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FINAL YEAR PROJECT REPORT

SMART WHEELCHAIR(PROTOTYPE)

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FINAL YEAR PROJECT REPORT

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IN:

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DECLARATION

I recognize that the project on above and the intellectual property that is in the work my original design without taking or imitate any intellectual property rights of others.I also declare the results of my project were never produced by any other students as well as from other institutions

ABSTRACT

This project is a robotic vehicle system for disabled people that controlled by voice commands. Disable people with weak upper limb find the normal wheelchair too tiring especially old people and it is hard for the people who have Quadriplegia to control the manual or electric wheelchair. A disabled person sitting in a vehicle can control it by giving voice command. The users voice will sent to hand phone and the arduino will receive the voice command through Bluetooth and sent it to the DC motor to make the motor to move based on command receive.

ABSTRAK

Projek ini adalah sistem kenderaan robotik bagi orang-orang kurang upaya yang dikawal oleharahan suara. Melumpuhkan orang dengan anggota badan atas lemah mencari kerusi roda biasa terlalu memenatkan rakyat terutamanya lama dan ia adalah sukar untuk orang-orang yang mempunyai Quadriplegia untuk mengawal kerusi roda manual atau elektrik. Orang kurang upaya duduk di dalam kenderaan boleh mengawalnya dengan memberi arahan suara. Para pengguna suara akan dihantar ke telefon tangan dan arduino akan menerima arahan suara melalui Bluetooth dan dihantar ke motor DC untuk membuat motor untuk bergerak berdasarkan arahan terima.

<u>ACKNOWLEDGEMENT</u>

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CHAPTER	DESCRIPTION	PAGE

CHAPTER 1 : INTRODUCTION

1.1 Background Research

This project is designed to create a robotic vehicle for disabled person to move freely by giving voice commands. Many disabled need a person to move them wherever they wants to. This project will work by giving voice commands to the smartphones and the voice commands will be sent to the Arduino via Bluetooth to interpret the commands to make the motor to move according to the commands. The IR sensor is used so to make the wheelchair stop automatically if the motor fail to get the stop command. It will stop whenever there is a block infront. This project will be very effective and save cost compare to electrical wheelchair. People who suffer from Quadriplegia cannot move any of their body except their head. With this project it will be very useful for them.

1.2 PROBLEM STATEMENT

Wheelchair can be used manually by hands, however many individual have weak upper limb or find the manually mode too tiring. Other than that, electric powered wheelchairs are too expensive. Furthermore, not all disabled people can use electric powered wheelchairs such as Quadriplegia patients.

1.3 OBJECTIVE

The objective of the project is to develop voice controlled vehicle that control the movement remotely through voice command for disable people

1.4 SCOPE AND LIMITATION

- The project is a prototype vehicle.
- Design for disabled person.
- Arduino Uno and DC motor circuit were built for movement for wheelchair.
- Voice recognition issues a command to control the movement of wheelchair. .
- This device only uses battery to work.
- Wireless technology for short-range voice and data communication.
- It can only forward and backward, left and right.
  The command is given via hand phone

1.2   Significant of Project

Independent mobilities increases vocational and educational opportunity, reduce depends on caregivers and family members and promotes feeling of self reliance. If older or disabled people find it increasingly difficult to walk or wheel themselves they can just use their voice to move them. If they become unable to walk or wheel themselves and help is routinely available in the home when needed, a move to a more enabling environment may be necessary. They also can freely move to a place when they needed rather than depending on someone. Other than that, normal wheelchair and remote wheelchair are quite expensive compare to this voice controlled device. Components such as Arduino Uno, Bluetooth board, dc motor driver, dc motor is the components used to make the prototype works. Besides, it is easy for them to control the wheelchair.

1.6 Summary Of Chapter

As a conclusion for the chapter 1, I understand about the Smart Wheelchair. The purpose is to increase the knowledge of voice controlled and to create a useful source in the area, where it will be possible to find references for deeper studies. The purpose of Smart Wheelchair is to create a robotic vehicle for disabled person that cannot walk and suffer from the disease Quadriplegia.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

A wheelchair is a chair with wheels. The device comes in variations allowing either manual propulsion by the seated occupant turning the rear wheels by hand, or electric propulsion by motors. There are often handles behind the seat to allow it to be pushed by another person. Wheelchairs are used by people for whom walking is difficult or impossible due to illness, injury, or disability. People who have difficulty sitting and walking often make use of a wheel bench. A wheelchair must meet the user's individual needs and environmental conditions, provide

postural support, and be safe and durable. The wheelchair must be available and affordable and be maintainable and sustainable in the country of use. This is not always easy, because wheelchair users are a diverse group with different requirements and environmental and socioeconomic conditions.

For society, the financial benefits associated with the provision of wheelchairs include reduced health care expenses, such as those for treating pressure sores and correcting deformities. A study from a developing country reported that in 1997, 75% of those with spinal cord injuries admitted to hospital died within 18–24 months from secondary complications arising from their injuries. In the same place, the incidence of pressure sores decreased by 71% and repetitive urinary tract infections fell by 61% within two years as a result of improvements in health care training and appropriate equipment, including good wheelchairs with cushions.

2.2 Types of Wheelchair

2.2.1 MANUAL WHEELCHAIR

Manual wheelchairs are those that require human power to move them. Many manual wheelchairs can be folded for storage, or placement into a vehicle, although modern wheelchairs are just as likely to be rigid framed. Manual or self-propelled wheelchairs are propelled by the occupant, usually by turning the large rear wheels, from 20-24 inches (51–61 cm)in average diameter, and resembling bicycle wheels. The user moves the chair by pushing on the hand rims, which are made of circular tubing attached to the outside of the large wheels. The hand rims have a diameter that is slightly less than that of the rear wheels. Skilled users can control speed and turning and often learn to balance the chair on its rear wheels do a wheelie. The wheelie is not just for show a rider who can control the chair in this manner can climb and descend curbs and move over small obstacles. Foot propulsion of the wheelchair by the occupant is also common for patients who have limited hand movement capabilities or simply do not wish to use their hands for propulsion. Foot propulsion also allows patients to exercise their legs to increase blood flow and limit further disability. But, the prices are not reasonable. Other than that, this manual wheelchair is not suitable for some disabled person.

The prices for manual wheelchair are shown below:

GET THE APP   SELL ON LAZADA   CUSTOMER CARE   TRACK MY ORDER   LOGIN   SIGNUP   TUKAR BAHASA

Search for products brands shops   🔍   🛒   🛡 100% Buyer   📦 Cash on
                                                            Protection   Delivery

Men's Fashion   Home & Living   Health & Beauty   Baby & Toys   Sports & Travel   Motor, Groceries & More   Highlights   Shop by Brands

/ Wheelchairs

AQ Medicare Travel Wheelchair
WHC3500
RM 585.00   -26%
RM 795.00
Installment 6 x RM 97.50
⭐⭐⭐⭐⭐ (3 reviews)

AQ Medicare Standard Wheelchair
WHC1260
RM 335.00   15%
RM 395.00
⭐⭐⭐⭐⭐ (5 reviews)

AQ Medicare Travel Wheelchair
WHC3130
RM 498.00   17%
RM 600.00
⭐⭐⭐⭐⭐ (7 reviews)

Hopkin Transit WheelChair
RM 445.00   16%
RM 529.00
⭐⭐⭐⭐⭐ (3 reviews)

Hopkin Transit Wh

2.2.2 ELECTRIC POWERED WHEELCHAIR

An electric-powered wheelchair is a wheelchair that is moved via the means of an electric motor and navigational controls which is usually a small joystick mounted on the armrest, rather than manual power. For users who cannot manage a manual joystick, head switches, chin-operated joysticks, sip-and-puff or other specialist controls may allow independent operation of the wheelchair. Wheelbase chairs are wheeled platforms with specially molded seating systems interfaced with them for users with a more complicated posture. A molded seating system involves taking a cast of a person's best achievable seated position and then either carving the shape from memory foam or forming a plastic mesh around it. This seat is then covered, framed, and attached to a wheelbase. The prices are shown in the figure below
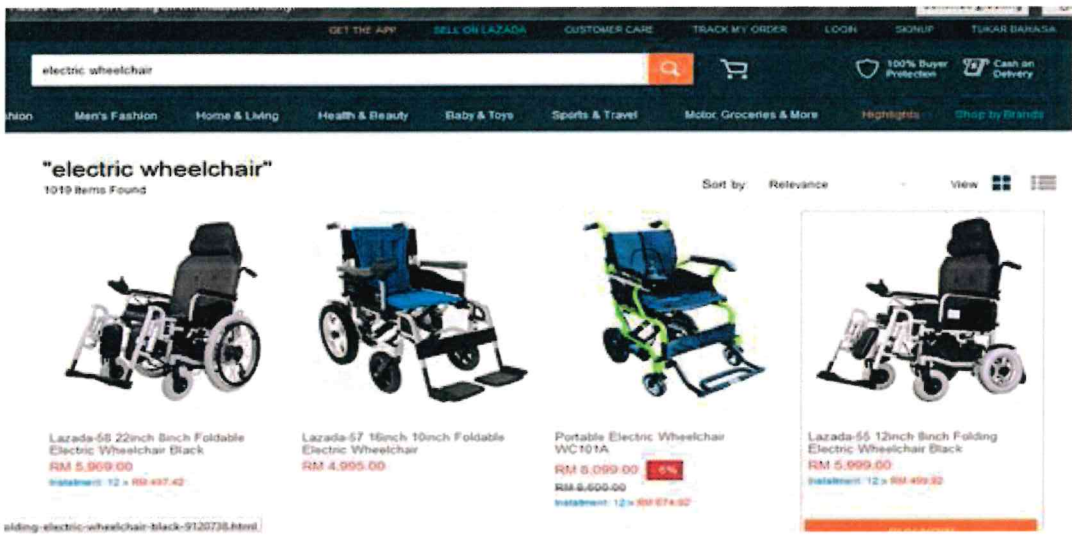

FIGURE 2.1:Electric Wheelchair

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2.3 Development Tools

2.3.1 Software Requirement

a) **Proteus**

The Proteus Design Suite is a Windows application for schematic capture, simulation, and PCB layout design. It can be purchased in many configurations, depending on the size of designs being produced and the requirements for microcontroller simulation. We use this software to draw our circuit and do the simulation. Along with ISIS there's also another package named as Proteus ARES. This Proteus ARES is used for PCB designing.
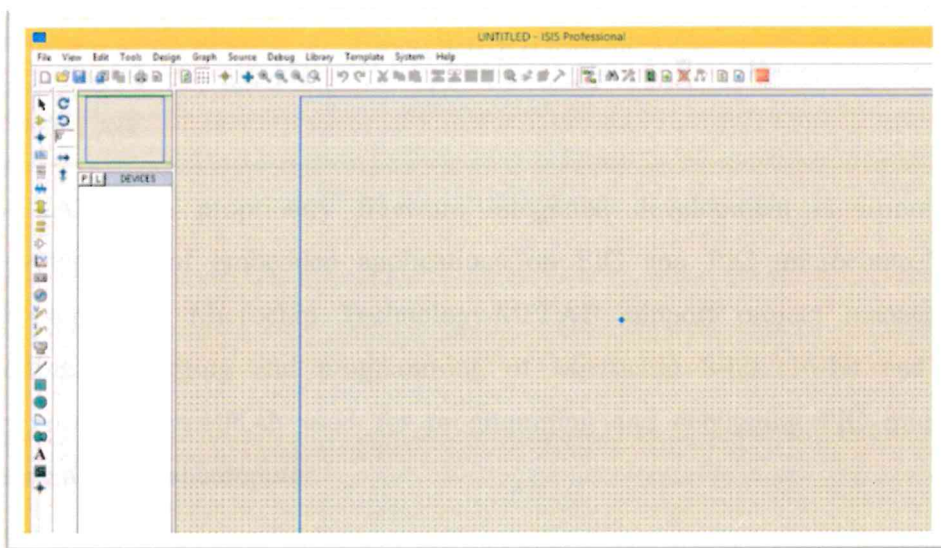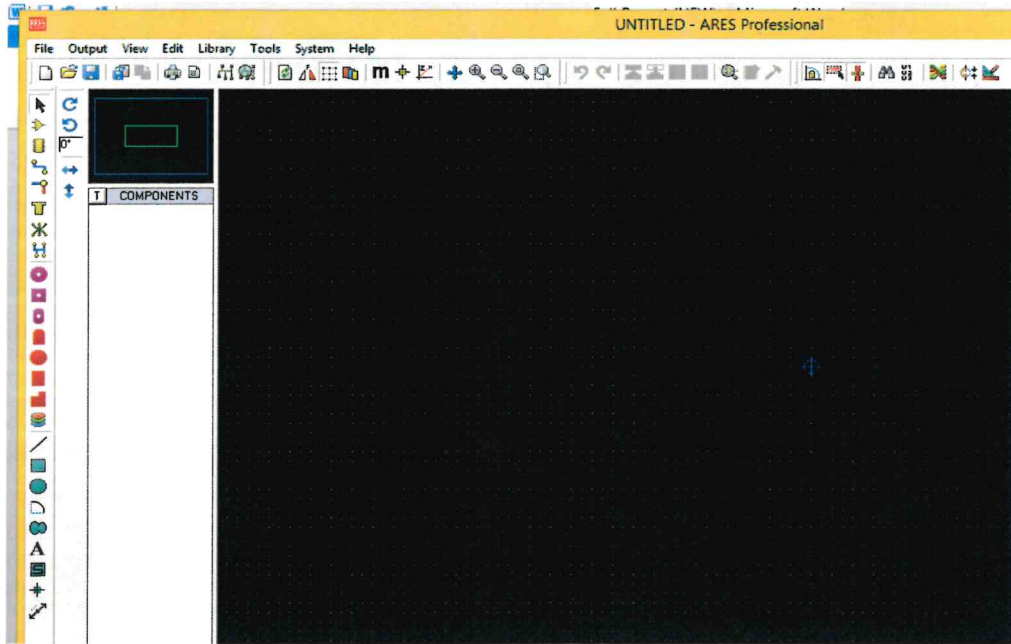
FIGURE 2.1: Proteus ISIS

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FIGURE 2.2: Proteus Ares

b) MP LAB

MPLAB is a proprietary freeware integrated development environment for the development of embedded applications on PIC and PIC microcontrollers, and is developed by Microchip Technology.MPLAB support project management, code editing, debugging and programming of Microchip 8-bit, 16-bit and 32-bit PIC microcontrollers.MPLAB used for programming and debugging PIC microcontrollers using a personal computer.
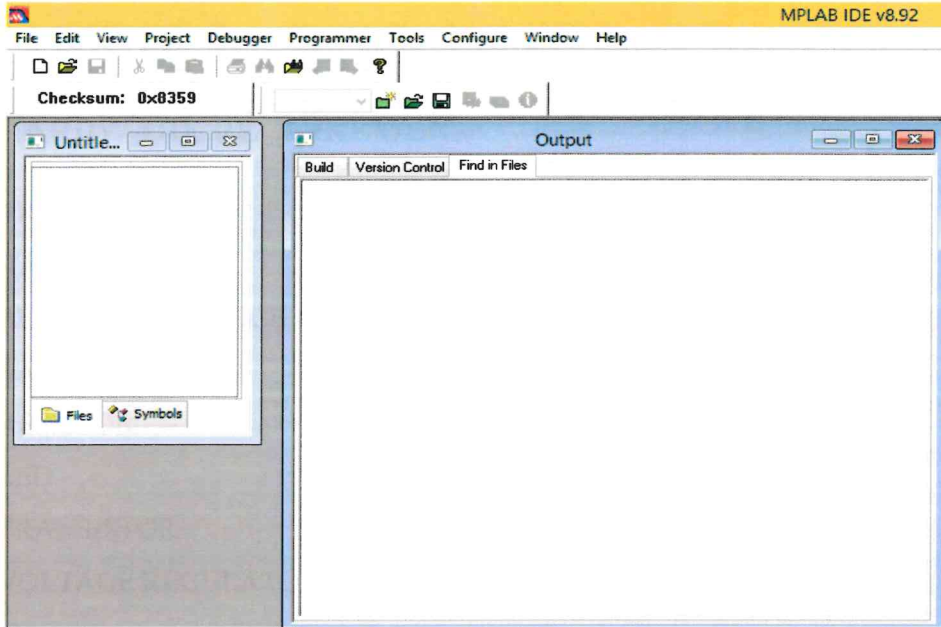
FIGURE 2.3: MPLAB Software

2.3.2 Hardware Requirement

Below is the list of the entire electronic components and the other material that will be needed to complete this project.

HARDWARE REQUIREMENT

- ARDUINO UNO
- HANDPHONE
- BLUETOOTH DEVICE
- BATTERY
- RESISTOR
- LED
- TRANSISTOR
- VOLTAGE REGULATOR (LM 7805)

1. ARDUINO UNO

Arduino Uno is a microcontroller board. It has 14 digital input/output pins, 6 analogue inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.Worst case scenario you can replace the chip for a few dollars and start over again. In this project, Arduino Uno is to use to recognize the voice command from Bluetooth and transmit it to DC Motor driver and trigger it. Arduinouno is advance technology that is easy to find and to program it.
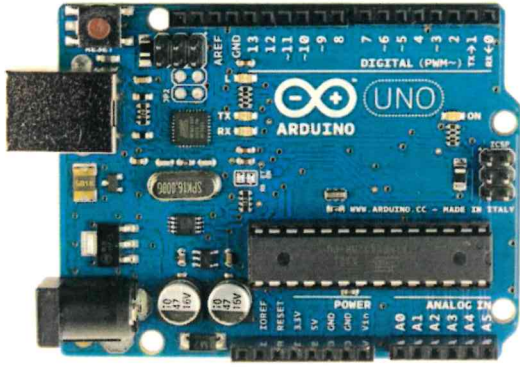
2. BLUETOOTH

Bluetooth is a standardized protocol for sending and receiving data. It's a secure protocol, and it's perfect for short-range, low-power, low-cost, wireless transmissions between electronic devices.Bluetooth serves as an excellent protocol for wirelessly transmitting relatively small amounts of data over a short range (<100m). It's perfectly suited as a wireless replacement for serial communication interfaces. In this project, Bluetooth is use to receive voice command from the hand phone and will transmit to arduino.
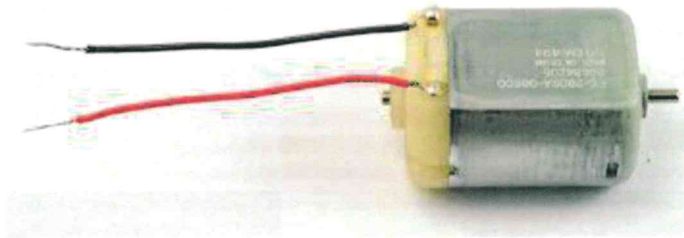

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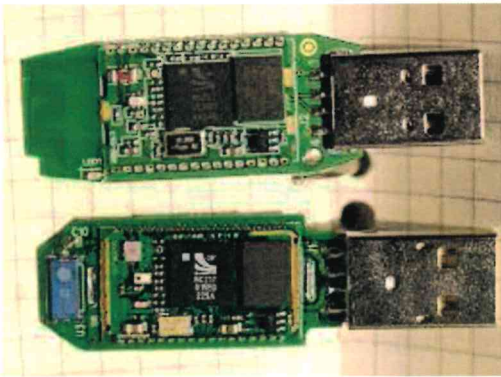
3.MOTOR

Type of motor:

Motor direct current (DC Motor)

• Moving in one direction only

• used in low-power electrical appliances

• dc motor energy source is a battery

DC motor is used to make the motors to move. It is used to make the motor move left, right, forward and backward.

4.BATTERY

Electrical battery is a device that consists of two or more electrochemical cells that convert stored chemical energy into electrical energy . Each cell has a positive terminal , or cathode , and the negative terminal , or anode north marked a positive electrical potential energy is higher than the terminal is negative. Terminal marked negative is that when the electron source is connected to an external circuit will flow and deliver power to an external device . When the battery is connected to the external circuit , electrolyte ions can move as in , allowing chemical reactions to be completed on a separate terminal and delivers energy to the external circuit . It is the movement of their ion battery that allows current to flow from the battery to perform the battery .Even technical term means a device with a variety of cells , single cells are popularly called battery .
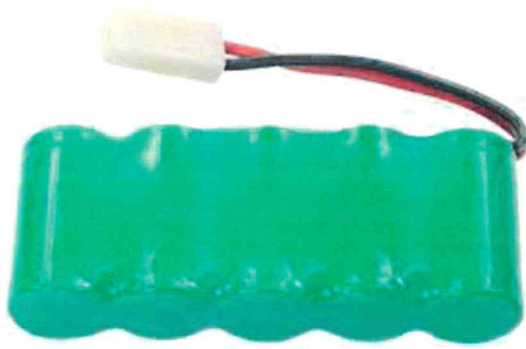
5.SMARTPHONE

Smartphone is use send voice signal. Smartphone is use to send voice signal using a application downloaded from playstore to connect with the Bluetooth device to run the motor

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6).Resistors

A resistor is a two-terminal electronic component designed to oppose an electric current by producing a voltage drop between its terminals in proportion to the current, that is, in accordance with Ohm's law:

$$V = IR$$

Resistors are used as part of electrical networks and electronic circuits. They are extremely commonplace in most electronic equipment. Practical resistors can be made of various compounds and films, as well as resistance wire (wire made of a high-resistivity alloy, such as nickel/chrome).
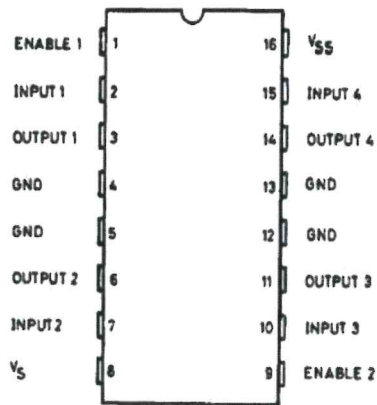
7)Transistor

A transistor is a semiconductor for device used to amplify and switch electronic signals and electrical power. It is composed of semiconductor material with at least three terminals for connection to an external circuit. A voltage or current applied to one pair of the transistor's terminals changes the current through another pair of terminal. Because the controlled (output) power can be higher than the controlling (input) power, transistors are packaged individually, but many are found embedded in integrated circuits.
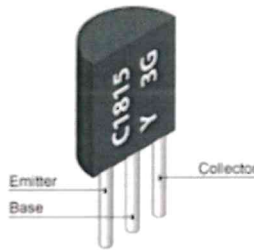

L293D

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC.

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```
ENABLE 1    1          16    V_SS

INPUT 1     2          15    INPUT 4

OUTPUT 1    3          14    OUTPUT 4

GND         4          13    GND

GND         5          12    GND

OUTPUT 2    6          11    OUTPUT 3

INPUT 2     7          10    INPUT 3

V_S         8           9    ENABLE 2
```

8)Voltage Regulator

7805 is a voltage regulator integrated circuit. It is a member of 78xx series of fixed linear voltage regulator ICs. The voltage source in a circuit may have fluctuations and would not give the fixed voltage output. The voltage regulator IC maintains the output voltage at a constant value. The xx in 78xx indicates the fixed output voltage it is designed to provide. 7805 provides +5V regulated power supply. Capacitors of suitable values can be connected at input and output pins depending upon the respective voltage levels.

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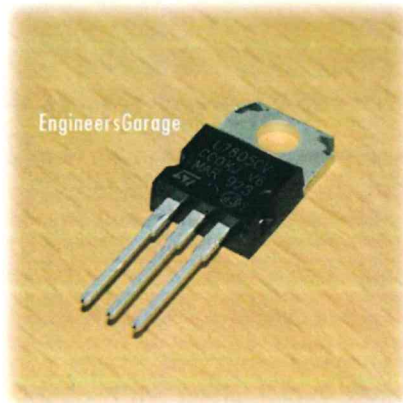
2.4 Conclusion

As a conclusion for the chapter 2,there are some components that used for fingerprint attendance system. The literature review focus on the understanding of relevant topic to convey the knowledge and ideas that have been established based on journals, articles and web sites that are related to methodologies and approaches. Other than that, software and hardware design review also being pin point under literature review section.

CHAPTER 3: PROJECT METHODOLOGY

3.1 Introduction

This section will be described the methodology approach use for this project development. Methodology in software process is used in order to plan, analysis, design, maintenance and implementation. This term may be used to refer to practices which are widely used across an industry or scientific discipline, the techniques used in a particular research study, or the techniques used to accomplish a particular project. Beside that people may also use the term methodology to refer to the study of such methods, rather than the methods themselves. This is why the methodology used in scientific research is always described, so that others can replicate the research themselves or identify errors in the methods used which may have created skewed results.

Each step of project is a process to complete the project. Every step must be followed one by one and must be done carefully. If some error occurs it can make a project probably could not operate or do not look neat and perfect. Before the project finish, various process needs to be done according to proper procedures to ensure that projects do not have any problems.

Week Planning

Weeks	Planning
W1	Registration Student
W2	Project Briefing - Implementation and evaluation procedures - Reporting format - Provide guidance and planning
W4	Submission of Project Title
W6	Assistance and Discussion - Identify the problem projects
W7 – W15	- Build new motor driver Design circuit using proteus - Troubleshooting - Solve problem circuit - Simulate - Design ARES - Etching & Soldering - Testing