

# **All in One Robot**

The Project Submitted in Partial Fulfillment of the Requirements for the Degree of  
Bachelor of Science in Computer Science and Engineering of the University of  
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# DECLARATION

We, hereby, declare that the work presented in this thesis is the outcome of the investigation performed by use under the supervision of **A S Zaforullah Momtaz**, Assistant Professor, and Department of Computer Science & Engineering University of Asia Pacific. We also declare that no part of this thesis and thereof has been submitted elsewhere for the award of any Degree or Diploma,

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**Candidates**

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We are thankful to the faculty members, staffs, classmates in the department of CSE who have help us with their valuable suggestion and guidelines throughout the project. Our final gratitude to our parents who have raised us with the love of science and supported us in all our pure suits, and for their understanding, endless patience and inspiration. They form part of the vision defining the good thinks that really matter in life.

Last of all we are thankful to our family; they are continuously with us, in our every period of life.

# Abstract

The all-in-one robot is designed to create a robotic vehicle to obstacle avoid through sonar sensors, as well as Bluetooth hc-06 through mobile applications and IR remote sensors for its movement. A sonar sensor is used to detect any obstruction and sends a command to the microcontroller Arduino Uno R3. Depending on the recognized input signal, the microcontroller Arduino Uno R3 activates the motors interface through a motor driver, leading the robot to move towards an alternative. The project is built with some IR sensors. A robot is a machine that can perform task automatically or with leadership. Some of the project is constructed with the IR sensors.

In this report a sample model of a remote-controlled Robot using Bluetooth device is presented. In the project an android application which possesses the ability to control a specific robot providing remote admittance from android phone using Bluetooth. Bluetooth technology is wireless radio broadcasts in a short distance providing a necessary technology to create convenience, intellect and controllability. Now-a-days robotics is the most significant & developing sector. Robots are used at home to planetary. Same as, robotic manipulators are very mutual for different robotic applications in general & industrial purposes. Our purpose of this project is to build a transporter robot which will be controlled by Bluetooth wireless technology. It can transfer mostly light things from one place to another. Our beset population are mostly old or disabled people who cannot move fast on their feet. Besides, this bot can be used in restaurants as a waiter to help menu or food, etc.

# **TABLE OF CONTENT**

DECLARATION	i
ACKNOWLEDGMENTS	ii
ABSTRACT	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	vii
LIST OF TABLES	viii
APPENDIX	vi
<b>Chapter 1: Introduction</b>	<b>01</b>
1.1 Introduction	01
1.2 Overview	02
1.3 Motivation	02
1.4 Objectives of project	03
1.5 Organization of project	03
<b>Chapter 2: Literature Review</b>	<b>04</b>
2.1 Literature Review	04
2.2 Historical Background	04
2.3 Related Works	05
<b>Chapter 3: Hardware</b>	<b>06</b>
3.1 Arduino UNO R3	06
3.2 Sensor Shield V5	07

3.3 L298N Motor Shield	08
3.4 XL6009	09
3.5 LM2596	10
3.6 Tie Clip	11
3.7 Hex Spacer with Screw	12
3.8 3 Cell Battery Case	13
3.9 18650 Battery Cell	13
3.10 Power Switch	14
3.11 18650 Battery Charger	15
3.12 Female to Female Jumper	16
3.13 Wheel	16
3.14 Motor	17
3.15 Frame	18
3.16 Power Cable	19
3.17 Heat Shrink Tube Red	19
3.18 Heat Shrink Tube Black	20
3.19 Servo Motor Tower Pro 9g	20
3.20 Sonar Sensor HC SR04	21
3.21 Sonar Holder	22
3.22 Arduino USB Programming Cable	22
3.23 Bluetooth Shield	23
 <b>Chapter 4: Activities</b>	 24
4.1 L298 Motor Shield	24
4.2 Gear Motor Work	25

4.3 Motor Increased Force	25
<b>Chapter 5: Flowchart &amp; Implementation</b>	26
5.1 Mobile App Controller Robot	26
5.2 Obstacle Avoidance	27
5.3 IR Remote Control	28
5.4 Design Implementation	29
5.5 Operation Principle	30
<b>Chapter 6: Budget and Project timeline</b>	34
6.1 Budget	34
6.2 Project timeline	35
<b>Chapter 7: Conclusion</b>	36
7.1 Application	36
7.2 Future Work	36
7.3 Conclusion	36
<b>Appendix A</b>	37
<b>Appendix B</b>	37
<b>Appendix C</b>	38

# LIST OF FIGURES

3.1 Arduino UNO R3	07
3.2 Sensor Shield V5	08
3.3 L298N Motor Shield	09
3.4 XL6009	10
3.5 LM2596	11
3.6 Tie Clip	12
3.7 Hex Spacer with Screw	12
3.8 3 Cell Battery Case	13
3.9 18650 Battery Cell	14
3.10 Power Switch	14
3.11 18650 Battery Charger	15
3.12 Female to Female Jumper	16
3.13 Wheel	17
3.14 Motor	18
3.15 Frame	18
3.16 Power Cable	19
3.17 Heat Shrink Tube Red	19
3.18 Heat Shrink Tube Black	20
3.19 Servo Motor Tower Pro 9g	21



3.20 Sonar Sensor HC SR04	22
3.21 Sonar Holder	22
3.22 Arduino USB Programming Cable	23
3.23 Bluetooth Shield	23
4.1 Motor Driver Shield	24
5.1 Mobile app control flowchart	26
5.2 Obstacle avoidance flowchart	27
5.3 IR Remote flowchart	28
5.4 Bluetooth module	29
5.5 Moves Forward	30
5.6 Drive Reverse	31
5.7 Drive Left	32
5.8 Drive Right	33

## LIST OF TABLES

Table: 01	34
Table: 02	35

# Chapter 1:

## Introduction

### 1.1 Introduction

Robotics is a branch of technology that makes our daily lives easier. We are constantly involved in various technological collaborations with the technology. Robot automation automobile systems. Either we take the initiative to build a robot like this and we want to create an all-in-one robot that will work with three modules one is the mobile Bluetooth control robot other number is the IR remote control robot and last one is Obstacle Avoidance robot.

Mobile Bluetooth Control, We can control via mobile phone verses It can be controlled remotely with remote control and Obstacle Avoidance robot If the robot encounters any obstacle, it will be able to change its position automatically and will be able to cross the path without any obstacle.

To make this all-in-one robot we need some knowledge of physics, some knowledge of electrical. Above all we need knowledge of computer science Because We will execute the robot through the code. We made the news on a small scale, but if it were possible for us to make it on a large scale, it would be very useful for our country. Combined values, it's called an all-in-one robot that allows three modules to work together.

We have solved some obstacles to build the robot, which we have solved very intelligently and with the help of teachers. We have tried to buy different modules at very low prices and increment well and have always measured the voltage in the circuits so that our circuit is never damaged due to excess voltage.

Our future plan is to create an all-in-one robot market through this project. And this will increase the interest of every student towards the robot as we will be handing over the news marketing process at a very low cost. We build robots using the Arduino open source platform and we always adhere to all the rules and regulations of the Code of Ethics.

## 1.2 Overview

Robotics is one of the largest branches of technology which includes a huge number of technology assemblies. Computer manages flower design, construction, application, control as well as controls and these. Robotics is a department of technology that designs, builds, operates, and controls robots. This knowledge can take the place of humans in insecure environments by dealing with automated machines.

Nowadays bulletproof processor, large storage volume, rich performing function. Bluetooth is mainly used for data conversations. It has changed how people use digital devices at home or in the office. One host Bluetooth device supports up to seven Bluetooth modules at the same time. Considering its normal working area within eight meters, it is especially useful in home environment. Bluetooth has provided people with their daily use. In recent years, Android, an open-source platform, is commonly used on smart phones. An operating system of Android, middleware level. Unlike other existing stages like iOS, the app provides. Using a smartphone as the "brain" of a robot is already an active field of investigation with several open opportunities and promising possibilities.

In this paper we have recently reviewed the current robots controlled by mobile phones and talked about a closed loop control system using the audio channels of mobile devices such as phones and tablet computers. In our work, move the robot upwards, backwards, left and right by the Android application. An official definition of such a robot is a reprogrammable versatile absorber. It is the brain of the computer that gives the robot its usability and flexibility. The so-called robotics revolt is actually part of the larger computer revolt. Even this limited edition of a robot has a number of features that make it fantastic in an industrial environment. Rewards often cited as the generosity of the introduction of robots include reduction of labor costs, increase in accuracy and yield, increase in flexibility compared to special machines, and achievement of additional human work conditions.

We used the Arduino Uno open source platform to build all-in-one robots. In addition we used a variety of sensor microcontroller boards and motors. When our hardware increments were exhausted, Then we did the code implementation.

## 1.3 Motivation

Restricted people are more likely to be exposed to daily life problems than other well people.

These are facing different types of problem as like to carrying goods when they are alone at home. With the help of technology, associate projects can be developed to overcome their difficulties. It can also be used broadly to resonant goods at industry purpose.

## **1.4 Objectives of project**

All-in-one robot phones can be controlled via the Bluetooth module. Those who do not have a mobile phone will be able to control the verse and if there are various obstacles in it, they will cross the path and go on the path without any obstacles. This is the main objective of our project. We want to design a robot that can achieve our main purpose. The main determinations are given below.

1. Operating the Robot wirelessly over mobile phone.
2. Usage of Android touchscreen smart phone in performance the task.
3. Bluetooth wireless broadcast.
4. It is also Obstacle robot.

## **1.5 Organization of project**

We have been working on this project for the last one year and as a result we have this all-in-one robot today. The steps we took to build the robot are discussed in this book in chronological order.

Chapter 1: Basically is an overview of the project. In this chapter, provides the background of the project, objectives, scope of the project, and also the thesis outline.

Chapter 2: Background Study.

Chapter 3: Hardware here all components in our project.

Chapter 4: Activities & methods.

Chapter 5: Flowchart view & Implementation.

Chapter 6: Budget and Project Timeline.

Chapter 7: Conclusion & future work.

# Chapter 2:

## Literature Review

### 2.1 Literature Review

We study a lot of the papers that have been published on these three modules of the robot and learn a lot from them. Not only this, with the help of our teachers we have been able to create this robot.

Obstacles in a real world life can be avoided by a human being but not by a robot because there are some obstacles to it, no matter how much we have artificial intelligence. This is how we build systems. At the very moment when we encountered this obstacle to build the robot, we immediately found the solution to the problem to various Internet source.

Many times we have to study from many sources to solve a problem. In this way, the scope of knowledge of all of us has increased.

### 2.2 Historical Background

At the present time in the twentieth century we want to see a huge expansion of the robot but its work started the end of the nineteenth century.

So it can be said that its history is very old and what we see now is just a process of improvement.

In fact, the ancient Greek engineer Hero of Alexandria, produced two texts, Pneumatic and Automata that testify to the existence of hundreds of different kinds of “wonder” machines capable of automated movement.

Scientists are going to introduce a day of artificial intelligence in robots from the very beginning and everyone is busy trying to improve this because if intelligence could not be made to work like humans, it would not actually be of much use.

The robots of the past could not do much work. But now the next risky task can be done very easily. Most of the infrastructure in the developed world is now built without human hands, and the building uses robotic to help you get things done faster. Robots are created by humans to make their work, easier and to make life more fulfilling. Our lives have become happier because of the robots of today because we proponents have made possible things that were impossible in the past without risk.

## 2.3 Related Works

Robotics related work started. A long time ago in our previous semester when our peripherals and interfaces course. Since then we have not chosen robotics. As our future plan or project. We get a basic idea about robotics in that course and there we have two project implementations. One of them is gas sensor detective and the other is traffic light control. From that initial idea and with the help of our teachers we have no initiative to build this all-in-one robot and we can do it successfully.

The all-in-one news is very effective because there are three things that have been done so beautifully in just one year of hardware implement.

Here ,Any autonomous mobile robot needed to avoid obstacles. The obstacle is to allow the robot to navigate in an unknown environment, avoiding the effects. Avoid obstacles Obstacles to the robot mind. One of the lucrative systems uses the method of following the walls in a robot to clean the floor for a long passage. The method employed to avoid obstacles is based on finding the edges. All mobile robots have some thoughts on avoiding collisions. Subsequent algorithms are more complex, as they involve barrier detection as well as some measurable measurement of barrier levels.

So the robot can overcome some difficulties by navigation, and it can navigate smoothly during its operation avoiding collisions. We have a basic algorithm. The same procedure applies to Bluetooth modules and IR remote control modules.

# Chapter 3:

## Hardware

### 3.1 Arduino UNO R3

Arduino is basically a microcontroller. The best opensource platform. Before we get to know about Arduino we need to know what a microcontroller is. What is a microcontroller? User can see the inside of a microcontroller. We know that a microcontroller called a single microcomputer. Now you may be wondering what to do with a microcontroller and how to use it. What you do with it is suppose user want your life to last for a certain period of time and then shut down automatically. You have to upload a certain amount to the microcontroller and the microcontroller will do the job for you. The only robots in the world that have ever been created using microcontrollers have got your idea of what a microcontroller is. Now we come to the part where we talk about the microcontrollers we've been talking about for so long. The Arduino is a circuit that has made our work much easier. An Arduino basically has a microcontroller and is programmed to program and receive various input-outputs, mainly [arduino.cc](http://arduino.cc). An organization called Circuit is the inventor of the circuit and they develop it. The Arduino work is so that we can easily program with microcontrollers and use it in our work. Since Arduino is an open source performer, anyone can use it and develop the size and type in the microcontroller. Each Arduino board has different features. User can easily use the microcontroller program and how to use it. There are many thanks in the market. User can use these Arduino programs for your convenience and you can use the microcontroller in a simple way. We hope users have understood. The Arduino Uno R3 is an open source. We can do many things on the free platform. Simplicity for amateurs as well as it is used in various ways. It has some features 14 digital input-output pins and six analog pin. Is connected to the report and through it we can connect to the computer and enter through the codes inside the computer and just as it works as the output we write in the quote that we need an output and we give it through.

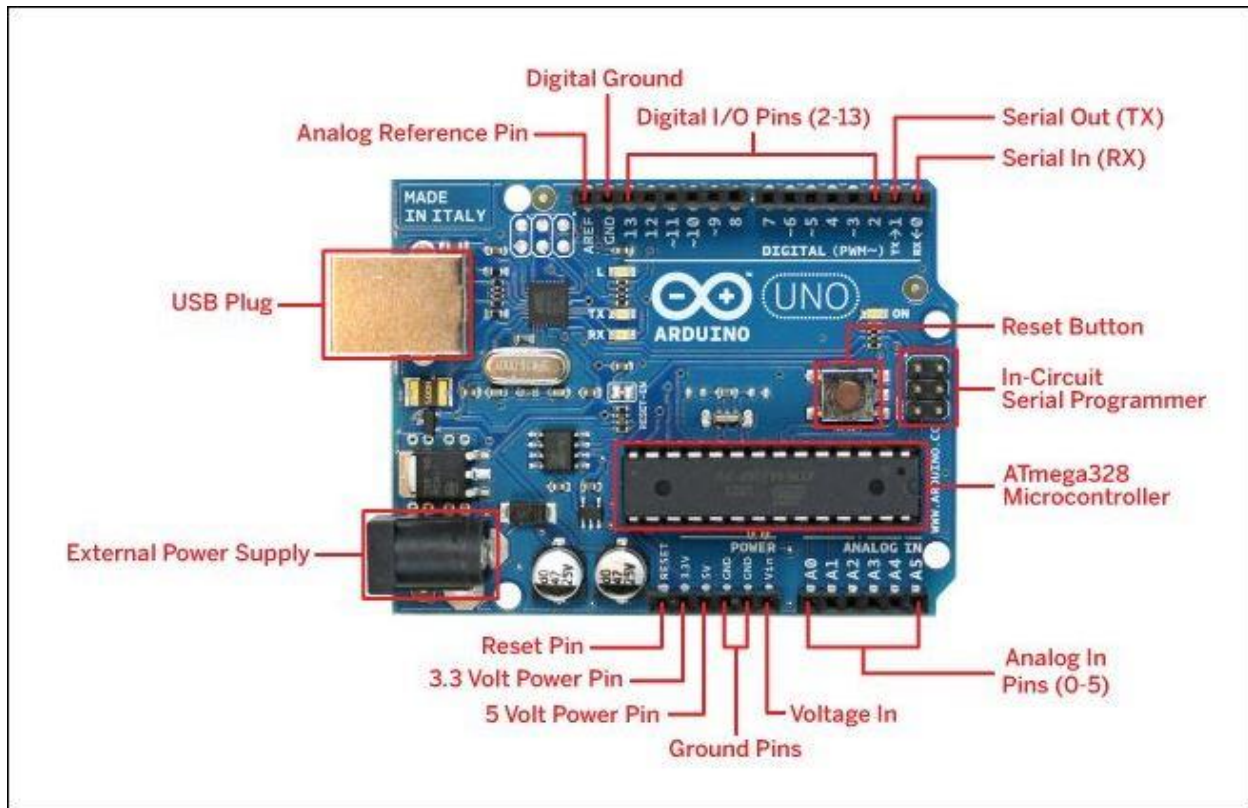


Figure 3.1: Arduino UNO R3

## 3.2 Sensor Shield V5

When we first talk about motor drivers, the question that arises in our minds is that in the world of robotics, we use Motorola, it is not possible to use direct power with this power. But using this relay model it is not possible to power so much information on and off. For this we use L298n motor. Its input will be The most important of these motors is the use of L298n IC. This ICT helps to increase or decrease the capacitor voltage of different capacitors.

We can connect two motors with one motor set. Now if we look at the back here, we will see that five volts and twelve are written. And from here we can take the offer of Five Volts if we want Current so we get it. It helps us to increase or decrease the current. How many pin are there? The first left input is enabled and we have to understand that the work of these teams will be good.

Here the enable touch between the four pins acts as a switch and the other two as input one and the other as a time full two and another as an output.



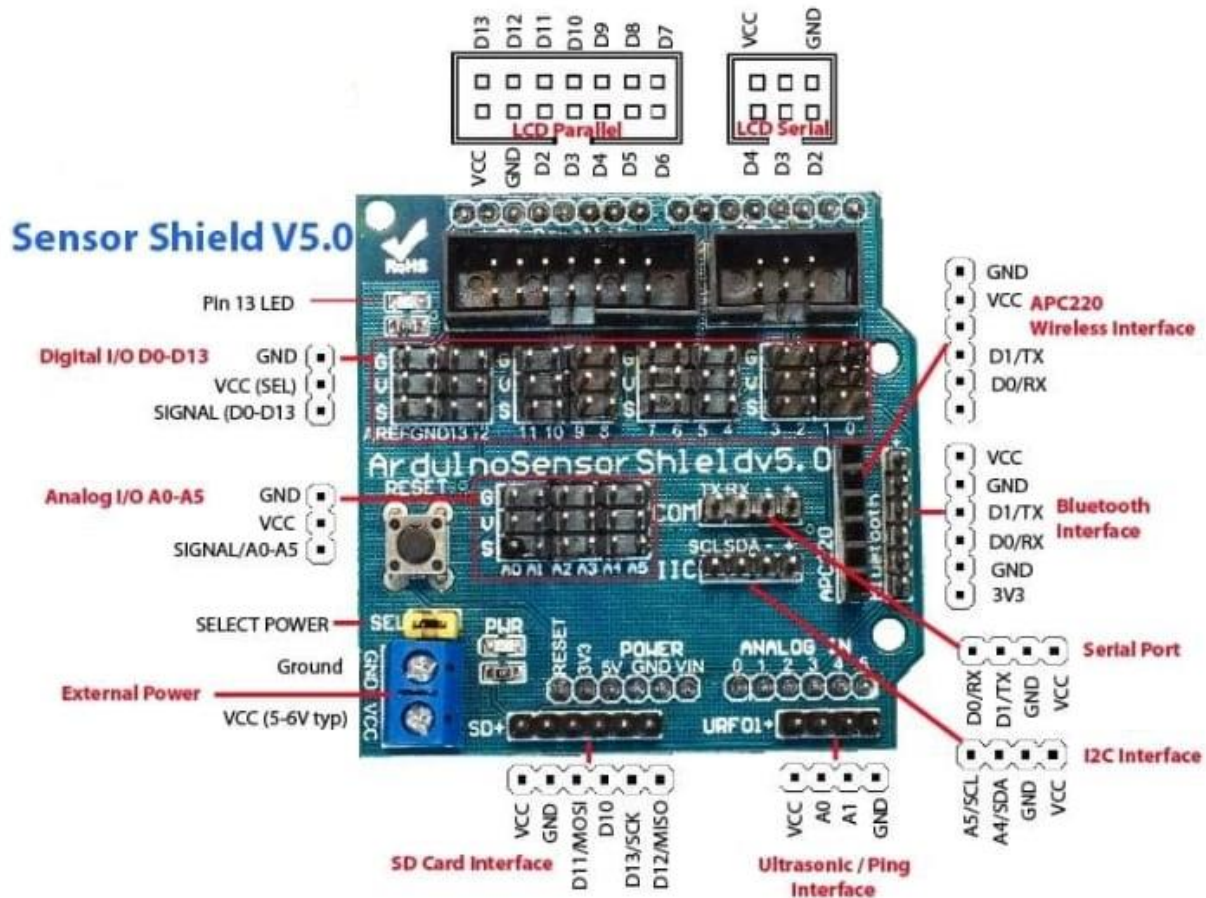


Figure 3.2: Sensor Shield V5

### 3.3 L298N Motor Shield

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Here the enable touch between the four pins acts as a switch and the other two as input one and the other as a time full two and another as an output.

Enabling the switch will act as input one and if two inputs are high then output will be off again two inputs 0 then output will stop.

Using this device we can move the car back and forth, we can turn the car, we can turn left and right.

We have to use the power supply to run this motor driver and take the power supply from the leather lithium battery.

we will give input with two lithium batteries and we will get output with the other side.

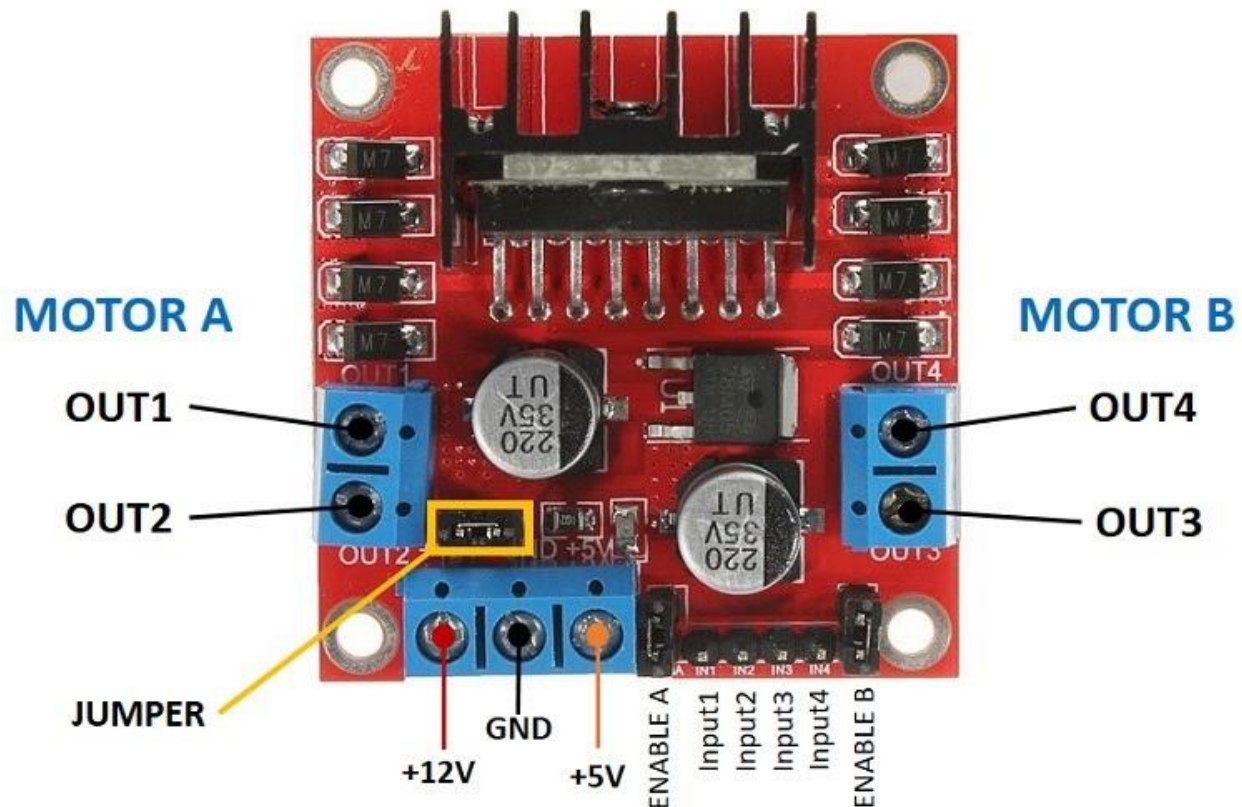


Figure 3.3: L298N Motor Shield

### 3.4 XL6009

This device they have made our job very easy because we have high voltage at the input voltage but this device can be run by this device. We need 12 volts motor but we are using lithium batteries which are very low but by using this device we Whether the input voltage goes or not, we will have the key to the vote. There will be no more or less protests because if the voltage is less or more, our robot is off.

But with the use of xl6009 switch we will always carry simple tense pubs will never carry voltage because this circuit has been used to keep the voltage stable all the time. And the amount of voltage that our robot needs is that by using Xl6009 it keeps the voltage stable so that our robot never shuts down. It can post DC to DC voltage and so we can always keep it unnecessarily. This module has been used in our project and it is very important that our robot never shut down due to sudden voltage drop.

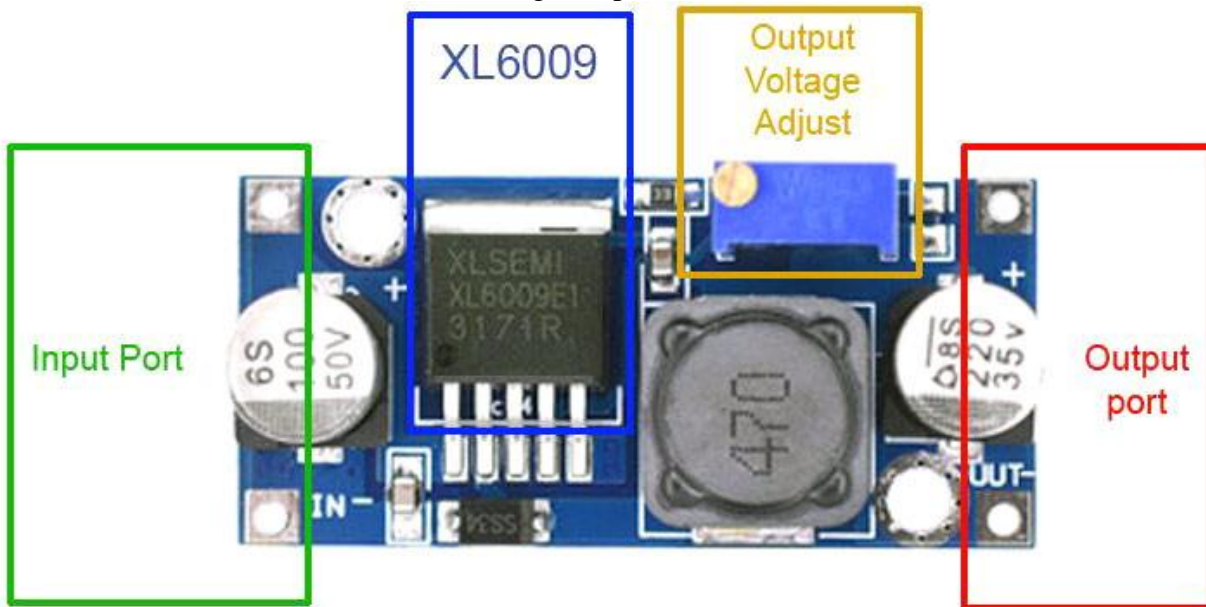


Figure 3.4: XL6009

### 3.5 LM2596

LM2596 is an electron voltage control by which we can give voltage to our motor needs and keep the voltages constant it acts as a step down just step-down ina we get 5 volts 12 volts input voltage from it and it should be noted that It is used to drive people below 3 A and is used for DC to DC converters.

If we need more current in any motor requirement we can give higher voltage using lm2596 and in that case it creates a constant frequency through which the voltage never decreases and this helps to lift our car. The purpose is that we use the currents below 3A in the stomach.

If more than 5A of current is turned off, our circuit will burn out. This only applies to three amperes and they can convert DC to DC very well. This makes our motors very easy to run.

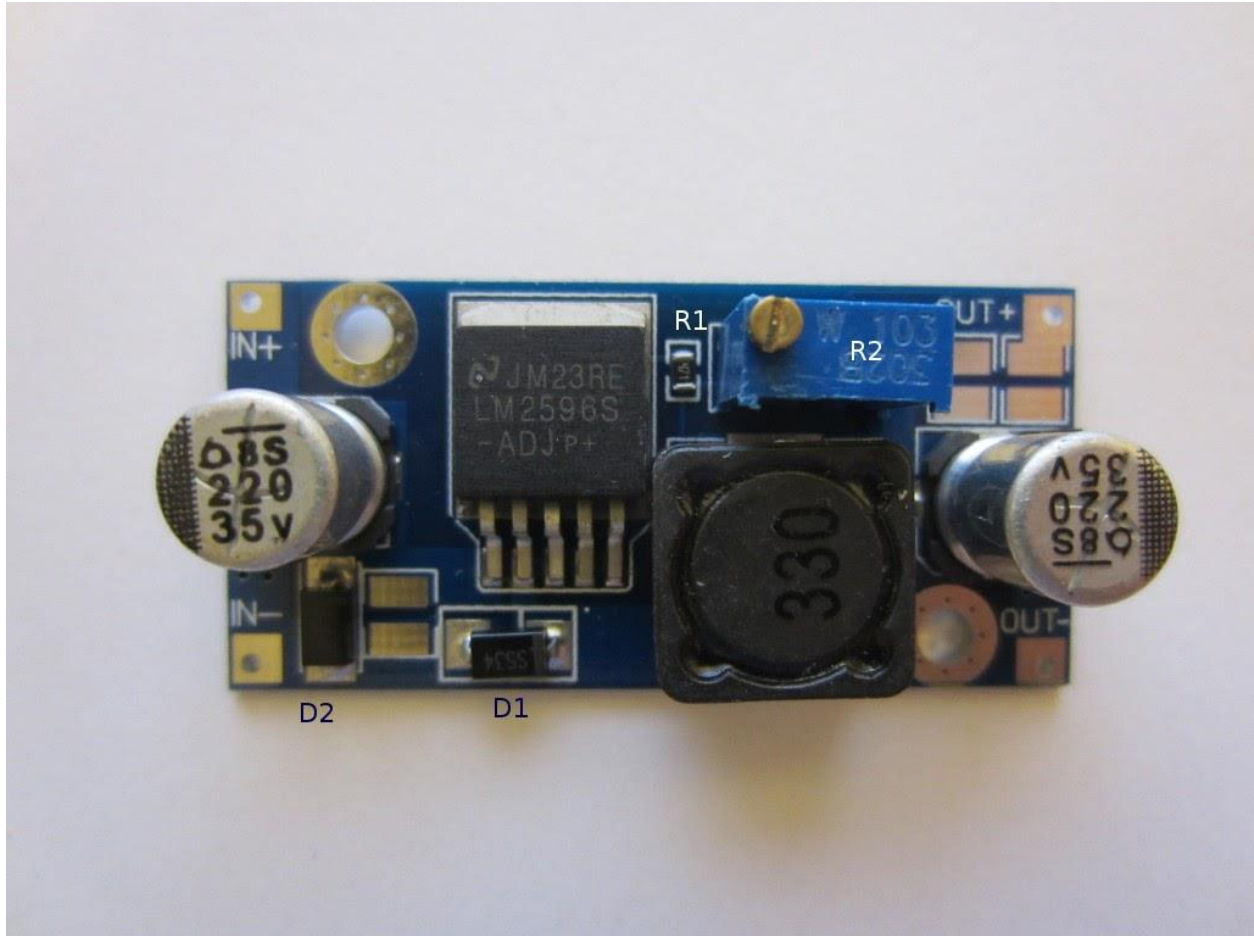


Figure 3.5: LM2596

### 3.6 Tie Clip

This allows to user to separate the required wires in device. Not only this, with the help of this we can connect the circuits with the different circuits very tightly so that the circuits do not collide with each other.





Figure 3.6: Tie Chip

### 3.7 Hex Spacer with Screw

By playing these instruments we can add our other components on the PCB board so that when we move the robot the components do not die or move from one place to another so that our robot stays stable. These nuts are complementary to each other. They go into each other one by one and will be completed. They eat the set. When the inner block is obtained, they do not blend perfectly with each other.



Figure 3.7: Hex Spacer with Screw

### 3.8 3 Cell Battery Case

Put all battery in this case. It is a plastic body frame.

For our project we will cover this 3 input battery case of lithium. It is made entirely of plastic. Here we will call the batteries and we will take the input voltage from the battery through here. And is there a certain number of holes in the frame through which the wires come out and from this we get the input of the battery voltage in the Arduino Uno.



Figure 3.8: 3 Cell Battery Case

### 3.9 18650 Battery Cell

An 18650 Battery is a lithium-ion rechargeable battery. The first 4 digits of the clarification “18650” specify the physical proportions while the 5 th digit indicates it is a cylinder cell. The standard 18650 battery is 18mm nearby by 65mm long

Some types of 18650 have been modified accumulation either a button top and/or internal security circuit. If user is using an 18650 battery for a consumer product, user should always verify with that product's constructor for the exact provisions required to power the device

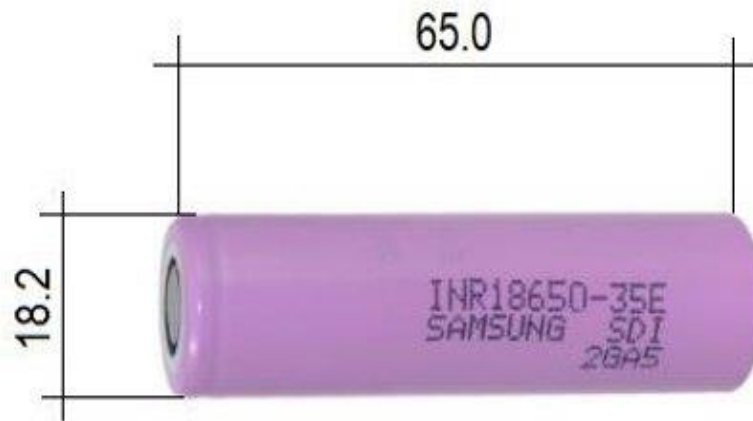


Figure 3.9: 18650 Battery Cell

### 3.10 Power Switch

A power switch controls the flow of power to an electronic expedient. The switch has an on and off position, usually signified by a 1 (on) and a 0 (off).



Figure 3.10: Power Switch

### 3.11 18650 Battery Charger

A lithium-ion battery needs a specific dedicated charger to safely recharge the battery. Numerous of these committed chargers are designed to habitually detect the battery type and chemistry and apply a safe charging current to the cell. Most lithium ion batteries function within a range of 2.5V to 4.2V wherever 2.5V is fully tired and 4.2V is fully charged.

Different usual AA and AAA alkaline batteries which have a voltage of 1.5V, 18650 li-ion batteries have a minimal voltage of ~3.7V and as such require a different protocol for safe charging. Another very important feature of a enthusiastic li-ion charger is to finish the charge cycle when the battery reaches 4.2V as over-charging an 18650 battery can cause internal injury and finally cause the battery to fail.



Figure 3.11: 18650 Battery Charger



### 3.12 Female to Female Jumper Cable

Jumper wires are basically wires that have connector pins at each end, agreeing them to be used to connect two points to each other deprived of soldering. Jumper wires atypically use with breadboards and additional prototyping tools in tutoring to variety it easy to change a circuit as needed. Simple. Indeed, it does not catch much more elementary than jumper wires.

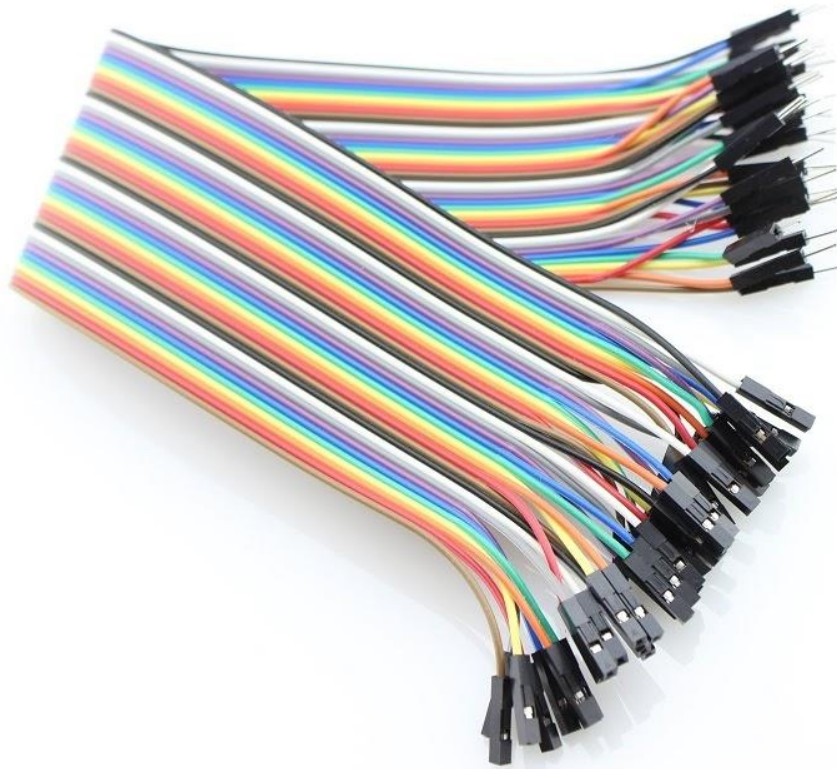


Figure 3.12: Female to Female Jumper Cable

### 3.13 Wheel

There are 4 wheels in our robot car. Those help our car move one to other places. Here uses N20 Wheels N20 Geared Motor Rubber Wheel Kit contains of Metal Gearbox Motor, Wheel 3mm Shaft and connecting parts. This is a DC Mini Metal Gear motor then it is perfect for creation small robots.

It is a frivolous and high torque motor. It has fine artisanship, it is durable, not easy to wear with outstanding stall characteristics, can climb hills easily, user can also simply base the wheels on motors shaft.



Figure 3.13: Wheel

### 3.14 Motor

A servo motor is a spinning actuator or linear actuator that authorities for accurate control of angular or linear situation, velocity, and acceleration. It involves of a proper motor coupled to a sensor for position response. It further needs a comparatively sophisticated controller, regularly a committed module designed definitely aimed at usage by servomotors.

A servo motor is a general term for a exact type of linear or rotary actuator. In actual fact, the style servo motor remarks to the period servo apparatus, which means that the motor is continually checked to control its motion.

Servomotors are used in modern cars to control their speed. When the accelerator is low, it sends electrical signals to the car's computer. The computer then methods this information and sends a signal to the servo involved to the control to adjust the engine speed.



Figure 3.14: Motor

### 3.15 Frame

Here this board where our robot is situated.



Figure 3.15: Frame

### 3.16 Power Cable

Power cables are used to spread energy from one point to another. They are commonly through up of a conducting material ( Copper or Aluminum).



Figure 3.16: Power Cable

### 3.17 Heat Srink Tupe Red

The red wires are inside it to provide thermal insulation. And it sets her apart from everything else.



Figure 3.17: Heat Srink Tupe Red

### 3.18 Heat Srink Tupe Black

The black wires are inside it to provide thermal insulation. And it sets her apart from everything else.



Figure 3.18: Heat Srink Tupe Black

### 3. 19 Servo Motor Tower Pro 9g

The TowerPro SG90 mini servo is inconsequential, high-quality and lightning-fast. The servo is designed to effort with nearly all wireless control systems. The SG90 mini servo with decorations is seamless for R/C helicopter, plane, car, boat and truck use.

The situation munitions Carbon Fiber Gears, which makes the servo motor greatly lighter than the same metal gear motor. For small load applications by means of the metal gear, servo motor adds on needless weight, so we propose using these lightweight plastic gear servo motors.

The TowerPro SG90 9g Mini Servo is a 180° turning servo. A Digital Servo Motor receives and processes PWM signal faster and better. It kits sophisticated interior circuitry that supplies good torque, holding power, and faster updates in response to exterior forces.



Figure 3.19: Servo Motor Tower Pro 9g

## 3.20 Sonar Sensor HC SR04

HCSR04 is an Ultrasonic-ranging unit, which consists of a transmitter, receiver and control circuit. It takes four pins for VCC, GND, Trigger and Echo. User can easily edge it with microcontrollers and Arduino boards.

The basic principle of work is:

- (1) Using IO trigger for smallest 10us high level signal,
- (2) The Module habitually sends eight 40 kHz and sense whether here is a pulse signal back.
- (3) IF the signal back, concluded high level , time of high output IO duration is the time from transfer ultrasonic to returning.

Test remoteness = (high level time  $\times$  velocity of sound (340M/S) / 2



**Pin 1 - VCC**  
**Pin 2 - Trigger Pin**  
**Pin 3 - Echo Pin**  
**Pin 4 - GND**

Figure 3.20: Sonar Sensor HC SR04

### 3.21 Sonar Holder

It kept Sonar Sensor inside & adjust robot.



Figure 3.21: Sonar Holder

### 3. 22 Arduino USB Programming Cable

This cable connects the robot to the computer. Then the user input it's code installed in robot from computer.



This is a standard-issue USB 2.0 cable. the thoughtful that's usually used for printers, Arduino, etc. Friendly with most SFE designed USB boards as well as USB Arduino boards



Figure 3.22: Arduino USB Programming Cable

### 3.23 Bluetooth Shield

The Bluetooth Shield participates a Serial Bluetooth module. User can elect two pins from Arduino D0 to D7 .It also develop five analog IOs that user can use it to connect other devices. The Bluetooth Shield might be location to Principal or Slave by user.

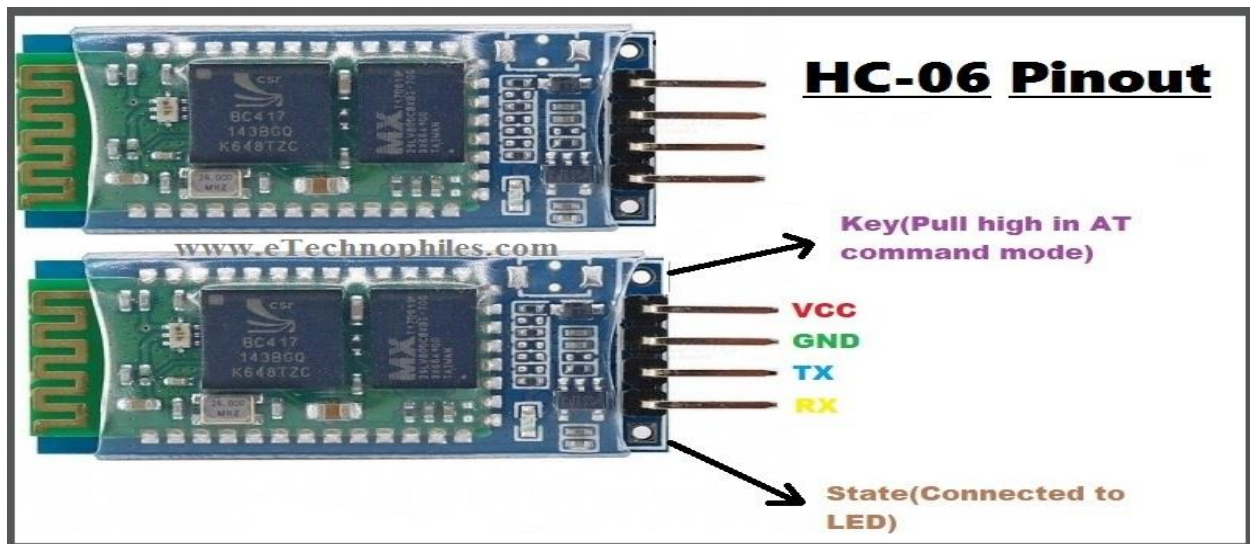


Figure 3.23: Bluetooth Shield



# Chapter 4:

## Activities

### 4.1 L298 Motor Shield

Motors are an intimate part of numerous robotics and electronics projects and have dissimilar kinds you can use depending on their application. Here is some material about different types of the motors:

**DC Motors:** DC motor is the most communal kind of engine that can be used for many requests. It will start rolling by spread on proper voltage to its ends and change its direction by switching voltage polarity. When The voltage level is less than the all-out acceptable voltage, the speed would reduction.

**Stepper Motors:** In some project such as 3D printers, scanners and CNC machines we essential to recognize motor rotation steps precisely. In these cases, we use Stepper motors. Stepper motor is an electric motor that divides a full spin into a amount of equivalent steps. The quantity of spin per step is determined by the motor structure. These motors have a very high correctness.



Figure 4.1: Motor Driver Shield

## 4.2 Gear Motor Work

A gear motor can be whichever an AC (alternating current) or a DC (direct current) electric motor. These kinds of motors also have two dissimilar speed conditions: normal speed and the stall-speed torque conditions.

Gear motors are mainly used to decrease speed in a series of gears, which in turn makes more rotation. This is expert by an united series of gears or a gear box being involved to the central motor rotor and shaft via a second decrease shaft. Generally speaking, the lengthier the train of reduction gears, the lesser the output of the end, or final, gear will be.

An outstanding example of this source would be an electric time clock (the type that uses hour, minute and second hands). The synchronous AC motor that is used to power the time clock will customarily spin the rotor at about 1500 revolutions per minute. Though, a series of decrease gears is used to slow the drive of the hands on the clock.

For instance, while the rotor spins at about 1500 revolutions per minute, the lessening gears allow the final secondhand gear to spin at only one revolution per minute.

## 4.3 Gear Motors and Increased Force

Gear motors are commonly used in profitable applications where a piece of apparatus .

If user constantly seen a crane in action, user seen a great example of in what way a gear motor works. As you have perhaps detected, a crane can be used to lift and move very weighty objects. The electric motor cast-off in most cranes is a type of gear motor that uses the basic principles of speed decrease to increase torque or power.

Gear motors used in gantries are typically specialty types that use a very low rotational output speed to make incredible amounts of rotation. On the other hand, the moralities of the gear motor used in a crane are exactly the same as persons used in the example electric time clock. The output speed of the rotor is decreased through a series of large gears until the rotating, RPM speed, of the final gear is very low. The low RPM speed helps to create a high amount of force that can be used to lift and move the heavy substances.

# Chapter 5:

## Flowchart & Implementation

### 5.1 Mobile App Controller Robot

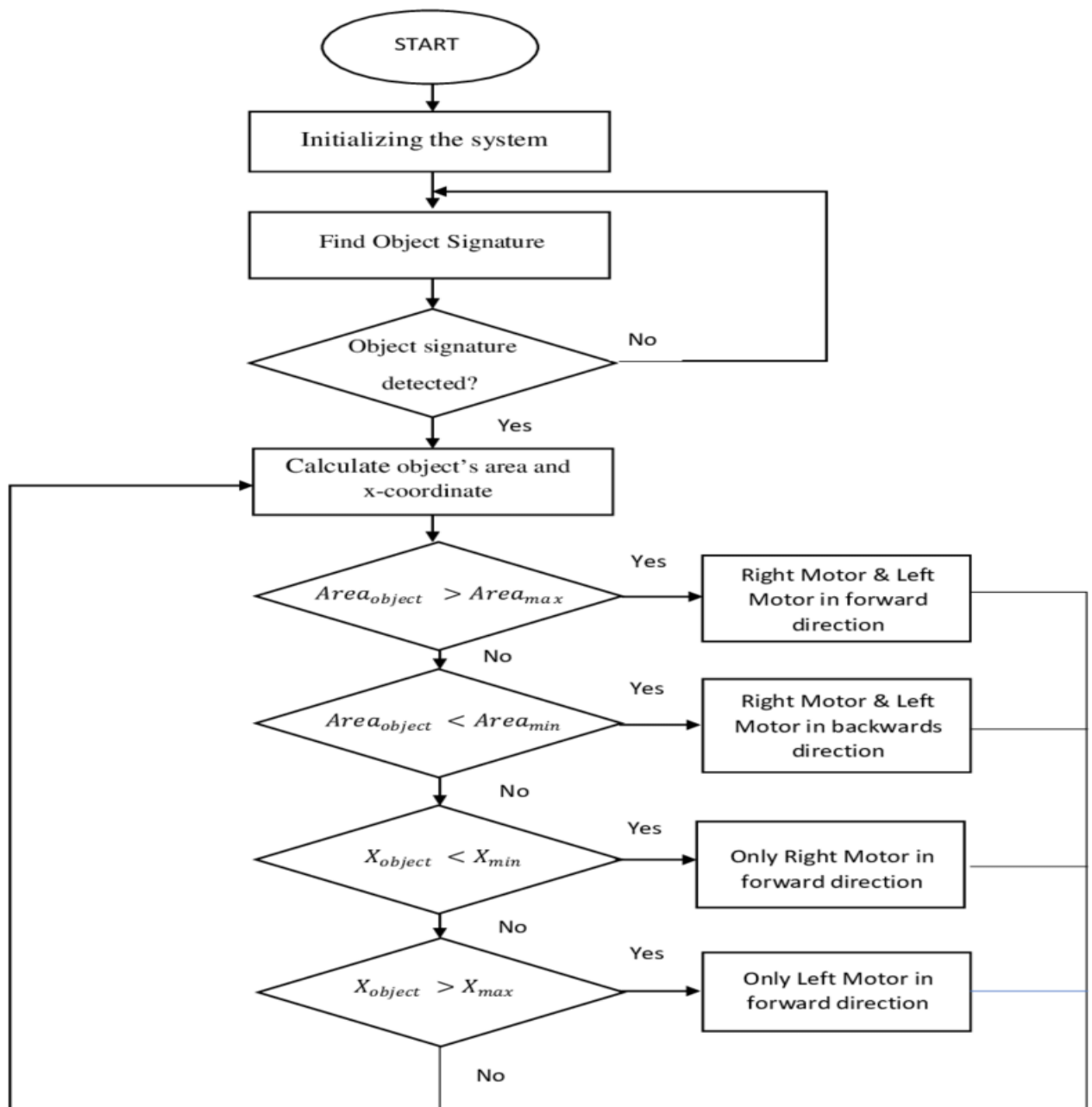


Figure 5.1: Mobile app control flowchart

## 5.2 Obstacle Avoidance

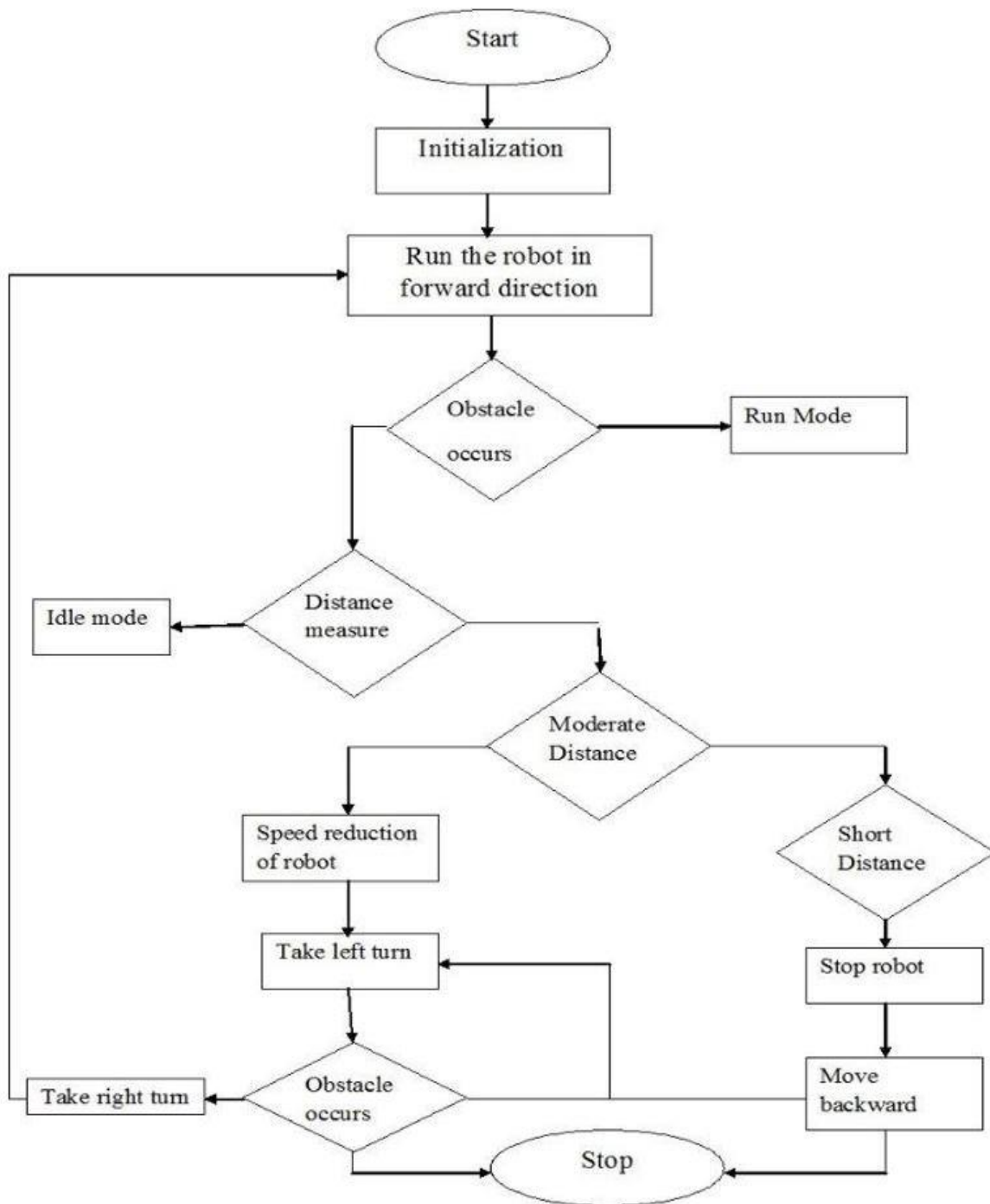


Figure 5.2: Obstacle avoidance flowchart

## 5.3 IR remote control

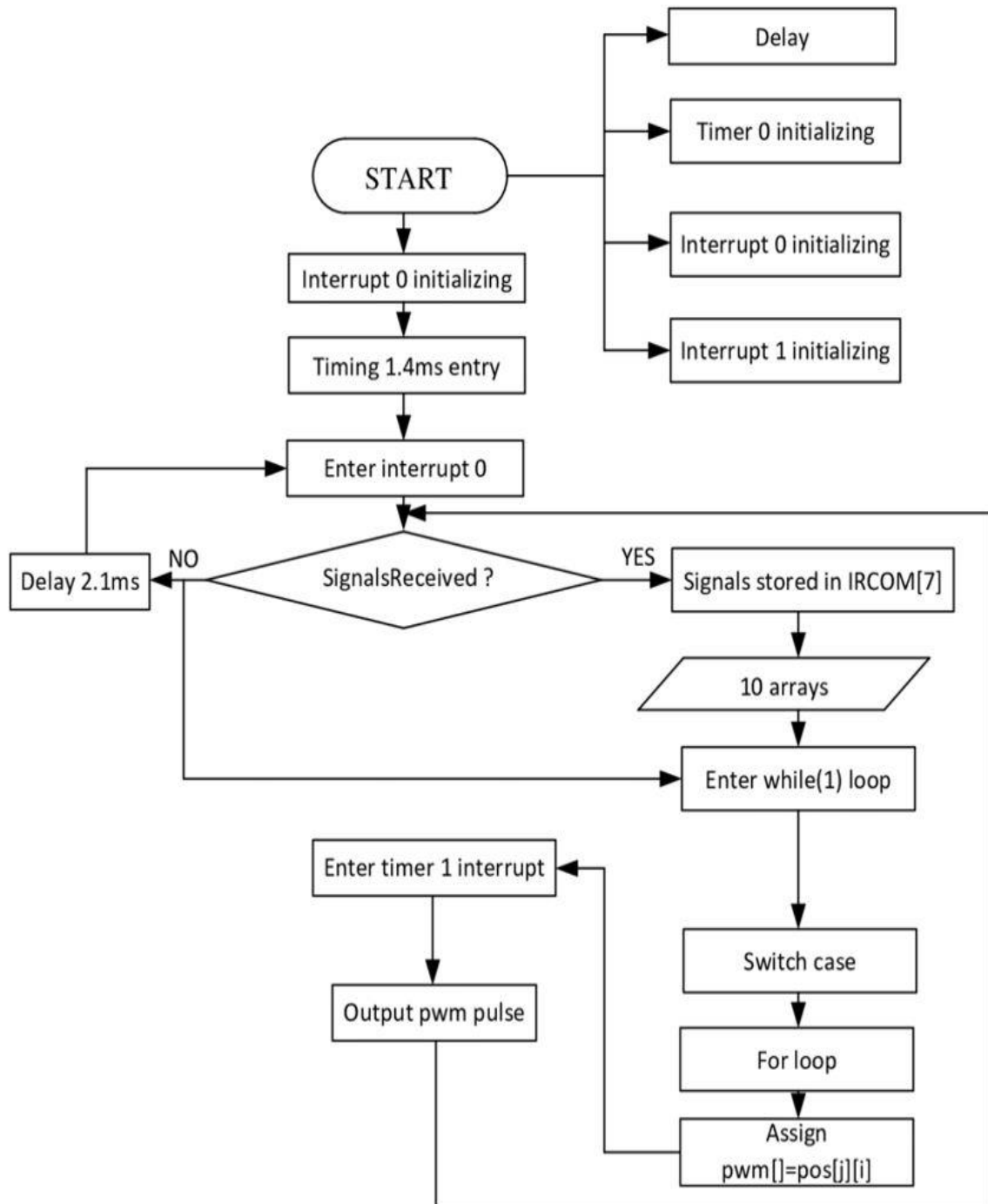


Figure 5.3: IR Remote Flowchart

## 5.4 Design Implementation:

### Bluetooth

Hc-06 Bluetooth module is a RF, RS232 port. This device can be emulated Rs232 protocol with any computer or smart phone without wire. We interface it port A0 & port A1 by software base UART system for connected Smart phone.

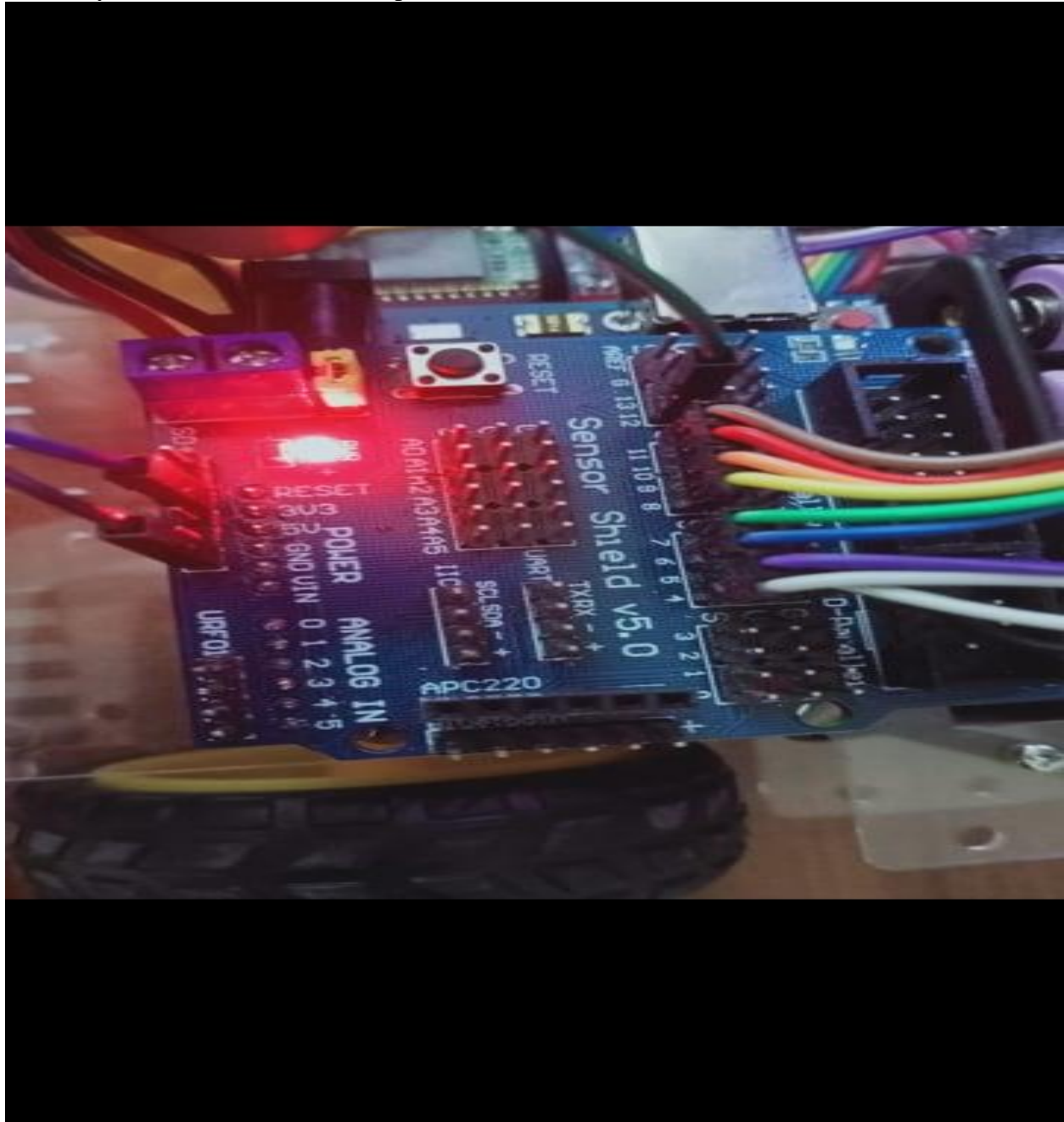


Figure 5.4: Bluetooth module



## 5.5 Operation Principle

At first we design motor driver and micro controller unit as per circuit design. Then we assemble the robot chassis with the two dc gear motor. We installed motor driver and microcontroller unit on the robotic chassis. Before we connected Bluetooth module at the micro controller unit.

Now we supplied greater than 6 voltage to limited 12 voltage in the motor driver. The microcontroller unit convert 12 voltage to 5 voltage by the voltage regulator and it send the motor drivers for logical operation. Now our device is able to operate.

1 First make sure our HC-06 Bluetooth module is paired with your mobile. The evasion password for pairing is “1234”.

Click on “SELECT DEVICE” icon to select paired Bluetooth unit.

Press F for Forward



Figure5.5: Moves forward

Press B for Reverse



Figure 5.6: Drive Reverse



Press c for Left



Figure 5.7: Drive Left

Press D for Right  
Press F for stop



Figure 5.8: Drive Right

# Chapter 6:

## Budget & Project Timeline

### 6.1 Budget Table:

Sl	Item	Unit	Price	Total
1	Arduino UNO R3	1	670	670
2	Sensor Shield v5	1	220	220
3	L298N Motor Shield	1	145	145
4	XL6009	1	100	100
5	LM2596	1	95	95
6	Tie Clip	10	2	20
7	Hex Spacer with Screw	8	18	144
8	3 Cell Battery Case	1	60	60
9	18650 Battery Cell	3	60	180
10	Power Switch	1	80	80
11	18650 Battery Charger	1	225	225
12	Female to Female Jumper Cable	1	20	20
13	Wheel	4	160	0
14	Motor	4	360	0
15	Frame	1	620	620
16	Power Cable	58	0.6	35
17	Heat Srink Tupe Red	2	2	4
18	Heat Srink Tupe Black	1	2	2
19	Servo Motor Tower Pro 9g	1	140	140
20	Sonar Sensor HC SR04	1	90	90
21	Sonar Holder	1	60	60
22	Arduino USB Programming Cable	1	120	120
23	Bluetooth Shield	1	380	360
	<b>Total:</b>	<b>105</b>		<b>3910</b>
	<b>Discount Offer:</b>			<b>0</b>
	<b>Sub Total:</b>			<b>3910</b>

Table: 01

## 6.2 Project timeline

Activities	Months					
	January (2021)	February – March (2021)	April – June (2021)	July- August(2021)	September- October(2021)	November- December(2021)
Idea Generation						
Paper & Literature Study						
Knowing About components						
Create Code						
Buying Components & Implementation						
Report Writing						

Table: 02

# **Chapter 7:**

## **Conclusion**

### **7.1 Application**

- Obstacle avoiding robots can be used in nearly all mobile robot direction-finding systems.
- They can be used for domestic work like automatic vacuum cleaning.
- They can also be used in unsafe environments, where human penetration could be fatal.
- It is also controlled Bluetooth module.

### **7.2 Future Work**

We have effectively completed our project with available sources. But the results and changes do not depend on expectations. This can be further improved by joining the ensuing variations to get better results. The process that we used in the Scotch yoke mechanism does not work efficiently. This ability can be improved by using some other devices.

### **7.3 Conclusion**

Finally, after many long months of work, we were able to build the robot module through which a hardware work of these three robots was performed.

The gold sensor of the implementation works very well inside and the Bluetooth module will be very nice. It will be adjusted with the mobile. It works. They don't have a mobile phone, they will be able to perform the effect using the IR remote feature.

On successful application of obstacle avoidance. Obstacle avoidance is a very good request to be used in vehicle preventing many chances and defeat of life.

# Appendix A

## Knowledge Profile:

K2	Mathematics	Here using Angular rotation knowledge.
K3	Engineering fundamentals	Basic knowledge of coding, Implementation necessity code C language.
K4	Specialist Knowledge	Knowledge of microcontroller.
K5	Engineering Design	Proposed Model & hardware implementation.
K8	Research Literature	We have to study many related papers and Literature.

# Appendix B

## Complex Engineering Problem (CEP) Mapping

How P's are addressed through the project and mapping between Ps, COs, and POs

Ps	Attribute	How Ps are addressed through the project	COs	POs
P1	Depth of Knowledge Requirement	Knowledge of microcontroller. Basic knowledge of coding, Implementation necessity code C language. Engineering design & development knowledge of software engineering and It is based IoT. All in One robot control is performed and executed using various sensors. Proposed Model & hardware implementation.	CO2 CO8	PO(b) PO(c) PO(j)
P2	Range of Conflicting Requirement	Components price rate is high of our country. Any more voltage provided which circuit is damaged.	CO1	PO(l)

P3	Depth of Analysis	To implement the All in One Robot project, We use Arduino Uno, Gear Motor, Motor Shilled, IR-Remote Control, Ultrasonic Sensor etc. Must study related papers. It is very helpful university students & college who interested robotics and buying Components.	CO3 CO4 CO7	PO(k) PO(e) PO(g) PO(c) PO(d)
P5	Familiarity of Issues	Conducting as search an rescue operation using robots in an infrequent issues still now and our research. It has no disadvantage in our society.	CO5	PO(f) PO(h)
P7	Interdependence	In this project ,team members very active in our particular work. Always discussion in decided any decision. Finished our project properly.	CO2 CO6	PO(c) PO(i)

## Appendix C

### How A's are addressed through the project

A's	Attribute	How A's are addressed through the project
A1	Range of resources	At first We study many research paper about of robot. The project has to create usage of various resources including money, information, electronic components such for example Arduino, Servo Motor, Sonar Sensor
A2	Level of interaction	The level of interaction among the members of the group was very great during the creation of the implementation design of our project.
A5	Familiarity	Conducting a search and rescue operation using robots in infrequent issues still now and our research.

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