

**POLITEKNIK**

**SULTAN SALAHUDDIN ABDUL AZIZ SHAH**

**CAR SANITIZING SYSTEM**

NAME

REGISTRATION NO

Muhammad Irsyad Bin Fithri Aziz

08DEP20F1049

**JABATAN KEJURUTERAAN ELEKTRIK**

# **CAR SANITIZING SYSTEM**

**NAME**

**REGISTRATION NO**

MUHAMMAD IRSYAD BIN FITHRI  
AZIZ

08DEP20F1049

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

**JABATAN KEJURUTERAAN ELEKTRIK**

**Click here to enter text.**

## **CONFIRMATION OF THE PROJECT**

The project report titled "Car Sanitizing System" has been submitted, reviewed and verified as a fulfills the conditions and requirements of the Project Writing as stipulated

Checked by:

Supervisor's name : PUAN NADIAH BINTI DIN

Supervisor's signature :

Date : 8/12/2022

Verified by:

Project Coordinator name :

Signature of Coordinator :

Date :

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

1. Signature :

Name : **MUHAMMAD IRSYAD BIN FITHRI AZIZ**

Registration Number : **08DEP20F1049**

Date : 8/12/2022

## DECLARATION OF ORIGINALITY AND OWNERSHIP

TITLE : CAR SANITIZING SYSTEM

SESSION: SESI 1 2022/2023

1. I, **1. MUHAMMAD IRSYAD BIN FITHRI AZIZ (08DEP20F1049)**

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**. (Hereinafter referred to as 'the Polytechnic').

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 Irsyad bin Fithri Aziz** )  
(Identification card No: - 020715101103) )  
.....  
) **Muhammad Irsyad**

In front of me, **Puan Nadiah bt Din** (Click here to )  
enter text.) )  
) **Nadiah Bt Din**

As a project supervisor, on the date:

## **ACKNOWLEDGEMENTS**

I would like to serve my highest level of gratitude towards everyone who has simultaneously either spontaneously or non-spontaneously donated their service and efforts onto lending me a hand in completing this project of mine. First and foremost, I'd like to dedicate my appreciation to the Allah SWT for the guidance, ability to think and come out with new ideas, protection and skills and for giving us a healthy life. Next, I would like to express my gratitude to Pn. Nadiah Binti Din, my project supervisor, for supervising me and providing me with ample provisions and much needed advice and support, as well as inspiration. She has been through this journey since the very beginning up until the very end . This study assignment would not have been completed in such a timely and professional manner if it had not been for her attentive suggestions and timely interventions. Her investment of emotional support for this endeavor had aided me in finishing my final year project to a large extent. I also would like to take this chance to express my gratitude to my place of study, Polytechnic Sultan Salahuddin Abdul Aziz Shah for allowing me to do this study and complete my Diploma courses. I had finally gained a lot of insight into how to conduct research and analyze data that would be valuable in our future investigations. To me, it is miles ahead in significance because I've received a great deal of information that will be useful and beneficial in the future. In addition, I would also like to thank to Pn Zarina Md Amin, Pn Nur Ilya Binti Ismail and Pn Hayati Binti Mohd Yasin, whom all of which are also fellow supervisors for this subject as my supporter to achieve the objective of my project. They also assisted me in inspiring recommendations and encouragement, as well as assisting me in the preparation of my project, particularly by providing me with ideas to inspire my project. Working in this profession necessitates great efficiency and competence to facilitate the work process, thus they also function as a panel who has provided a lot of direction and criticism in every job they perform. Last but absolutely not least, many salutations and appreciation also go out to all the friends and other people who have indirectly lent a hand in helping me accomplish this project.



## ABSTRACT

The importance and prime value of cleanliness and hygiene of a person's vehicle is often overlooked and frowned upon. It rarely becomes a topic of discussion especially to the general public. But in reality, this is a phenomenon that we subconsciously do not realize as it happens as day goes on. In other words, it builds up day by day and eventually the muck, debris and germs have built up so much that some people will just choose to ignore it further. This applies especially towards public vehicle transport that often carries multiple customers throughout the day, these customers have been all over the place and like it or not, they're practically exchanging germs under the fabrics of the seats of the vehicles. It is a proven fact that no single product is effective enough to kill a hundred percent of germs on a particular surface, so it is a responsible for us to keep our vehicles clean to the best of our abilities. That is when this project comes in. Big public transportation companies when given the chance, usually hires a third-party company to clean their cars for them, same goes for individual E-hailing drivers as they often disregard the cleanliness of their vehicles. So, with the existence of this system, it not only will clean and disinfect one's vehicle with the best efficiency but also will save tremendous amounts of cost, effort and time. With just the simple push of a button, the insides of the public transportation vehicle can be disinfected with no extra work needed to be put in. Simply push the button, step out of the vehicle for a couple seconds until the display have popped up signaling that the vehicle has been sanitized. This not only gives a narrative of cleanliness of the environment to the customers but also ensures the actual hygiene of the vehicle in the most efficient way possible. This system uses the functionalities and the flexibility of the Arduino IDE component. It is implemented in the circuit alongside many other components that I use including the LCD display, motion detector and more.

Keyword: Public transport, sanitize, cleanliness, Arduino, motion detector, LCD display



## ABSTRAK

Kepentingan dan nilai utama kebersihan dan kebersihan kenderaan seseorang sering diabaikan dan dipandang sebelah mata. Ia jarang menjadi topik perbincangan terutama kepada masyarakat umum. Tetapi pada hakikatnya, ini adalah fenomena yang kita tidak sedar secara tidak sedar kerana ia berlaku seiring dengan berlalunya hari. Dalam erti kata lain, ia terkumpul dari hari ke hari dan akhirnya kotoran, serpihan dan kuman telah terkumpul dengan begitu banyak sehingga sesetengah orang akan memilih untuk mengabaikannya lagi. Ini terpakai terutamanya bagi pengangkutan kenderaan awam yang sering membawa berbilang pelanggan sepanjang hari, pelanggan ini telah berada di merata tempat dan suka atau tidak, mereka boleh bertukar kuman di bawah fabrik tempat duduk kenderaan. Ia adalah fakta yang terbukti bahawa tiada satu produk pun yang cukup berkesan untuk membunuh seratus peratus kuman pada permukaan tertentu, jadi adalah bertanggungjawab bagi kita untuk memastikan kenderaan kita bersih mengikut kemampuan kita. Pada masa itulah projek ini masuk. Syarikat pengangkutan awam yang besar apabila diberi peluang, biasanya mengupah syarikat pihak ketiga untuk membersihkan kereta mereka untuk mereka, begitu juga dengan pemandu E-hailing individu kerana mereka sering mengabaikan kebersihan kenderaan mereka. Jadi, dengan kewujudan sistem ini, ia bukan sahaja akan membersihkan dan membasmi kuman kenderaan seseorang dengan kecekapan terbaik tetapi juga akan menjimatkan kos, usaha dan masa yang sangat besar. Dengan hanya menekan satu butang, bahagian dalam kenderaan pengangkutan awam boleh dinyahjangkit tanpa perlu melakukan kerja tambahan. Hanya tekan butang, keluar dari kenderaan selama beberapa saat sehingga paparan muncul sebagai isyarat bahawa kenderaan itu telah dibersihkan. Ini bukan sahaja memberikan naratif kebersihan alam sekitar kepada pelanggan tetapi juga memastikan kebersihan sebenar kenderaan dengan cara yang paling efisien. Sistem ini menggunakan fungsi dan fleksibiliti komponen IDE Arduino. Ia dilaksanakan dalam litar bersama-sama banyak komponen lain yang saya gunakan termasuk paparan LCD, pengesan gerakan dan banyak lagi.

Kata kunci: Pengangkutan awam, sanitasi, kebersihan, Arduino, pengesan gerakan, paparan LCD

## **TABLE OF CONTENTS**

<b>CONFIRMATION OF THE PROJECT</b>	<b>i</b>
<b>DECLARATION OF ORIGINALITY AND OWNERSHIP</b>	<b>iii</b>
<b>ACKNOWLEDGEMENTS</b>	<b>iv</b>
<b>ABSTRACT</b>	<b>vi</b>
<b>TABLE OF CONTENTS</b>	<b>viii</b>
<b>CHAPTER 1</b>	<b>1</b>
<b>1 INTRODUCTION</b>	
1.1 Introduction	1
1.2 Background Research	2
1.3 Problem Statement	2
1.4 Research Objectives	3
1.5 Scope of Research	3
1.6 Project Significance	4
<b>CHAPTER 2</b>	<b>5</b>
<b>2 LITERATURE REVIEW</b>	
2.1 Literature Review	
2.2 Obtained Informations	
<b>CHAPTER 3</b>	<b>8</b>
<b>3 RESEARCH METHODOLOGY</b>	
3.1 Methodology	8
3.2 Block Diagram	9
3.3 Flowchart	10
3.4 Project Software	11
3.4.1 Schematic Circuit	11
<b>CHAPTER 4</b>	
<b>4 RESULTS AND DISCUSSION</b>	<b>11</b>
4.1 Introduction	12
4.2 Conclusion	13
4.3 Discussion	17
4.2 Chapter Summary	18
<b>CHAPTER 5</b>	
<b>CONCLUSION AND RECOMMENDATIONS</b>	
5.1 Introduction	19
5.2 Conclusion	20
5.3 Chapter Summary	20

## **CHAPTER 6**

### **PROJECT MANAGEMENT AND COSTING**

5.1	Introduction	20
5.2	Gantt Chart	21
5.3	Costing and Budgeting	22
5.4	Chapter Summary	23

<b>REFERENCE</b>	<b>24</b>
------------------	-----------





# CHAPTER 1

## 1.1 Introduction

Nowadays the authenticity and cleanliness of the daily rides and vehicles are often neglected by the popular masses. Even down to the everyday life citizens with their own vehicles and transportations. This can be one of many reasons, it could have been rooted by the severe complacency of an individual. This thus then fruits the lack of hygiene of their transportations and not only that, it could also show effects on their homes For the everyday life citizen, most of them simply just do not have the necessary time to put into taking care of their vehicle's hygiene as it often goes unnoticed to the public eye. And as for the public transport workers, most of them do not care of the health and well-being of the vehicle that they are driving.

This has been proven as they only get paid to drive that particular vehicle and not to care about the cleanliness of it . This goes both ways for the big companies as well . Granted, some of them do regular check-ups and clean ups of their commercial vehicles and some of them are really well took care of . But for the big majority, it is otherwise. This all circles back to the lack of time and effort they have. Also, could partly be due to the lack of tool and equipments. And even if they do have the proper equipment and tools, the level of efficiency that they are able to operate is just nowhere near worth it.

So, in order to counter-act this problem, The need of a system that is able to operate this particular function with extreme efficiency and requires no hard work would be extremely beneficial, not only to the public and general use but also for the everyday citizen use.

## 1.2 Background Research

One of the biggest impacts has been the reduction in passenger transport demand, due to a combination of government lockdowns and fears of contracting and spreading the virus when using mass transport modes. While freight transport has also been reduced, the drivers of freight activity during the current crisis are complex, driven by both supply and demand-side factors, and in the latter, by the need to keep essential services operating. In contrast, passenger transport, for both leisure and business travel is often optional, and more influenced by people's decision making processes. The focus of this paper is therefore on passenger transport.

The crisis has affected all forms of transport, from cars, and public transport in cities, to buses, trains and planes nationally and internationally. Global road transport activity was almost 50% below the 2019 average by the end of March 2020 and commercial flight activity almost 75% below 2019 by mid April 2020. Public transport has also been affected, For example, the strict lockdown imposed in Malaysia imposed around March 2020 has led to a 95% decrease in general travels and journeys in Kuala Lumpur. This is supported by data from one popular transport planning smartphone app showing that trips are down by over 90% since the crisis began in many of the world's major cities.

## 1.3 Problem Statement

In this era of modernization, transportation is an important core in the daily life. The process of getting from one place to another has been a predicament humans have been dealing with for centuries. About a 40% total of Malaysian citizens uses some form of public transportation. And a large majority of those numbers come from E-Hailing services like Grab, Uber and Taxis.

As of 9 May 2022, there are a total of 4,461,135 confirmed cases of Covid-19 reported in Malaysia alone. One of the many departments and groups of people are considered high risk to be infected. And the 40% group of people in Malaysia are definitely in the high risk category. Covid-19 has taught us to be more hygienic in everything we do. For example like sanitizing your hands after making contact on a surface that many people has also touched. This applies to the insides of a particular public transportation.

Public transport, mainly E-Hailing sedans often carry multiple customers throughout the day. This can be proven to be putting quite the high risk as some of these customers could have been all over the place and ultimately spreading any form of microorganisms and bacteria to the seats of the car. It is proven that public transportations rarely gets cleansed and sanitised. This is also due to the fact that the owner of the vehicle simple just do not have the time to do so or just do not care about the hygiene of their transportations.

So to put into simple words, these sedans are basically a moving micro-bacterial spreader as they exchange microorganism from the fabric of the seats

from one customer to another . This obviously could be potentially harmful to the users and even the driver . In some cases it might even cause death towards low immunity group of people especially in this covid era .

So in order to aid in this particular problem , these cars must be cleansed and sanitized often in order to decrease the risk or the spread of microorganism and potentially harmful bacterias to spread rapidly in the fabric of the seats in each sedans. It is a proven fact that whatever product is used , none of them can kill 100% of the total bacterias . So as educated citizens , it is our responsibility to keep our public transportations as clean as it possibly can . But the problem that comes with sanitizing a particular public transport comes in many shapes .

First of all , the process of sanitizing every each surface of a particular E-Hailing car is very long and redundant . The driver would have to manually go to each individual surfaces and spray it with some form of sanitising product . This also leads to the next point which is inefficiency . We are humans and we often are never perfect in conducting any form of process. Thus this also applies in manual sanitising . The owner of the car more often than not will do a bad job in sanitising their own car and will leave certain spots unattended . Thus making it inefficient . Some owners also just simply do not have the time to do so and are just lazy .

So , the existence of a system that will help in solving this problem is needed .

#### **1.4 Research Objectives**

1. The whole idea of this project is to be able to construct a fully functioning device that is able to sanitise the entirety of a particular transport vehicle 360 degrees throughout so that the entire car has no uncovered spots.
2. To implement and fully develop a system that allows the device to detect the presence of the driver in the car, and once the absence of the driver has been detected, the system will automatically turn on for a duration of 6 seconds, sanitising the vehicle and turn off by itself.
3. To develop a system that will show a display that indicates when the last time the car was sanitised .

#### **1.5 Scope of Research**

This particular project focuses on the implementation of the system and be applicable to your daily average public transportation vehicle for an easy and effective way to sanitise their vehicles . In addition to that, the detection of the absence of the driver will activate the function of the nozzle device and spray out the sanitising mists 360 degrees of total area coverage in order to get the entire vehicle surface is sanitised.



## 1.6 Project Significance

As per stated many times in a few of the statements and paraphrases above , the cleanliness and sanitary situation in any public transport is second to none . It is incredible important especially amongst the everyday passengers and customers .

Based on the multiple researches and information gathering that I have done , I have come across a few devices that were invented by multiple sources that has a correlation to car sanitation . One of the most significant and most promising product or device I have found is the ‘The Sanitisation System’ created by a company known as Supagard . Their device creates Ozone which is a colourless gas composed of trivalent Oxygen (O<sub>3</sub>) that is found in nature . It’s in the atmosphere for irradiation of the solar ultraviolet rays , or through the electrical charges produced during storms. It is present in the mountains in greater concentrations and that’s what gives us freshness and pure air perception. This sanitation system , when applied to a vehicle cleans the interior of a vehicle to ‘medical grade’ levels . Their machine is a fully functional remote application that can be downloaded onto a phone or tablet to control over the machine from a distance.

As for my addition and improvement of this system, it does not incorporate remote functions . Instead it is fully autonomous . Taking full advantage and the use of the PIR Motion Sensor , it will detect the absence of the driver and sends a signal to the circuit which then would automatically turn the system on . The water pump will then pump the sanitizing liquids to the mist nozzles which then will be sprayed out for a duration of 6-8 seconds . This is done in order to get full coverage of the car . Once the sanitizing process is done , an LCD display will then display a text that indicates that the car has been sanitized . The LCD will then be displayed on the dashboard where it is visible to the passengers . This will then create a sense of security and cleanliness to the customers and make them feel comfortable knowing that the vehicle is sanitized and clean the best way possible.

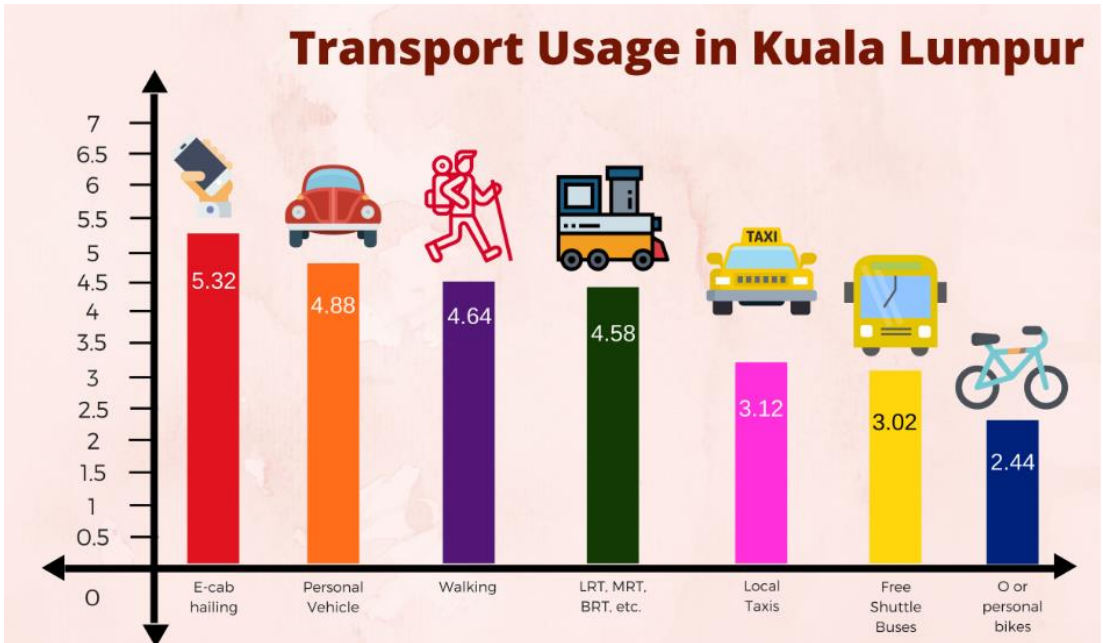
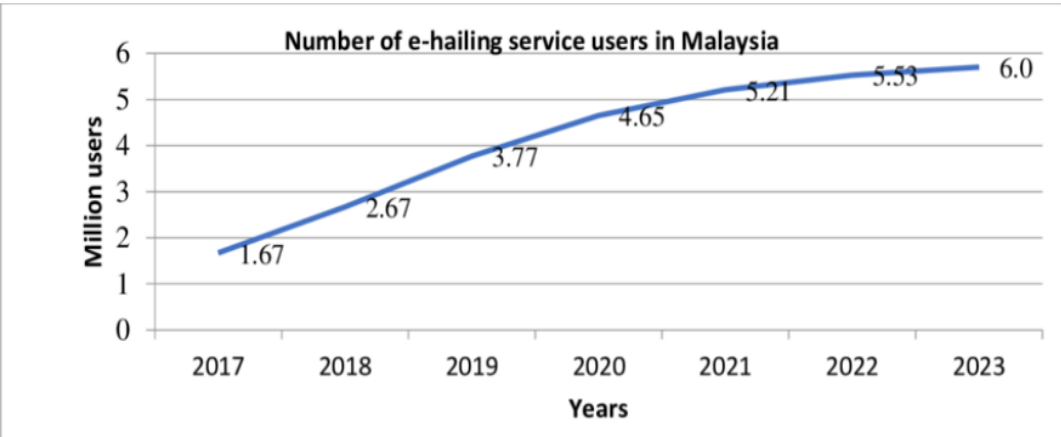
## CHAPTER 2

### 2.1 Literature Review

An article written by Colleen Costello from Metro Magazine , he stated a biomedical research done by Weill Cornell Medical (biomedical research unit and medical school of Cornell University) that conducted a study several years back on the global public transportation vehicles analyzing thousands of samples of microbes on the seat of taxis and busses. Researches uncovered that the vastness of complexities of the germs of these vehicles alone finding that an astounding 27 percent of the samples were live , antibiotic-resistant bacteria that could result in series and even deadly diseases.

The Centers for Disease Control and Prevention (CDC) has developed procedures for cleaning and disinfecting facilities and vehicles, which includes recommandations on minimum requirements for scheduling of certain activities. These are summarized in and it should be noted that local governments , health departments and product manufacturers may have other requirements or recommendations that should be considered and complied with by transit agenyies. It is recommended that each transit agency conduct an analysis to determine the appropriate scheduele frequencies for its program.

As for cleaning and disinfecting products , The Environmental Protection Agency (EPA) defines all chemical solutions used to mitigate and disinfect surfaces pesticidies . All EPA registered pesticides must have an EPA registration number, which consits of a company number and a produt number (e,g , 123-45) . Alternative brand names have the same EPA registration nyber as the primary product. Therefor if a transit agency has difficulty producing a product from List N , then that agency should seek to purchase other brands that have the same EPA regitstration number that are targeted. The CDC states that when disinfectants with List N product numbers are not available, alternative disinfectants can be used, for example (1/3 cup of bleach added to 1 gallon of water or 70 percent alcohol solutions.



## **2.2 Obtained Information**

Through the countless researches that I have conducted throughout the execution of this project , there are a number of useful information and things that I have learnt .

To name a few , the growing curve and the increase in popularity of the public transportation use by the general public in Malaysia has been one of the most fascinating things I have come across . But due to the pandemic that hit in 2020 , the growing curve has seemed to hit a wall and spiraled down in numbers . This is due to the reason of the lockdown or better known as Movement Control Order (MCO) that was issued by the Malaysian government back in March of 2020 . This simultaneously affected not only the number of people using public transport such as E-Hailing and a bus rides , but it also caused the loss of jobs for several of these E-Hailing and bus drivers .

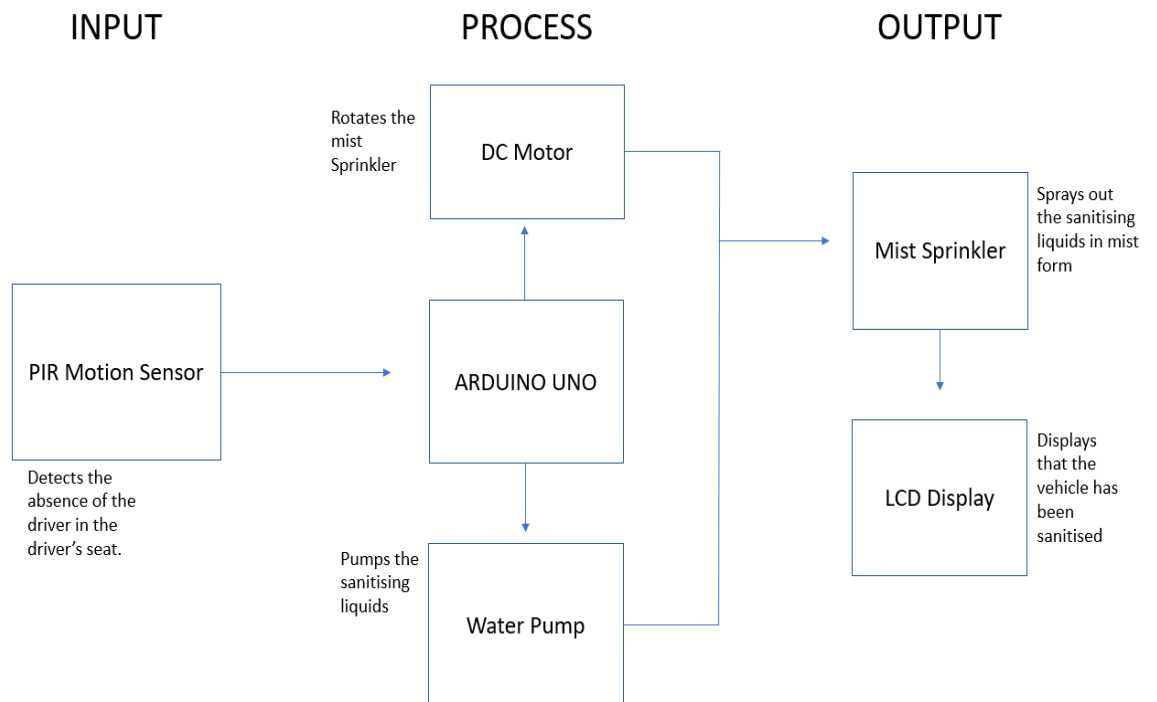
Other than that , based on the studies and researches I have done , I have found that there is a growth of paranoia or fear amongst the general public when it comes to anything to do with any public uses . For example , public and social gathering , using the public toilet , sitting on the bench at the park , being within 1 meter of range with any other person . Let alone being in a public vehicle transport like a bus or an E-Hailing sedan where multiple passengers sit on the same seat throughout the day . The fears and concerns are definitely understandable due to the Covid-19 pandemic . It surely has made the general public more aware and more attentive especially when it comes to sanitary situations and conditions.

# CHAPTER 3

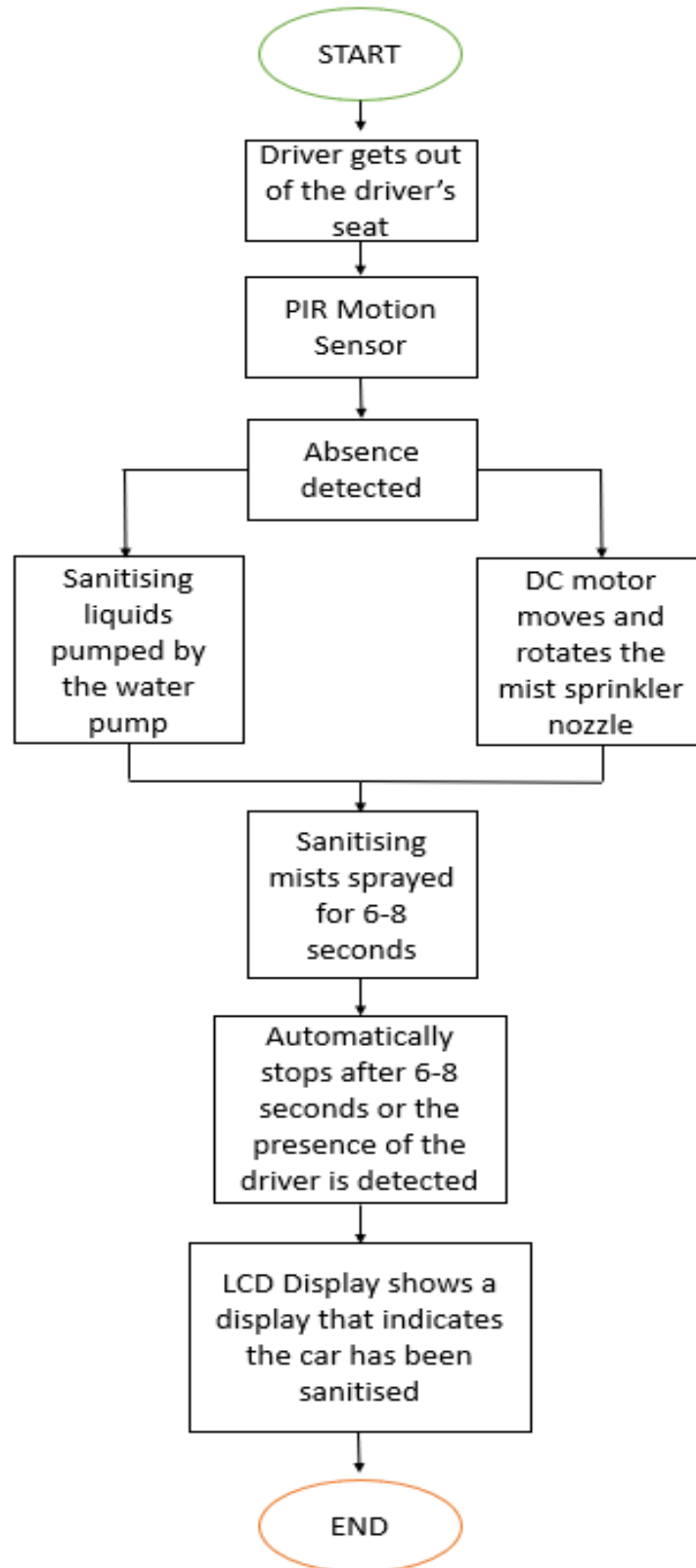
## 3.1 Methodology

The construction of the idea of this project begun with the initial idea of a simple automatic car perfume , but as more ideas came through and with the aid and advices of the fellow supervisors , thus the whole initiative idea of the ‘Car Sanitizing System’ came through . The project started out with a simple rough sketch of the circuit that was combined with multiple circuits that were found on Google . Once the final drafting and sketch of the circuit has been made , the circuit is then built on the Proteus 8 Professional software. During this process , the coding and commands were also made and burnt onto the Arduino UNO component .

## 3.2 Block Diagram

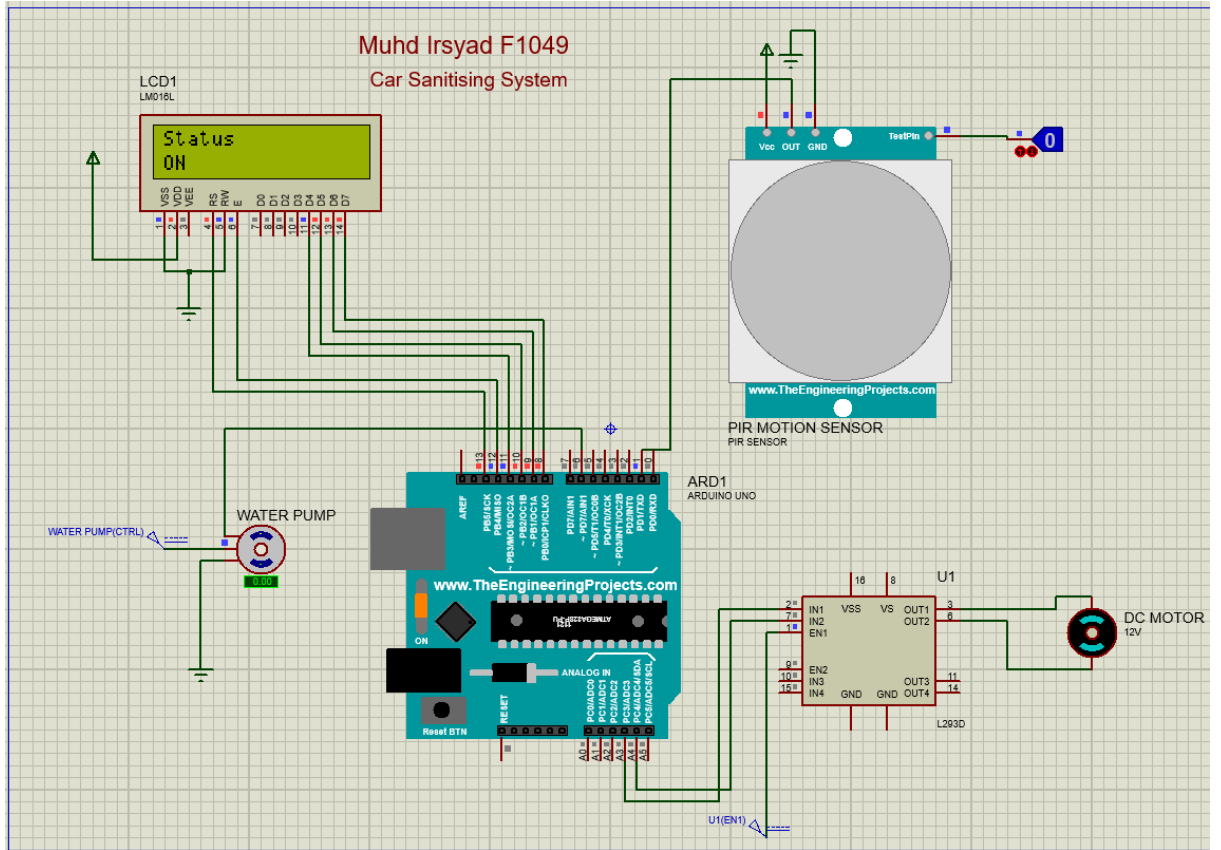


### 3.3 Flow Chart

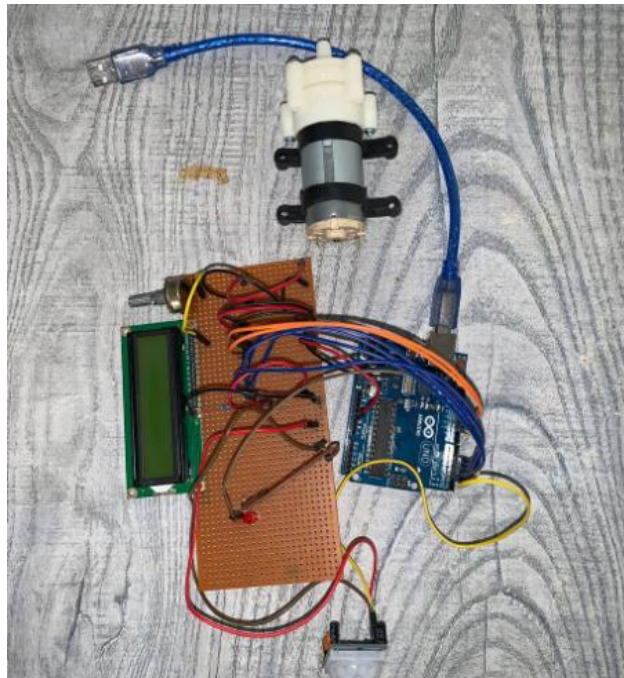


### 3.4 Project Hardware

#### 3.4.1 Schematic Circuit



### 3.4.2 Physical Circuit





### 1. Arduino UNO

The brain of the project and is the component that acts as a catalyst for all the other components to function.1



### 1. PIR motion sensor

Detects the presence and absence of the driver in the driver's seat.



### 2. LCD Display

Displays the message that indicates the passengers that the car is sanitised.



### 3. 12V water pump

Pumps out the sanitising liquids out to the sprinkler.



### 4. Mist Sprinkler

The components that shoots out the sanitising mists and spreads the sanitising liquids out.



## 3.5 Project Software

```
sketch_nov02a
#include <LiquidCrystal.h>

// initialize the library with the numbers of the interface pins
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
int ledPin = 13;
int pirPin = 10;
int pirState = LOW; // we start, assuming no motion detected
int val = 0; // variable for reading the pin status
int counter = 0;
int currentState = 0;
int previousState = 0;

void setup() {
  pinMode(ledPin, OUTPUT); // declare LED as output
  pinMode(pirPin, INPUT); // declare sensor as input
  lcd.begin(16, 2);
  lcd.setCursor(4, 0);
  lcd.print("STATUS ON");
}

void loop() {
  val = digitalRead(pirPin); // read PIR sensor input value
  if (val == HIGH) { // check if the input is HIGH
    digitalWrite(ledPin, HIGH); // turn LED ON
    if (pirState == LOW) {
      // we have just turned on
      currentState = 1;
      // We only want to print on the output change, not state
      pirState = HIGH;
      delay(1000);
    }
  } else {
    digitalWrite(ledPin, LOW); // turn LED OFF
    if (pirState == HIGH) {
      // we have just turned of
      currentState = 0;
    }
  }
}
```

## CHAPTER 4

### 4.1 Introduction

Nowadays the authenticity and cleanliness of the daily rides and vehicles are often neglected by the popular masses. Even down to the everyday life citizens with their own vehicles and transportations. This can be one of many reasons , it could have been rooted by the severe complacency of an individual . This thus then fruits the lack of hygiene of their transportations and not only that , it could also show effects on their homes For the everyday life citizen, most of them simply just do not have the necessary time to put into taking care of their vehicle's hygiene as it often goes unnoticed to the public eye . And as for the public transport workers, most of them do not care of the health and well being of the vehicle that they are driving .

This has been proven as they only get paid to drive that particular vehicle and not to care about the cleanliness of it . This goes both ways for the big companies as well . Granted, some of them do regular check ups and clean ups of their commercial vehicles and some of them are really well took care of . But for the big majority , it is otherwise. This all circles back to the lack of time and effort they have . Also could partly be due to the lack of tool and equipments. And even if they do have the proper equipments and tools , the level of efficiency that they are able to operate is just nowhere near worth it .

So in order to counter-act this problem, The need of a system that is able to operate this particular function with extreme efficiency and requires no hard work would be extremely beneficial , not only to the public and general use but also for the everyday citizen use.

## 4.2 Results and Analysis

### 4.2.1 Project Surveys

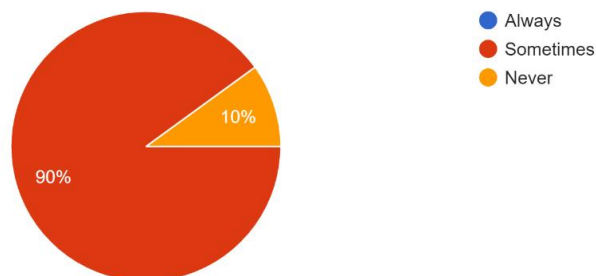
A public survey was done using the Google Form platform to get the general response and answers regarding the products and its suitability and how it will perform if it were to be put in the market. This survey has questions that are closely related to the behaviours and tendencies of the general passengers .

## Cleanliness of Public Transportation (E-Hailing)

### 4.2.1 Data Collected in Pie Chart

How often do you use E-Hailing as a mode of transportation?

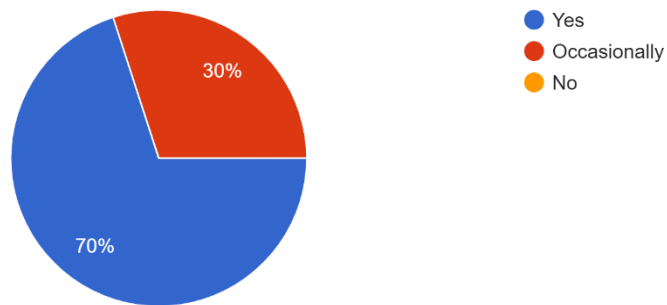
10 responses



Pie chart shows that a majority of people have used or are still using the E-Hailing service.

Do you wear a facemask inside of an E-Hailing vehicle

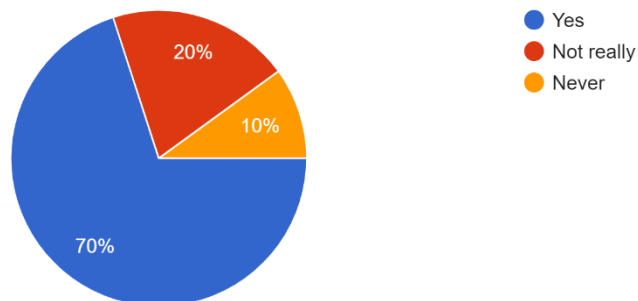
10 responses



Pie chart shows that a good majority of people use a facemask whilst being inside an E-Hailing vehicle.

Do you pay attention to the cleanliness of an E-Hailing vehicle ?

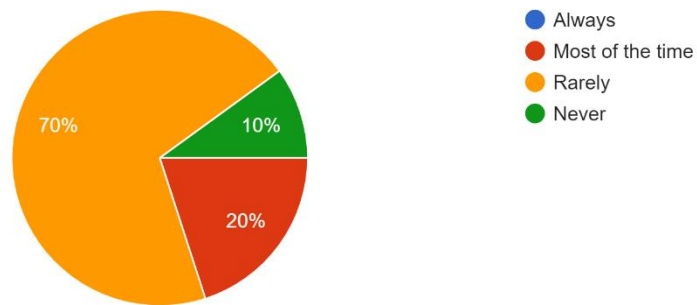
10 responses



This pie chart shows that a large majority of passengers do actually pay attention and care about the cleanliness and hygienic situation of the E-Hailing vehicle they are in.

How often do you see litter (trash) in a E-Hailing vehicle ?

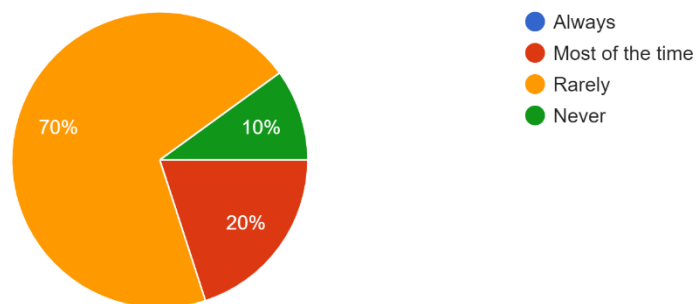
10 responses



This pie chart shows that most of the E-Hailing vehicles they are in are usually clean without any visible litters. But 20% of the passengers actually agree that there are litters most of the time.

Have you ever noticed any bad odour (smell) in an E-Hailing vehicle ?

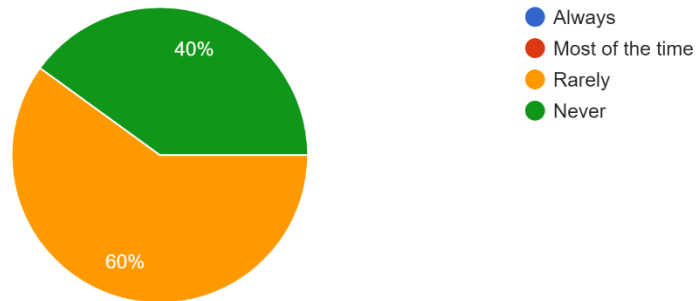
10 responses



This pie chart shows that there are rarely any bad odors or smell from inside an E-Hailing vehicle.

Have you ever felt itchy or irritation on the skin after sitting down in a car cushion of an E-Hailing vehicle ?

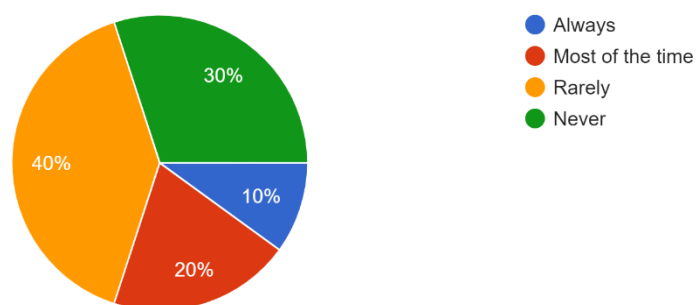
10 responses



This pie chart proves that 60% of passengers has felt some sort of skin irritation from sitting on the cushion of an E-Hailing vehicle while the other 40% has never felt any sort of irritation.

Have you ever felt unpleasant towards the hygiene of the inside of an E-Hailing vehicle ?

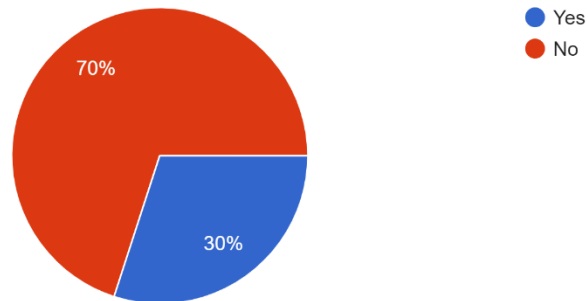
10 responses



This pie chart proves that a large majority of people has felt some sort of unpleasant feeling towards the hygienic situation of the E-Hailing vehicle that they are in.

Have you ever made a complaint or alerted the driver of an E-Hailing vehicle if their vehicle is in a bad hygienic state ?

10 responses



Pie chart shows that only 30% of the passengers actually has filed a report or alerted the driver of some sort regarding the hygienic situation of their vehicle.

### 4.3 Discussion

In absolute summary, preparations and prior tests has to be done beforehand in order to not cause any potential errors or the project to not function. Once the device has been connected to a power source, the LCD display will turn on with a display that says 'Not sanitized'. Once the driver's absence is detected, the 12V water pump will pump out sanitizing liquids to the mist sprinkler via the command of the Arduino UNO. Once the mists has been sprayed, the LCD display will show a new display saying 'Recently Sanitized'. From what I have done so far, the LCD display does turn on when it is connected to a power source, and the PIR motion sensor does inevitably detect the presence or movement of the driver. The water pump also does pump water but the consistency and the amount of water that is being pumped is quite slow compared to what was expected. Due to some inefficient ways of coding, the final display stating the display of 'Recently Sanitized' does not pop up. The consistency of it actually displaying that is quite unexpected as sometimes it doesn't pop up any display at all. What can be concluded is that it might be the source of loose connections on the PCB board or some holes in the coding, to put into simple words, human error plays a huge influence in this project. Thus, what can be concluded is that the just the right amount of lead has to be applied on the board. The coding part of the project also has to be done with prior researches and studies and always constantly check for errors in the coding. Last but not least, many tests were done before finalizing the device in order to prevent setbacks and component damages.



#### **4.4 Chapter Summary**

To summarize this chapter, all of the data that has been recorded are essential in order to get the closest picture onto completing the project. It is important to work based off of the facts and answers that I have got from the general public. It has been proven that if a certain work or task is done from the experience of previous users and or just the general public, the results of said task will be having a much better outcome as it is done tailored to the experiences of the people beforehand.

## CHAPTER 5

### 5.1 Introduction

In total absolute summary, this entire project was not made in much a haste. Instead, it was taken with a slow and steady approach with plenty of prior researches and studies. This is done in order so that I will have the general idea on how to maneuver my way around tackling this project. It speaks on a lot on preparations and the materials that you have to work with. And in my opinion that is what I think helped me out tremendously in an attempt to accomplish this project.

### 5.2 Conclusion

Throughout the course of completing this project, I have learnt a lot of things. Many of which came from the aid of fellow supervisors and friends. Firstly, prior research regarding the general topic of the project is incredibly vital. This is due to the reason that if one were to head into an unknown area of subject with no knowledge in mind, it could lead to the project not end up working due to the lack of said knowledge. Before picking the topic or title for this project, many ideas and constellations have come through but it is then added up more by more with new modifications and improvements. Closely relating to the sanitization topic, it is important to know the potential severity or potential importance of what and or how the system could turn out.

The process of trying to find the right components were thought thoroughly step by step by figuring out how I wanted the project to function and turn out. Thus, each components are picked accordingly to the steps of the device. Firstly, the brain of the system which is the Arduino UNO. Then, it begins by the detection of the driver's presence and absence by the PIR motion sensor, followed up by the 12V water pump pumping the sanitizing liquids out to the mist sprinkler. Then, once the spraying of the sanitizing mists has stopped, the final outcome would be the LCD display showing the message that indicates the vehicle has just been recently sanitized. It firstly began from the software part of the project by the construction of the circuit diagram done in the Proteus 8 Professional software. Once every function has been figured out, then comes the process of purchasing and finding the components required to build the system. A good majority of the components were bought online as it is easier to find specific components. Whilst waiting for the components to arrive, the process of finding the coding has also begun. Plenty of research was done in order to get the right command suiting for the function of each individual components. With the help of fellow supervisors and friends, a large majority of the coding has been successfully ran. The testing phase comes next by first testing each individual components and making sure they are fully functioning. The circuit is constructed on the face of the breadboard and everything was running smoothly. After multiple trial and error were done, all the

components are soldered on the PCB board alongside by building the suitable box in order to fit the system in.

In the end, a good majority of the system actually does function and was able to produce the desired outcome. It may not be perfect in some parts and some components might not fully function to its fullest but the original aim for the system has been achieved.

### **5.3 Chapter Summary**

With everything done as far as humanely could with hopes up, I strive to achieve this project to great heights. This system aims to give E-Hailing drivers or any other public vehicle drivers in general a much simpler and effective way to clean and sanitise their vehicle. A more effective way in which does not require them to do heavy labours and put in extra efforts towards the process of sanitation. What makes my project different is that not only does it benefit the driver, but it also benefits the fellow passengers. Living in the post covid era, the concerns of any form of bacteria, microorganism or even a virus still lingers around in people's minds till this day. Thus, the existence of this system will not only help eliminate that concern in the passenger's mind. But also, will provide a sense of security to them knowing that the vehicle that they are in is just sanitised right before they step in the vehicle.

## **CHAPTER 6**

### **6.1 Introduction**

There are a number of technical resources and platforms that can be used and will be used for the completion of this project. As for the general use and even testing , the use of Proteus 8 Professional software is often used . It is used for its flexibility in its many abilities to complete a lot of tasks , from PCB creation , circuit simulation and component testing.

## 6.2 Gantt Chart

GANNT CHART																					
CAR SANITIZING MACHINE																					
NO	Task Name	Implementation	Duration (Days)	Cost (RM)	Date	Week 1 (12.8.2022-28.8.2022)	Week 2 (29.8.2022-4.9.2022)	Week 3 (5.9.2022-11.9.2022)	Week 4 (13.9.2022-20.9.2022)	Week 5 (21.9.2022-28.9.2022)	Week 6 (29.9.2022-5.10.2022)	Week 7 (6.10.2022-13.10.2022)	Week 8 (14.10.2022-21.10.2022)	Week 9 (16.10.2022-22.10.2022)	Week 10 (31.10.2022-6.11.2022)	Week 11 (7.11.2022-13.11.2022)	Week 12 (14.11.2022-20.11.2022)	Week 13 (21.11.2022-27.11.2022)	Week 14 (28.11.2022-5.12.2022)		
1	CAR SANITIZING MACHINE																				
2	PURCHASE OF COMPONENTS AND MATERIALS	Plan Actual																			
3	CODING IN THE ARDUINO SOFTWARE	Plan Actual																			
4	TESTING COMPONENTS AND PUTTING TOGETHER THE CIRCUIT	Plan Actual																			
5	STARTING UPDATES ON THE IDEAS PLATFORM	Plan Actual																			
6	SOLDERING THE COMPONENTS ONTO THE PCB BOARD	Plan Actual																			
7	TESTING PHASE FOR THE SOLDERED BOARD	Plan Actual																			
8	CONSTRUCTING A CASEBOOK THAT WILL FIT THE DEVICE	Plan Actual																			
9	CREATING AND PRINTING THE PROJECT BANNER	Plan Actual																			
10	REPORT WRITING																				
11	FINISHING THE FINAL PROPOSAL	Plan Actual																			
12	COMPLETING THE LOGBOOK	Plan Actual																			

### 6.3 Costing and Budgeting

**Table 1: List of Components and Materials**

No.	Component and materials	The unit price	Quantity	Total
1	Arduino UNO set	RM 23.50	1	RM 23.5
2	DC Motor	RM 8	3	RM 24
3	Fogging Spray Sprinkler Set	RM 2	1	RM 2
4	Switch	RM 2.5	1	RM 2.5
5	LCD Display	RM 7.5	1	RM 7.5
6	High Pressure Sprinkler Hose	RM 1.12	1	RM 1.12
7	Sanitising liquid	RM 28	1	RM 28
9	Other materials	RM 30	-	RM30
	<b>Total :</b>			<b>RM 118.62</b>
	List of other costing			
1	Transportation			=
2	Postage			RM 40
3	Craft Work			RM 25
4	Internet			RM 30
5	Application			RM 100
	<b>Total :</b>			<b>RM 195</b>
			<b>Overall total</b>	<b>RM 313.62</b>

## **6.4 Chapter Summary**

This project is done thoroughly done as an individual task . From the estimation cost provided in the above , it is stated that the estimation value is around RM 315 . With the component and materials costing more or less around RM 150 and the additional costs of around RM200. Considering the fact that this system is a long term project, everything is taken into consideration. This is important especially budget wise, as us students are not formally given sponsorships in terms of money in order to purchase the components. It is essential that everything is planned out beforehand so that any mistakes could be avoided.

## REFERENCES

1. W. Abrahamse, L. Steg, R. Gifford, and C. Vlek, "Factors influencing car use for commuting and the intention to reduce it: a question of self or morality?" *Transportation Research F*, vol. 12, no. 4, pp. 317–324, 2009.
2. Utusan Malaysia (2021) forum/2022/03/hanya rm3.75 guna pengangkutan awam DR. MOHD. HAFIZ ZULFAKAR & MOHD. FAIZOL RIZAL MOHD. RASID, Universiti Teknologi Mara (UiTM) Kampus Puncak Alam
3. Mysejahtera ' Total cumulative confirmed cases status' (9 May 2022)
4. *2008 Public Transportation Fact Book*. Washington, DC: American Public Transportation Association; 2008. Available at: [http://www.apta.com/resources/statistics/Documents/FactBook/APTA\\_2008\\_Fact\\_Book.pdf](http://www.apta.com/resources/statistics/Documents/FactBook/APTA_2008_Fact_Book.pdf). Accessed September 2, 2010. [Google Scholar](#)
5. Ogilvie D, Egan M, Hamilton V, Petticrew M. Promoting walking and cycling as an alternative to using cars: systematic review. *BMJ*. 2004;329(7469):763. [Crossref](#), [Medline](#), [Google Scholar](#)
6. Besser LM, Dannenberg AL. Walking to public transit: steps to help meet physical activity recommendations. *Am J Prev Med*. 2005;29(4):273–280. [Crossref](#), [Medline](#), [Google Scholar](#)
7. Chertok M, Voukelatos A, Sheppard V, Rissel C. Comparison of air pollution exposure for five commuting modes in Sydney – car, train, bus, bicycle and walking. *Health Promot J Austr*. 2004;15(1):63–67. [Crossref](#), [Google Scholar](#)
8. van Wijnen JH, Verhoeff AP, Jans HW, van Bruggen M. The exposure of cyclists, car drivers and pedestrians to traffic-related air pollutants. *Int Arch Occup Environ Health*. 1995;67(3):187–193. [Crossref](#), [Medline](#), [Google Scholar](#)
9. . Chillrud SN, Grass D, Ross JM, et al.. Steel dust in the New York City subway system as a source of manganese, chromium, and iron exposures for transit workers. *J Urban Health*. 2005;82(1):33–42. [Crossref](#), [Medline](#), [Google Scholar](#)
10. Sallis JF, Kraft K, Linton LS. How the environment shapes physical activity: a transdisciplinary research agenda. *Am J Prev Med*. 2002;22(3):208. [Crossref](#), [Medline](#), [Google Scholar](#)

11. N. G. M. Nor, A. R. M. Nor, and A. Z. Abdullah, "Predicting the impact of demand- and supply-side measures on bus ridership in Putrajaya, Malaysia," *Journal of Public Transportation*, vol. 9, no. 5, pp. 57–70, 2006.
12. M. N. Borhan, R. A. A. O. K. Rahmat, A. Ismail, and N. Mohd, "Effect of bus travel time and parking fees on the use of public transport in Putrajaya," *Jurnal Teknologi (Sciences and Engineering)*, vol. 61, no. 1, pp. 67–71, 2013.
13. M. A. R. Nor and M. N. G. Nor, "Empowering public transport for urban environmental management," *Malaysian Journal of Environmental Management*, vol. 7, pp. 93–111, 2006.
14. M. A. Elliot, "Predicting motorcyclists' intentions to speed: effects of selected cognitions from the theory of planned behaviour, self-identity and social identity," *Accident Analysis and Prevention*, vol. 42, no. 2, pp. 718–725, 2010.
15. A. Tangphaisankun, F. Nakamura, and T. Okamura, "Influences of paratransit as a feeder of mass transit system in developing countries based on commuter satisfaction," *Journal of Eastern Asia Society for Transportation Studies*, vol. 8, pp. 1341–1356, 2010.
16. A. Nurdden, R. A. Rahmat, and A. Ismail, "Effect of transportation polices on modal shift from private car to public transport in Malaysia," *Journal of Applied Sciences*, vol. 7, no. 7, pp. 1013–1018, 2007.