their overall quality of life.

1.9 SUMMARY

Automatic gated parking for disabled persons is a system that provides convenience and safety for individuals with mobility challenges. The system typically consists of a private parking space with a gate that automatically opens and closes upon

the owner's approach or departure. The parking system can be installed in locations like mall and public areas. It is designed to ensure that disabled individuals have easy access to their vehicles without the need for physical exertion or assistance. Overall, the automatic gated parking system for disabled persons is an innovative solution that provides increased independence and convenience for individuals with mobility challenges [2, 5].

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Literature review is the consolidation of a body of information based on correct articles from secondary sources such as books, journals, articles, newspaper, magazines, and other sources that are suitable for a specific topic and can help build the knowledge base on the topic discussed. Literature means a systematic and critical reference to selected information and problem studies. Literature review is important because with this method it can identify and learn about previous methods that might be slightly identical the project. There are few important parts that required to refer to the literature review such as the development of research theory, the progress of the research design, the use of research system and data analysis. Literature review not just about giving a summary report of the results of the study, it also includes the aspects of the problem study, the improvements, the shortcomings, and advantages based on the comparison of previous study [1].

2.2 PREVIOUS STUDIES/COMMENTS/INQUIRIES

Previous studies found that disabled person parking that was previously provided was often misused by irresponsible individuals and there was also disabled person parking that required disabled person to get out of the vehicle and move the cones placed in the parking lot to prevent other vehicles from entering the parking [4]. Some parking lots have been provided with sophisticated equipment such as disabled card scanners installed in front of the parking lot, but this method still requires disabled person to get off the vehicle if they come alone. The creation of special stickers is also doubtful because there are several facilities to print fake stickers all over the place. As the result,

disabled person found it difficult to get the privilege of parking during peak hours and they will have difficulty entering any building easily due to the need to park far from the entrance. Previously provided parking is less effective for disabled person which always been misused by irresponsible person [14, 15].



Diagram 2.2.1: Common Disabled Parking



Diagram 2.2.2: Cone That Provided by Building Parking Management



Diagram 2.2.3: Difference Between Original and Fake Disabled Stickers

Table 2.2.4: Scientific Studies Matrix Table Study

Title: Automatic Gated Disabled Parking System						
No	Name/Author	Problem Statement	Scope study	Theory/Model/Conceptual Design	Methodology	Result/Drawing/Design

1.	Jabatan Kebajikan Masyarakat (2008)	Disabled persons need a better parking area and nearby the entrance of any building.	To ease disabled persons with their parking issues which make them difficult to entry any building.	Prepare a special parking lot which named disabled person parking. The parking is different from any other parking which can determine by their painting color.	Here, disabled person just needs to park their vehicle in the parking section and entry the building.	It is just a necessary parking that use to located at anywhere but this time with a special color that make people easily justify disabled parking. 
2.	Jabatan Kebajikan Masyarakat (2008)	Disabled people do not get comfortable facilities and are not given	To help people with disabilities from being oppressed by a few in the community	Enforce the law to defend the fate of the disabled person. This law can reduce a few abuses of disabled parking spaces but still not effective enough for a few who are stubborn.	The person who misused the parking lot can be fine RM100 and might need to pay the extra fine for the	A simple law that can make people more alert about the disabled persons right.

		privileges in every matter			parking management if need to unlock the clamp on vehicle's wheel	 UNDANG-UNDANG MALAYSIA VERSI ATAS TAJIAN TEKES CETAKAN SEMULA DIREMAS KINI Akta 685 AKTA ORANG KURANG UPAYA 2008 Selangmuru pada 1 April 2014
3	Jabatan Pengangkutan Jalan (JPJ)	Difficult to determine the disabled person vehicles	To easily identify which vehicle are owned by disabled person.	This can also ease the parking management of the building to easily spot the vehicle that not owned by disabled person park at the disabled parking lot.	Simply stick the sticker on every top right angle of the front and back mirror.	This are some of conditions of applications that required by JPJ to apply for the disabled sticker. Jpj.gov.my (pemandu OKU)

2.3 SUMMARY

The HC-06 wireless RF data transfer is chosen as our Bluetooth device for its low power consumption and fewer support hardware required comparing to other options. It also supports the in-system programming, can be easily use for Internet of Things (IOT) which only require wireless connection and images processing capabilities that fit our project requirement well. Because Arduino board has many functions that useable to our project, we use Arduino Software interface as our programming tool for project building period for the easiness to debug and make changes [16].

CHAPTER 3

METHODOLOGY/DESIGN

3.1 INTRODUCTION

In Chapter 3, the focus will be on detailing the research project design process, breaking it down into various aspects to facilitate a clear understanding for stakeholders and enhance the study's comprehensibility. The chapter will delve into specific elements such as methods, procedures, project production techniques, materials and equipment, and data analysis methods utilized in the project.

The comprehensive presentation of these aspects aims to provide clarity and transparency to all involved parties, including JKR and other engineering bodies. Their feedback and comments are crucial to highlighting and refining the study [7, 9].

Regarding the method or procedure of the study, emphasis will be placed on the approach chosen to achieve the primary objective. Specifically, the chapter will elaborate on the construction of a special parking design for Persons with Disabilities (OKU), aligning with the initial discussion in the project's introduction [7]. This inclusion aims to safeguard and protect the privileges of disabled individuals, and the procedures for implementing the special parking for OKU will be outlined in detail.

Lastly, the chapter will outline the tests conducted to evaluate the effectiveness of various components, such as voice detection against HC-60 wireless RF data transfer, scan distance by Ultrasonic Sensor, and the reaction rate of fence openings, as specified in the study project. The purpose of these efficacy tests is to ensure compliance with safety standards, sustainability considerations, innovation aspects, and alignment with Industry 4.0 principles. This comprehensive testing process aims to validate the functionality and reliability of the proposed system, reinforcing its potential contributions in the realms of safety, sustainability, innovation, and Industry.

3.2 PROJECT DESIGN

3.2.1 Project Production Methods/Procedures/Techniques

Project Model Production Procedure

1. Design

- a. Materials such as plywood, sandpaper, wood planks, rulers, pencils, glue, saws, scissors, nails, paint, and brushes are to be prepared.
- b. Plywood is to be cut using a saw, measuring 30 cm wide and 45 cm long.
- c. A piece of wood, measuring 30 cm wide and 45 cm long, is to be cut.
- d. The wooden planks are to be connected using nails to form a square.
- e. Plywood is to be placed on the site and then nailed.
- f. The design of the disabled parking space and the disabled logo is to be drawn.
- g. Wooden batting is to be attached in front of the parking lot using glue (batting height = 4 cm).
- h. The wooden batten is to be glued to the corner of the right side of the parking box (batten height = 5 cm).
- i. The parking lot is to be painted blue.
- j. The parking lot line is to be painted yellow.
- k. The OKU logo is to be painted in white.
- l. The model design is completed

2. Build a System

- a. An automatic system is installed on the fence.
- b. A detection sensor is installed at the front of the parking lot.
- c. The two systems are coordinated by voice detection in the voice control application.

3. Testing the System

Test 1: The Effectiveness of Voice Detection in Voice Control Application

1. The voice control application is logged into with a personal ID and password.
2. The recording of voice orders in the application is started.
3. Once the voice recording is done, it is linked with the HC-06 unit.
4. Up to 10 attempts are made.

Test 2: Scan Distance Ultrasonic Sensor

1. The car is set up.
2. The car is placed at a distance of 50mm with the Motion Sensor.
3. The response of the motion sensor is noted.
4. The response is recorded in the data table, indicating whether it works or not.
5. Steps 1 to 4 are repeated at the next distances (100 mm, 150 mm, 200 mm).
6. 10 trials are conducted for each distance.

Test 3: The Reaction Rate of Fence Openings

1. The voice control application in the mobile phone is opened.
2. The keyword that has been set in the application is spoken.
3. The duration and traceability of the gate opening response are observed and recorded.
4. Up to 10 attempts are made.

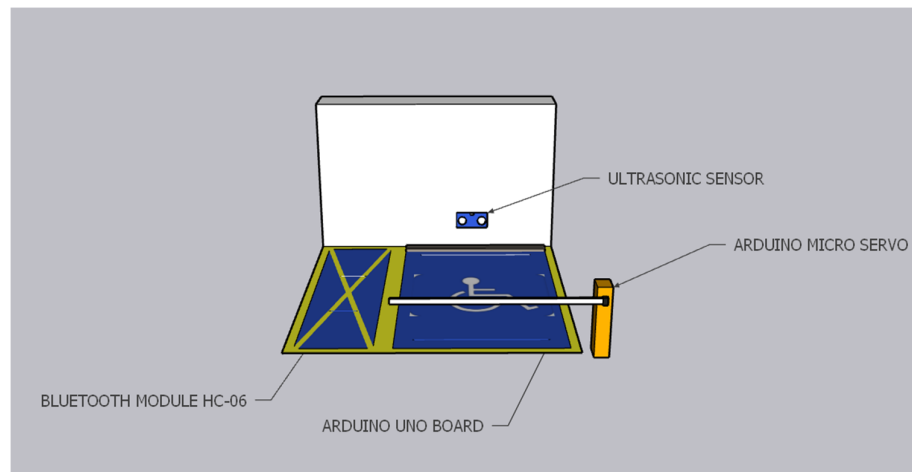


Figure 3.2.1 (1): Front View

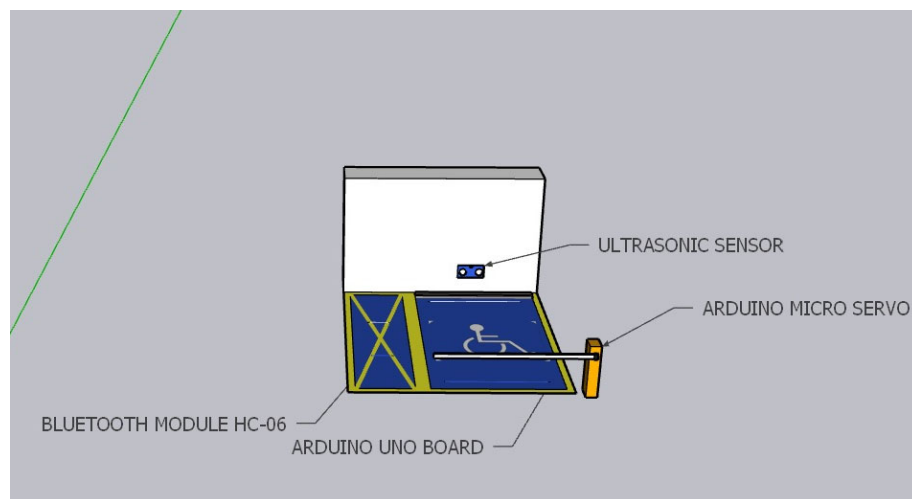


Figure 3.2.1 (2): Top View

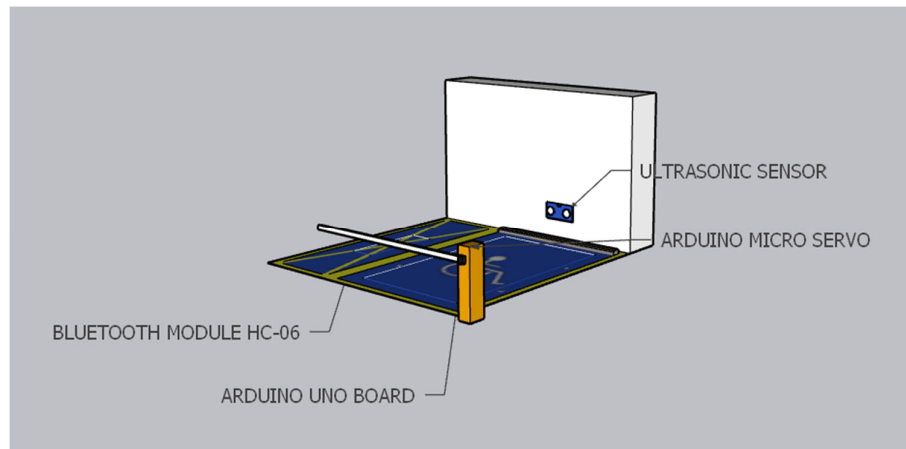


Figure 3.2.1 (3): Side View

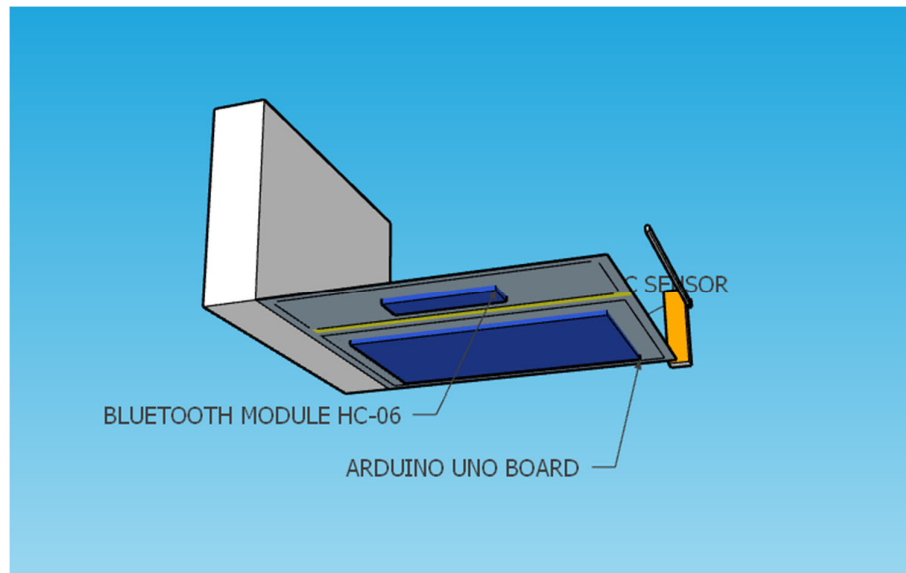


Figure 3.2.1 (4): Bottom View

Techniques:

This project will employ the voice control method for managing access to the parking facility. Disabled individuals will need to articulate a predefined keyword on their mobile phones when approaching the entrance of the parking lot. The system will then process the data information, which includes the validity of the Person with

Disabilities (OKU) status recorded during the initial registration in the application on the phone.

Upon successful validation of the disabled person, the gate will automatically open, allowing the disabled driver to enter the parking lot. Similarly, when the disabled individual wishes to exit, a sensor positioned at the front of the parking space will scan for the presence of a disabled vehicle. Subsequently, the gate will automatically close. The findings and results of these interactions will be recorded and subjected to analysis to assess the effectiveness of the methods implemented in this research project.

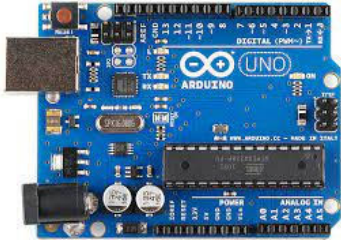
By integrating voice control and sensor-based technologies, this project aims to enhance accessibility and convenience for disabled individuals, ensuring a seamless and secure parking experience. The recorded data and analysis will contribute valuable insights into the functionality and efficiency of the implemented system, thereby validating its practical application in real-world scenarios [7, 8].

3.2.2 Materials and Tools

I) Materials:

Item	Specification
1. HC-06 Wireless RF Data Transfer 	The Bluetooth module which is designed to facilitate wireless serial communication between any microcontroller & other Bluetooth-enabled devices is known as the HC-06 Bluetooth module. This is a slave Bluetooth device that provides UART serial communication. So, a master is necessary to set up a successful wireless interface

2. Micro Servo 9g 	A small and lightweight servo motor with high output power. The Micro Servo 9g typically includes three wires for power, ground, and control, and can be controlled using a microcontroller such as an Arduino board. It can be powered using a battery pack or a power supply and can be connected to other components using jumper wires or a breadboard. The Micro Servo 9g is a versatile and affordable motor that can be used in a wide variety of projects.
3. Serial LCD Display 	Serial LCD Display Module is a type of display that can be connected to an Arduino board or other microcontrollers to display text and graphics. The module typically includes a liquid crystal display (LCD), a microcontroller, and a serial interface that can communicate with the Arduino board using a serial communication protocol such as I2C or SPI. Here are some specifications for a typical Serial LCD Display Module
4. LED 	It is a semiconductor device that emits light when a current flow through it. LEDs are commonly used as indicators, status lights, and in illumination applications.

5. ULTRASONIC SENSOR 	As the name indicates, ultrasonic sensors measure distance by using ultrasonic waves. The sensor head emits an ultrasonic wave and receives the wave reflected from the target. Ultrasonic Sensors measure the distance to the target by measuring the time between the emission and reception.
6. Arduino board 	Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online.

II) Tools:

Tools	Descriptions
1. Soldering Iron 	A soldering iron is used to solder electronic components together. It is an essential tool when building electronic circuits and projects.

2. Wire Cutters and Strippers 	Wire cutters and strippers are used to cut and strip the insulation from wires. They are essential for making electrical connections and building circuits.
3. Multimeter 	A multimeter is a tool used to measure voltage, current, and resistance in electrical circuits. It is essential for testing and troubleshooting circuits.
4. Screwdriver Set 	A set of screwdrivers is useful for assembling and disassembling electronic devices and components.
5. Power Supply 	A power supply is used to provide the necessary voltage and current to the circuit. It is important to choose a power supply that is compatible with the voltage and current requirements of the components being used.

3.2.3 Data Analysis Method

The production of this project involves several data analysis methods used. The first is data collection. Collect data on the performance of the automatic parking system, such as the success rate of parking attempts, the time it takes to park, and any errors or malfunctions that occur.

The second is qualitative analysis. Conduct qualitative analysis to gather feedback from users of the automatic parking system, such as their satisfaction with the system, any concerns they have, and any suggestions for improvement.

The third is define the research question. Identify the specific research question or problem that you want to investigate with the data. For example, you may want to understand how often the automatic parking system is used, or whether there are differences in performance between different types of vehicles.

3.3 SUMMARY

This chapter has discussed a few different topics which is introduction, project design, project production methods, materials and tools, and data analysis method. Introduction will explain this project briefly. Next, project design will explain how this product is get design. After that, project production method will explain how this project will be made and conduct. Next, material and tools will explain what materials and tools that will be used to make this project. Lastly, data analysis method will explain how to collect data from this project [1, 2, 5].

CHAPTER 4

RESEARCH FINDINGS AND DISCUSSION

4.1 INTRODUCTION

The research project, titled 'Personal Automatic Gated for Disabled Person,' has the primary objective of designing an automatic gated parking lot specifically tailored for disabled individuals. This design is crucial to preventing instances of theft of designated disabled parking spaces, which can pose harm to disabled individuals.

Furthermore, the project aims to develop a sophisticated parking system incorporating Industry 4.0 (IR 4.0) technologies [16]. These include an automatic fence system, a voice detection system, and an ultrasonic sensor detection system. The gate will automatically open when a disabled person initiates a voice command through the voice control application. Simultaneously, the gate will close automatically after the disabled vehicle exits the parking lot, as detected by the ultrasonic sensor. This integrated system is intended to enhance the overall experience for people with disabilities in terms of time efficiency, privileges, and safety while navigating spaces like malls and supermarkets [7, 8]].

The subsequent phase of the project involves testing the automatic gated parking system specifically designed for disabled individuals. This test can be done anywhere with the aim of evaluating the effectiveness of each system function. Key aspects under consideration include the effectiveness of the voice control application, the duration required to scan the validity of the OKU card, the time taken for the gate to open after the voice command, and the time taken for the gate to close. These tests provide valuable insights into the system's performance, helping to refine and optimize its functions for practical implementation [5, 8].

4.2 STUDY/TEST FINDINGS

Project Test Equipment

1. Replica of disabled person parking space
2. Component circuits
3. Power supply (battery)
4. Mobile phone
5. Voice control apps
6. Arduino apps on laptop

Testing Method

Method of test that have been conducted in this project is effective test. The equipment that needs to test the project are stopwatch, mobile phone, application, and Arduino apps on laptop. There are five tests that have been carried out in this project such as:

1. Bluetooth connection effective test
2. Password effective test
3. Micro Servo motor test
4. Micro Servo function test
5. Ultrasonic function test

Testing Procedure

1. Connect the circuit to power supply
2. Switch on all component that need to be turn on before use
3. Open “Voice Control” apps in mobile phone
4. Say the keyword in the application
5. The microcontroller will make the servo motor run to open the gate
6. Car entry the parking space
7. Car exits the parking space

8. Ultrasonic Sensor will sensor the movement of the car after the exit
9. Gate will close after car move till the specific range that already set in Arduino UNO.

Test Result

1. BLUETOOTH CONNECTION EFFECTIVENESS TEST (HC-06)

BLUETOOTH CONNECTION	TEST 1	TEST 2	TEST 3	TEST 4	TEST 5	TEST 6	TEST 7	TEST 8	TEST 9	TEST 10
RECONNECT TO HC-06 BLUETOOTH MODULE	PAIRED	PAIRED	PAIRED	PAIRED	PAIRED	PAIRED	PAIRED	PAIRED	PAIRED	PAIRED

Table 4.2.1: Bluetooth Connection Effectiveness Test Data

Based on the table above, The HC-06 Bluetooth Module functions as a unit device facilitating data transfer to the microcontroller (Arduino-UNO). The table above illustrates a conducted test evaluating the effectiveness of the Bluetooth connection between the mobile phone and the HC-06 Bluetooth Module. According to the results, the Bluetooth connection is successfully paired every time the connection is unconnected. This test is performed to demonstrate the ease with which the HC-06 Bluetooth Module can be paired to the mobile phone after the connection is disconnected. In the context of the project, this capability enhances the product's quality, enabling easy device pairing for disabled individuals after the parking space has been used by another person.

2. PASSWORD EFFECTIVENESS TEST

KEYWORD	TEST 1	TEST 2	TEST 3	TEST 4	TEST 5	TEST 6	TEST 7	TEST 8	TEST 9	TEST 10
"GATE OPEN"	FINE	FINE	FAIL	FINE	FAIL	FAIL	FINE	FINE	FAIL	FINE
"PLEASE OPEN"	FINE	FINE	FINE	FAIL	FINE	FINE	FINE	FAIL	FINE	FINE
"HELLO THERE"	FINE	FINE	FINE	FINE	FINE	FINE	FINE	FINE	FINE	FINE

Table 4.2.2: Password Effectiveness Test Data

Based on the table above, Passwords are created to enhance the security system. As indicated in the table above, it is evident that the initial password or keyword generated experiences the highest failure rate in password effectiveness testing. The first keyword, "gate open," proves challenging for Voice Control apps on mobile phones due to user pronunciation. During the voice command, the Voice Control apps fail to detect "gate open" but successfully identify "get open." The second password, "please open," also fails twice in this assessment. Similar to the first instance, Voice Control apps only register "open." However, the last password consistently passes the voice detection test every time it is conducted. In conclusion, users should create passwords that are easily detected by Voice Control apps to simplify the parking entry process.

3. MICRO SERVO FUNCTION TEST (GATE)

KEYWORD	TEST 1	TEST 2	TEST 3	TEST 4	TEST 5	TEST 6	TEST 7	TEST 8	TEST 9	TEST 10
"GATE OPEN"	FINE	FINE	FAIL	FINE	FAIL	FAIL	FINE	FINE	FAIL	FINE
"PLEASE OPEN"	FINE	FINE	FINE	FAIL	FINE	FINE	FINE	FAIL	FINE	FINE
"HELLO THERE"	FINE	FINE	FINE	FINE	FINE	FINE	FINE	FINE	FINE	FINE

Table 4.2.3: Micro Servo Function Test Data

Based on the table above, Micro Servo Motor is a gear motor capable of rotating in degrees. This unit serves as the security gate in this model. According to the results presented in the table, it is observed that the Micro Servo Motor will only operate after the successful execution of voice control. This aligns with the findings of the password effectiveness test, where each unsuccessful attempt corresponds to a failure in activating the Micro Servo Motor. In conclusion, it is imperative to ensure that the password or keyword is successfully detected by the Voice Control apps to activate the Micro Servo Motor.

4. MICRO SERVO MOTOR FUNCTION TEST

MICROSERVO FUNCTION	TEST 1	TEST 2	TEST 3	TEST 4	TEST 5	TEST 6	TEST 7	TEST 8	TEST 9	TEST 10
"GATE OPEN"										
OPEN (s)	3s	3s	FAIL	3s	FAIL	FAIL	3s	3s	FAIL	3s
CLOSE (s)	5s	8s	FAIL	8s	FAIL	FAIL	7s	10s	FAIL	10s
"PLEASE OPEN"										
OPEN (s)	3s	3s	3s	FAIL	3s	3s	3s	FAIL	3s	3s
CLOSE (s)	12s	5s	7s	FAIL	10s	9s	8s	FAIL	4s	5s
"HELLO THERE"										
OPEN (s)	3s	3s	3s	3s	3s	3s	3s	3s	3s	3s
CLOSE (s)	8s	6s	6s	5s	8s	5s	10s	12s	7s	7s

Table 4.2.4: Micro Servo Motor Function Test Data

Based on the table above, the table above displays the recorded time taken by the Micro Servo Motor to initiate its function after the car exits the parking lot. The time required to open the gate remains consistent across all tests. Consequently, the Micro Servo Motor is programmed to commence its function 3 seconds after the completion of voice detection. However, closing the gate requires additional seconds for the Micro Servo Motor to initiate the closing process. The recorded times in the table range from 5 seconds as the shortest duration to close the gate, to 13 seconds as the longest. These outcomes are contingent upon the speed at which the car exits the parking lot. This test is linked to the subsequent Ultrasonic Sensor function test, wherein the gate-closing time is influenced by the car's speed in leaving the parking lot.

5. ULTRASONIC SENSOR FUNCTION TEST (SENSOR)

ULTRASONIC SENSOR FUNCTION	TEST 1	TEST 2	TEST 3	TEST 4	TEST 5	TEST 6	TEST 7	TEST 8	TEST 9	TEST 10
"GATE OPEN"										
RANGE BETWEEN CAR AND ULTRASONIC (cm)	18cm	14cm	FAIL	14cm	FAIL	FAIL	13cm	10cm	FAIL	10cm
"PLEASE OPEN"										
RANGE BETWEEN CAR AND ULTRASONIC (cm)	10cm	18cm	13cm	FAIL	10cm	10cm	15cm	FAIL	19cm	18cm
"HELLO THERE"										
RANGE BETWEEN CAR AND ULTRASONIC (cm)	14cm	15cm	14cm	18cm	14cm	19cm	10cm	10cm	15cm	15cm

Table 4.2.5: Ultrasonic Sensor Function Test Data

Based on the table above, the Ultrasonic Sensor is a device designed for measuring distance accurately. The table above documents a test conducted to determine a specific range that triggers the initiation of the Micro Servo Motor's function. As indicated, the largest recorded range is 19 cm, while the smallest is 10 cm. In the Arduino-UNO code, it is programmed that the gate will commence closing once the car has moved more than 10 cm. This feature aids users in promptly closing the gate, ensuring the security of the parking area.

Data Analysis

Table 4.2.6: Data Analysis

Conducted Test	Successful	Fail	Total
Test 1: Bluetooth Connection Effectiveness Test			
Reconnect to HC-06 Bluetooth Module	10	0	10
Test 2: Password Effectiveness Test			
“Gate open”	6	4	10
“Please open”	8	2	10
“Hello there”	10	0	10
Test 3: Micro Servo Function Test			
“Gate open”	6	4	10
“Please open”	8	2	10
Hello there”	10	0	10
Test 4: Micro Servo Motor Function Test			
“Gate open”	6	4	10
“Please open”	8	2	10
“Hello there”	10	0	10
Test 5: Ultrasonic Sensor Function Test			
“Gate open”	6	4	10
“Please open”	8	2	10
“Hello there”	10	0	10

As indicated in the table above, Test 1 was successfully conducted in every attempt. This success can be attributed to the Bluetooth module device, as it easily established a connection with the mobile phone every time the connection was disconnected.

Subsequently, as depicted in the table, Tests 2 to 5 involved different voice commands, namely "gate open," "please open," and "hello there." A consistent trend emerged, with the command "please open" demonstrating notable reliability. It achieved success rates ranging from 8 to 10 out of 10 attempts across all tests. On the other hand, "hello there" exhibited a perfect success rate in every instance. In contrast, "gate open" showed variability, with success rates ranging from 6 to 10 out of 10 attempts, accompanied by variable failure counts. This suggests that the reliability of "gate open" may be influenced by specific factors, warranting further investigation or adjustments to enhance overall performance.

4.3 DISCUSSION

The study on automatic gated parking for disabled individuals found that these systems offer a promising solution to improve accessibility and convenience for disabled persons. By incorporating designated accessible parking spaces, wheelchair-friendly infrastructure, and assistive technologies, these systems enhance the overall parking experience for disabled individuals. The use of advanced technologies, such as voice controller application, enables real-time monitoring and regulation of vehicle access, enhancing security and reducing parking violations. User-friendly interfaces, clear signage, and seamless integration with navigation systems contribute to a positive parking experience. Despite initial setup costs and maintenance requirements, ongoing research and advancements in technology are expected to further optimize automatic gated parking systems for disabled persons [17, 19].

Besides, from all conducted tests, it is observed that the entire system operates effectively. Considerations should be given to the user's choice of password and their

pronunciation while utilizing the apps. The system functions in accordance with our objective, which is to develop an automatic gated parking system for disabled individuals. For disabled persons, we are confident that this system will assist them in addressing issues such as misuse of parking spaces by irresponsible individuals and the challenge of finding parking near the building entrance.

4.4 SUMMARY

The "Personal Automatic Gated for Disabled Person" project is a study to develop an automatic door alarm system for disabled people to open the door with just one voice control using an application in their mobile device such as an access card or smartphone. This study aims to provide easier, safer, and more reliable access to people with disabilities at the parking lot of public buildings [7, 9].

Besides that, some of the findings of the study include the need to develop a system that is safer and easier to use for people with disabilities. In addition, the need to consider all relevant factors such as the shape and size of the device, type of mobile device and activation time and compatibility with the existing door [8, 13].

In this project, several technologies are used such as voice controller technology, ultrasonic sensor detection technology and automatic door operation technology. This project is expected to help people with disabilities to gain easier and easier access to park their vehicle in public buildings [17].

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

In this section, a discussion on conclusions, recommendations, project limitations, and the "Automatic Gated Parking for Disabled Person" project is presented. The conclusion encompasses the compilation of evaluation results, analysis, interpretation, comparative studies, comments, and consideration of the project's execution. Its aim is to reflect the project's achievements in comparison to the set objectives. Discussions revolve around the effectiveness of door and parking automation systems and the benefits of this technology for individuals with disabilities [7, 8, 9].

Additionally, the recommendation section addresses potential measures or enhancements to improve the performance and effectiveness of the Automatic Gated Parking for Disabled Person system. These recommendations may involve software updates, physical design improvements, or enhancements to other aspects of the system.

The limitations of the project are discussed, highlighting encountered weaknesses and constraints during the project's implementation. These limitations may involve technical, financial, or logistical factors that impacted the project's success. Awareness of these limitations is crucial for understanding the feasibility and scope of the project. Concluding this chapter, an overall summary is provided, encapsulating the main information derived from the research. It includes key achievements, the project's impact on society, and potential directions for future development or research related to the research project [2,10].

5.2 CONCLUSION

In conclusion, the implementation of an automatic gated parking system for disabled persons represents a significant step towards fostering inclusivity and accessibility in our community. This innovative project has successfully addressed the challenges faced by individuals with disabilities when it comes to parking facilities, providing a solution that not only enhances convenience but also reduced the misused of disabled person parking lot by irresponsible person [8, 13].

Through the incorporation of automated technologies, such as HC-06 Bluetooth Module, voice control application and designated parking spaces equipped with user-friendly interfaces, the project aims to streamline the parking experience for disabled individuals. The careful consideration of user needs, including ease of use and efficient response times, ensures that the system is tailored to the specific requirements of the target demographic.

Moreover, the project contributes to creating a more equitable and inclusive urban environment by breaking down barriers that often limit the mobility of disabled individuals. Accessible parking is not just a matter of convenience but a fundamental aspect of social equality, allowing people with disabilities to participate more actively in various aspects of daily life [13, 16].

As we look towards the future, it is imperative to continue refining and expanding upon the automatic gated parking system for disabled persons. Regular updates and maintenance, along with user feedback, will be crucial in ensuring the system's ongoing effectiveness and adaptability to the evolving needs of the disabled community [19].

In essence, the automatic gated parking for disabled persons project stands as a testament to the positive impact that technology can have on fostering inclusivity. By providing a practical solution to a common challenge faced by disabled individuals, this project contributes to creating a more accessible and welcoming environment for all members of our community [8, 9].

5.3 RECOMENMENDATION

Overall, the Automatic Gated Parking for Disabled Person project that was specially built at the UTC Ipoh Perak Shopping Canter can be used as an example for other shopping canters or supermarkets in Malaysia. Hi, this is because the Automatic Gated Parking for Disabled Person project model can prevent disabled parking from being stolen or misused by the public and further increase the privileges of the disabled in Malaysia. Therefore, the system used in the production of this project can make the disabled get satisfaction in terms of convenience, safety, and privileges. Efforts to promote this project through cooperation between private companies or work parties such as MBI, JKM and JKR should be done [15, 16]. This is because the project has the potential to be developed and stakeholders need to maximize this benefit [7, 8]. In addition, aspects of facilities, privileges and systems can be further improved such as:

- i. Voice Control System Optimization. Carry out further studies to optimize the voice control system. This can include researching common sounds in the parking lot environment and adjusting parameters so that the system can understand commands more accurately.
- ii. Integration of Machine Vision Technology. Researching the potential integration of machine vision technology as an addition to the system. This study can provide an improvement in the detection and identification of objects, including the identification of vehicles and disabled individuals.
- iii. Improvement of Ultrasonic Sensor Detection System. Plan a study to improve the effectiveness of ultrasonic sensor detection. This includes adaptation to cope with certain weather situations or optimization for complex areas such as multi-storey car parks.
- iv. Automatic Door Comprehension Analysis. Perform an in-depth analysis of the automatic door's understanding of the surrounding situation, including the safety of users moving in and out. This proposal could involve increasing the door's reaction to emergency situations.

- v. Overall System Security Review. Conduct a comprehensive safety review of the entire system, including the safety of individuals using this automated parking lot. This can involve simulating emergency situations and improving security protocols.
- vi. Use of Cloud Computing Systems (Cloud Computing). Researching the potential use of cloud computing systems for data storage and processing. This can increase system efficiency and allow flexible access to data from any location.
- vii. Study on Usability Aspects. Involves further studies on aspects of the feasibility of the system, especially for individuals with disabilities. This includes adapting the user interface to ensure better accessibility.
- viii. Study on Integration with Public Transport. Researching the potential integration of this automatic parking system with the public transport system. This could involve a study of strategic locations to provide parking spaces for individuals with disabilities that are more accessible from public transport stations.
- ix. Cooperation with the Disabled Community. Involve the disabled community more actively in the development and improvement process of the system. This can involve field studies, interviews, and discussion sessions with individuals with disabilities to better understand their needs and make appropriate adjustments.
- x. Use of IoT Technology for Further Security. Explore opportunities to use the Internet of Things (IoT) to further improve system security. This can include the use of smart sensors to detect vehicles or individuals within the parking area.

These suggestions are expected to produce positive developments and improve certain aspects in the "Automatic Gated Parking for Disabled Person" project, leading to a more sophisticated system that is compatible with the needs of the disabled community at the Shopping Center at UTC Ipoh, Perak as well as in entire Malaysia.

5.4 STUDY LIMITATION

There are several advantages to building an automated gated parking system for those with disabilities, but before implementing an automatic gated parking system for disabled persons, it's crucial to conduct a thorough feasibility study. Like any project, it may also have limitations. Here are some potential limitations to consider:

- i. **Cost.** Creating and setting up a automatic gated parking system for disabled person might be costly. Sensors, actuators, control systems, and other infrastructure components could be expensive. The implementation of the system may not be possible due to financial limitations, especially for smaller firms or organisations with tighter budgets [11].
- ii. **Maintenance.** To guarantee optimal operation, automation systems, like any other technology, need to undergo routine maintenance. Regular improves and repairs may be necessary for software, electronic systems, and mechanical components. The project's sustainability may be affected by factors such as continuing maintenance expenses and a lack of qualified specialists [13].
- iii. **Regulatory and Compliance Issues:** When putting such systems into place, it may be necessary to follow local laws and compliance requirements. It can be difficult to make sure the automatic gated parking system complies with all legal standards, and this could put restrictions on the system's performance and design [4].
- iv. **Space Restrictions.** The physical layout and available parking area space might limit the installation of an automatic gated system. Limited space or architectural constraints could prevent proper technology installation, making it difficult to provide suitable parking for disabled people [3].

5.5 SUMMARY

The "Automatic Gated Parking for Disabled Person" project has successfully built an automated system to handle parking issues experienced by individuals with disabilities, utilising technology such as the HC-06 Bluetooth Module and voice control application [4]. This project improves accessibility, improves the parking experience, and eliminates the unauthorised usage of reserved parking places. The project helps to create a more equal urban environment by highlighting the importance of accessible parking in achieving social equality [3]. Optimising voice control, integrating machine vision technology, improving sensor detection, analysing automatic door comprehension, ensuring overall system security, exploring cloud computing, studying usability, investigating public transportation integration, involving the disabled community, and considering IoT technology are all suggestions for system refinement. However, before widespread implementation, various limitations such as cost, maintenance, regulatory compliance, and space constraints should be thoroughly investigated [13].

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APPENDIX

i. Gantt Chart

Table 6.1.1: Gantt Chart

FYP 1															
ACTIVITIES	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	Week 15
PENDAFTARAN PELAJAR															
TAKLIMAT PROJEK 1 PENYERAHAN TAKWIM & BUKU LOG SESI PELAKSANAAN DAN PENYELIAAN PROJEK															
SESI PELAKSANAAN & PENYELIAAN PROJEK															
SESI PELAKSANAAN & PENYELIAAN PROJEK MENGENALPASTI TAJUK PROJEK YANG															

BERSESUAIAN DENGAN KRITERIA PROJEK DI JABATAN															
SESI PELAKSANAAN DAN PENYEDIAAN PROJEK MENENTUKAN OBJEKTIF, SKOP PROJEK, DAN KAEDAH															
SESI PELAKSANAAN & PENYELIAAN PROJEK JANGKAAN KOS PERBELANJAAN PROJEK															
SESI PELAKSANAAN DAN PENYELIAAN PROJEK															
SESI PEMBENTANGAN “PROGRESS PRESENTATION”															
SESI PERLAKSANAAN DAN PENYELIAAN PROJEK															
SESI PERLAKSANAAN DAN PENYELIAAN PROJEK. PELAJAR MEMBUAT															

PENAMBAHBAIKAN SUSULAN DARIPADA SESI PEMBENTANGAN PERTENGAHAN SEMESTER DENGAN MENGAMBIL KIRA KOMEN-KOMEN DARIPADA PANEL															
SESI PERLAKSANAAN DAN PENYELIAAN PROJEK. PELAJAR MEMBUAT PENAMBAHBAIKAN DAN MENGENALPASTI KESIGNIFIKAN TERHADAP PENYATAAN MASALAH, OBJEKTIF DAN SKOP KAJIAN. PELAJAR MEREKABENTUK PROSEDUR/KAEDAH/METODOLOGI BAGI PROJEK YANG AKAN DIJALANKAN OLEHNYA BERDASARKAN KEPADA KESIGNIFIKAN DAN JUGA SUSUNATUR YANG LOGIK															

PEMBENTANG PROGRESS PRESENTATION																
PERSIAPAN FINAL PRESENTATION																
PEMBENTANGAN FINAL PRESENTATION																
PENYERAHAN FINAL REPORT																

ii. **Project Cost**

Table 6.2.1: Project Cost

NO	PRODUCT	UNIT	PRICE
1.	ULTRASONIC SENSOR	1	RM 8.20
2.	ARDUINO UNO BOARD	1	RM 47.80
3.	BLUETOOTH MODULE HC-06	1	RM 18.80
4.	ARDUINO MIRCO SERVO	1	RM 12.00
5.	WIRE	1	RM 4.00
6.	WOOD BOARD	1	RM 10.00
7.	CAR	1	RM 33.00
8.	CODING	2	RM 120.00
	Total		RM 253.80

iii. Sketch/Drawing/Circuit Diagram/Transfer Chart (If Relevant)

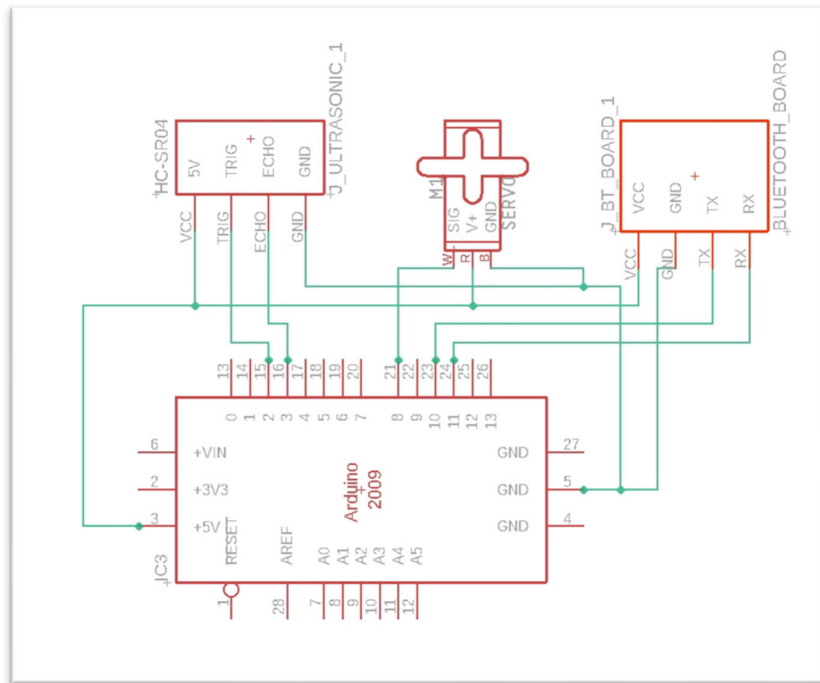


Figure 6.4.1: Schematic Circuit

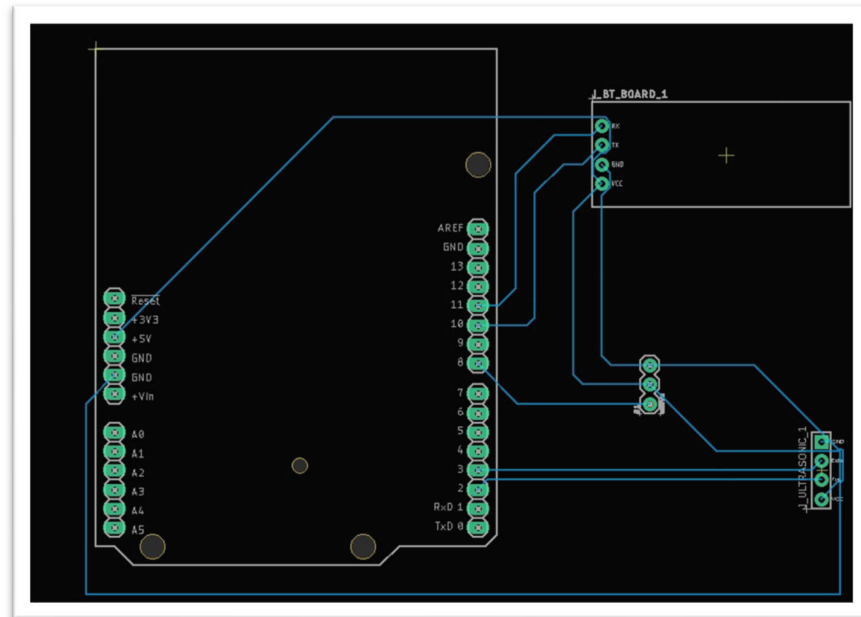


Figure 6.4.2: PCB Layout

THANK YOU