

SEARCH ROBO: A ROBOTIC SYSTEM DEVELOPMENT

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering.

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APPROVAL

This Project titled “**Search Robo: A Robotic System Development**”, submitted by Toufik Ahmed, Saijiya and Md Shohanur Rahman to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering (BSc) and approved as to its style and contents. The presentation has been held on April 2019.

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We hereby declare that, this project has been done by us under the supervision of **Anup Majumder, Lecturer, Department of CSE**, Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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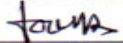
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ABSTRACT

Few years ago the world was unknown to us. We only knew about those places where we could go. But to discover those places we had to go there without any protection or ever without knowing the environment. Even in this modern era, we don't know about lots of places. But with the help of modern technology, we can build something that will help us to discover those remote places without going there by ourselves. With that concept, we have implemented and built an Android Mobile controlled gas search robot that can move and identify the poisonous gas. The movement of the robot is controlled by the Bluetooth module. It automatically light up the area through the sensor when the searched area is dark. It also detects the temperature and shows it on the LCD screen. This robot is easy to move, to operate and to perform a poison gas security. By detecting the poisonous gas it will prevent the human to go there and get affected. It will also give us an approximate idea about the environment. So it will help us from being damaged and keep us safe.

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CHAPTER 1

Introduction

Introduction

An embedded system, the right definitions is the system designed using arduino,L293D IC, gear motor, dc motor, motor driver, sensor, led, wheel, pipe, and HC-05 Bluetooth module, we are control this system of the mobile. the system search the poison gas, The concept of this project is mainly to overcome the deficit of this situation.

Motivation

With the development in the fields of robotics, human intrusion has become less and robots are being widely used for safety plan. In our day-to-day, month to month, year to year life. Poison gas accident has become common and very dangerous sometimes may lead to danger that damage our life make it to protect human life. In such cases, we have done some important system design and implement [1]. Which will be next future of robotic system? We will have a system that will be the based on human computer interactions. This search robot will be the next automation system. This system goes to any place and detects the poison gas and helps our world, as a solution to manual primary poison gas. a cost effective search robot is developed. We call it in the search poison gas fighting robot.

Objectives

The main aim of this project is to design a poison gas search robot using Android application for remote operation. The poison gas search robot has an eight wheel to move the other side. Use one camera this camera identify the poison gas. It is controlled through wireless mobile communication. For the desired operation, Arduino is used. In the expected system, an android application is used to send commands from the transmitter to the receiver for controlling the movement of the robot in forward, backward, right or left directions. At the receiver side, eight motors are interfaced to the Arduino where in one of them are used for the movement of the vehicle and the

remaining one to place the arm of the robot. Remote operation is done by android OS based Smartphone or tablet. The Android device transmitter acts as a remote control with the advantage of actually accepting adequate range, while the receiver has a Bluetooth device fed to the Arduino to drive gear motors through the motor driver IC (L293D) for particular operation. We have done some important system design and implementation [1]. Which will be next futures of robotic system. The robot runs on eight wheels each driven by individual motors. These individual motors help complete the necessary force to run the vehicle. Eight wheels on either side are synchronized in order to obtain complete 360° Turn on the spot and normal forward and reverse motion. This gives a larger degree of freedom for the robot to collect trash from almost every nook and corner of the area

Expected Outcome

The Robot analysis outcome are expected to supply in several aspects to the main target mentioned in the Challenge. The particular to the target outcome which specifically asks for the development of Large-scale validation of advanced industrial robotics systems. In this respect it is worth noting how the goal of the project is precisely the one of validating a new robotic infrastructure for improving the productions integration for a completely automatic factory [1].

Report Layout

In this report, we discussed about the overall development project of Search Robo system.

In the first chapter we discussed about the perception of search robo, the motivation for this project, the objectives, and the expected outcome of the project.

In the second chapter we discussed the background of search robo, the works that has been done till now on this topic, comparative studies between related works, scope of the problems that is in the existing system and the challenges we faced while doing this project.

The third chapter consists the business process model that we build, the requirements that we collected from students and teachers, the use case model and a brief description of it, the logical data model and lastly the obligatory apparatuses to design the robo.

Design specifications are discussed in the fourth chapter. In this chapter front-end design, back-end design, interaction design and ux and instigation requirements are discussed.

In the next chapter we talked about how the prompting of database, front-end design, interactions were done. Also we showed the test results.

Lastly we discussed the scope for further development for this project in the future.

.

CHAPTER 2

Background

Introduction

In this chapter, we discuss on several research work done by designing and building machines, gas identification.

Robotics is the science of designing and building machines that can be programmed to perform by humans. The Robot is programs update days by days. One of the best challenges will notice is the qualification. At this time, qualifications are one of the core features that determine how visually interesting a Robot. The qualification holds the topic of the Robot, and there is a vast amount of possibilities when designing a Robotic qualification

Related Work

Implementation of poison gas search” is an unparalleled apps based on Android. There are so many apps on search robot system based on gaming objective. But, our apps is only based on realistic automated many effective feature to facilitate the system. This robot easy to move other side. From the beginning, we were very interested on Android and wanted to develop something. So, we chosen this poison gas search robot system to developed, Comparatives studies the use of robotic systems in poison gas search is being more studied due poison gas search to commonly being exposed to dangerous actions to save lives. A robotic systems is a mechanical device that performs a task using sensors to perceives its environment, computer programs to control the robot based on its environment, the functionality included in the robotic system may need to vary to support in tasks such as, identifying, monitoring conditions, controlling .This article provides an overview of robotic systems that have been developed for poison gas search as well as some design aspects of these robots [1]. The robotic systems that have been developed for poison gas search, mobile systems. Fixed systems, monitors, etc.

Comparative Studies

Using this apps, Cop can sue against accused automatically without any interaction. When a problem will occur than police will press red light. According to red light, sensor will be on and give signal to IP camera to capture image of the vehicle and send to the police phone. Phone will be connected with IP camera and server. From this image, apps will recognize number plate of that vehicle as text and send to sever. Then this number plate will compare with stored information about vehicle. After identifying, it will sue against accused automatically. Alongside, it will notify the traffic police and accused vehicle. If the apps is unable to recognize number plate from image, it will also notify the traffic police to collect information manually from image. Then traffic police can take necessary step against them.

Scope of the Problem

Poison gas and rescue activity are considered risky mission. They are an ideal target for robot technology to keep away poison gas from danger.it makes possible to rescue much more. Some poison departments have already developed and deployed poison gas and rescue robots. However, the performance of the robots is not enough. The author considers and examines them from two points of view: "size and weight" and "cost and performance". Base on the considerations, the robots should make possible to save and rescue much more poison gas. Poison gas and rescue activity are considered risky mission. They are an ideal target for robot technology to keep away poison gas from danger. However, the performance of the robots is not enough. The author considers and examines them from two points of view.

Time Scheduling

Table 2.1: Time Scheduling

Planning	5 weeks
Design & Analysis	15 weeks
Coding	7 weeks
Testing & Implementation	5 weeks
Total	32 weeks (7 month and 2 weeks)

Challenges

As the world population continues to grow, and the demand for technology rises, manufacturers have larger orders to fill than ever before. Efficiency is key, which is why many are turning to modern robotics to improve their overall production rates. It is a good solution to a complex problem, but it is not without its fair share of challenges. We have done some important system design and implement which will be next future of robotic system? This poison gas robot will be the next automation system in industry. In this project here the android application interacts with the Wi-Fi module and then sends the digital data to arduino. We have done some important system design and implement. Which will be next future of robotic system? We will have a system that will be the based on human.

Skill sets and Experience:

We have done some important system design and implementation. Which will be next future of robotic system? We will have a system that will be the based on human computer interactions. This poison gas search robot will be the next automation system in industry. In this project here the android application interacts with the Wi-Fi module and then send the digital data to arduino [1].

Cost of technology

Purchasing robots outright can be an expensive venture for large manufacturing companies. Even small ones may not be able to sustain the cost. To combat this, new waves of companies are offering robotics as a service .In this way, companies can quickly and effectively implement robots into the. I have done some important system design and implementation. Which will be next future of robotic system? We will have a system that will be the based on human computer interactions. This poison gas robot will be the next automation system in industry. In this project here the android application interacts with the Wi-Fi module and then sends the digital data to arduino. We have done some important system design and implementation. Which will be next future of robotic system? We will have a system that will be the based on human computer interactions. This firefighting robot will be the next automation system in industry. In this project here the android application interacts with the Wi-Fi module and then send the digital data to arduino.

CHAPTER 3

Requirement Analysis

Business Process Model: We give graphical representations of our project for the business.

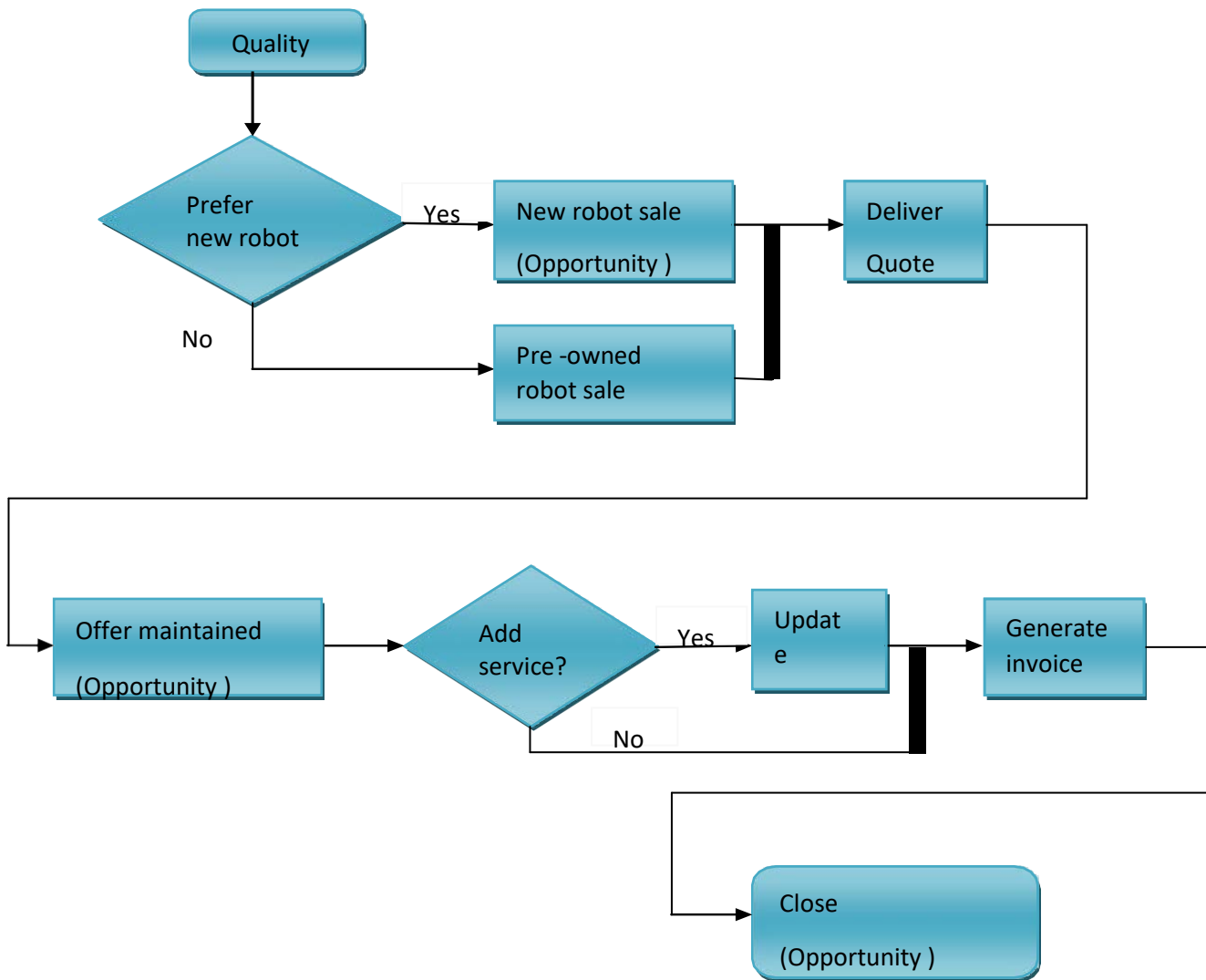


Figure 3.1: Business Process Model

Requirement Collection and Analysis: devices use our search robot.

User Requirement:

Table 3.1: User Requirement

Arduino uno	Chases	Hard board	Register
Bluetooth Module	Smart phone	LED	MQ-5(gas detector)
L293D IC	Jumper ware	LDE	Switch
L293D IC	Cable	Battery with charger	Volt register
L293D IC	Nut bolt	16*2 display	Costape
Wheel	PVC pipe	Potentiometer	
Base board	Motor driver	Pin	

Arduino Uno

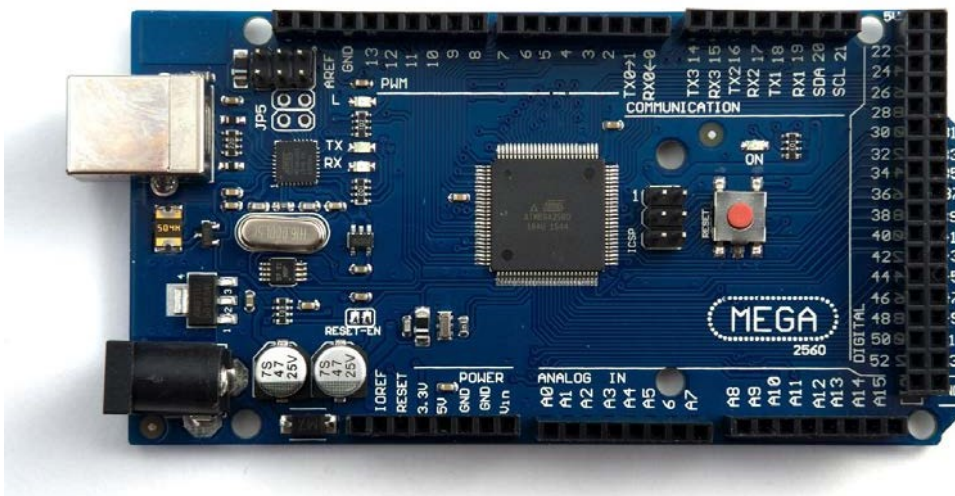


Figure 3.2.1: Arduino Uno

We have done some important system design and implementation [2]. Which will be next future of robotic system. We will have a system that will be the based on human computer interactions. This poison gas search robot will be the next automation system in industry. In this project here the android application interacts with the Bluetooth module and then send the digital data to arduino. We connect our board. Connect our Mega2560 board with an A B USB cable. This poison gas search robot will be the next automation system in industry. In this project here the android application interacts with the Bluetooth module and then send the digital data to arduino. and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards [2].

Bluetooth Module



Figure 3.2.2: Bluetooth Module

we have done some important system design and implementation. Which will be next future of robotic system. We will have a system that will be the based on human computer interactions. This search robo will be the next automation system in industry . In this project here the android applications interacts with the Bluetooth module and then send the digital data to arduino [3].

Pin Description: The HC-05 Bluetooth Module has 6pins. They are as follows:

ENABLE: When enable is pulled LOW, the module is disabled which means the module will not turn on and it fails to communicate. When enable is left open or connected to 3.3V.the module is enabled. The module remains on and communication also takes place.
VCC Supply Voltage 3.3V to 5V.

TXD & RXD: These two pins acts as an UART interface for communication STATE- It acts as a condition indicator. When the module is not connected to pair with any other Bluetooth device. Signal goes Low. At this low state. The led flashes continuously which denotes that the module is not paired with other device. When this module is connected to pair with any other Bluetooth device, the signal goes high.

Button Switch

This is used to switch the module into AT command mode. To enable AT command mode, press the button switch for a second. With the help of AT commands, the user can change the parameters of this module but only when the module is not paired with any other button device.

Motor and Wheel:



Figure 3.2.3: Motor and Wheel

A motor is a specific type of electrical motor that is designed to produce high torque while maintaining a low horsepower, or low speed, motor output. Motors can be found in many different applications. And are probably used in many devices in our home.

Jumper ware

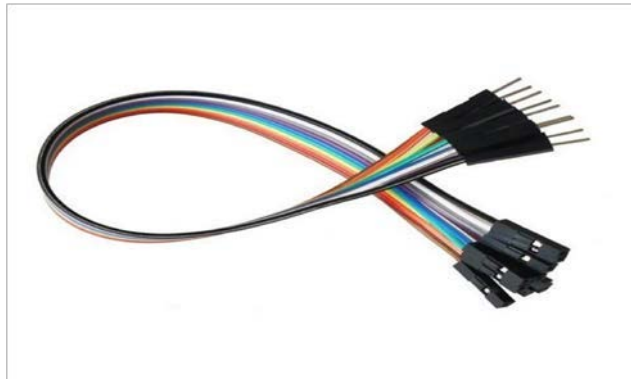


Figure 3.2.4: Jumper Ware

A jump wire is an electrical wire or group of them in a cable with a connector or pin at each end which is normally used to interconnect the components of a breadboard or other prototype or internally or with other equipment or components, without soldering.

LM-35 Sensor

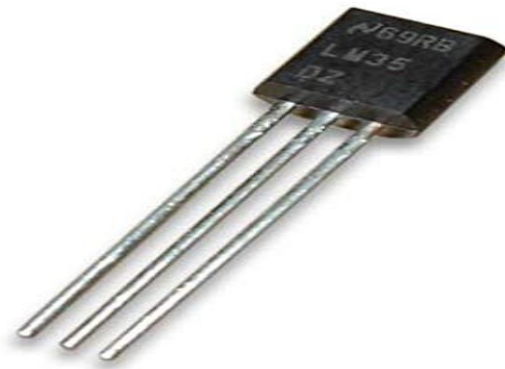


Figure 3.2.5: LM-35 Sensor

LM35 is the precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature. The low-output impedance, linear output, and precise inherent calibration of the LM35 device makes interfacing to readout or control circuitry especially easy [4].

Led Light



Figure 3.2.6: LED Light

As electrons pass through this type of semiconductor, it turns into light. Compared to incandescent and CFL bulbs. LED lights are more efficient at turning energy into light [5].

Nut Bolt



Figure 3.2.7: NUT BOLT

Nuts are almost always used in conjunction with a mating bolt to fasten multiple parts together. We can use the nut create a frame by nut we can use the other nut in this body [6].

PVC Pipe



Figure 3.2.8: PVC Pipe

We probably familiar with PVC pipe. We can use PVC pipe our project. PVC stands for polyvinyl chloride, and it's become a common replacement for metal piping. PVC's strength, durability, easy installation, and low cost have made it one of the most widely used plastics in the world. PVC is a thermoplastic material that is molded into different shapes to create pipes, fittings, valves and other liquid handling supplies [7].

Display (16*2)



Figure 3.2.9: Display (16*2)

LCD screen is an electronic display module and find a wide range of applications [8]. We can use the LCD display. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. We can use this display seen temperature.

Use Case Modelling and Description:

We have done some important system design and implementation. Which will be next future of robotic system. We will have a system that will be the based on human computer interactions. This poison gas search robot will be the next automation system in industry. In this project here the android application interacts with the Bluetooth module and then send the digital data to arduino.

Shown in figure:

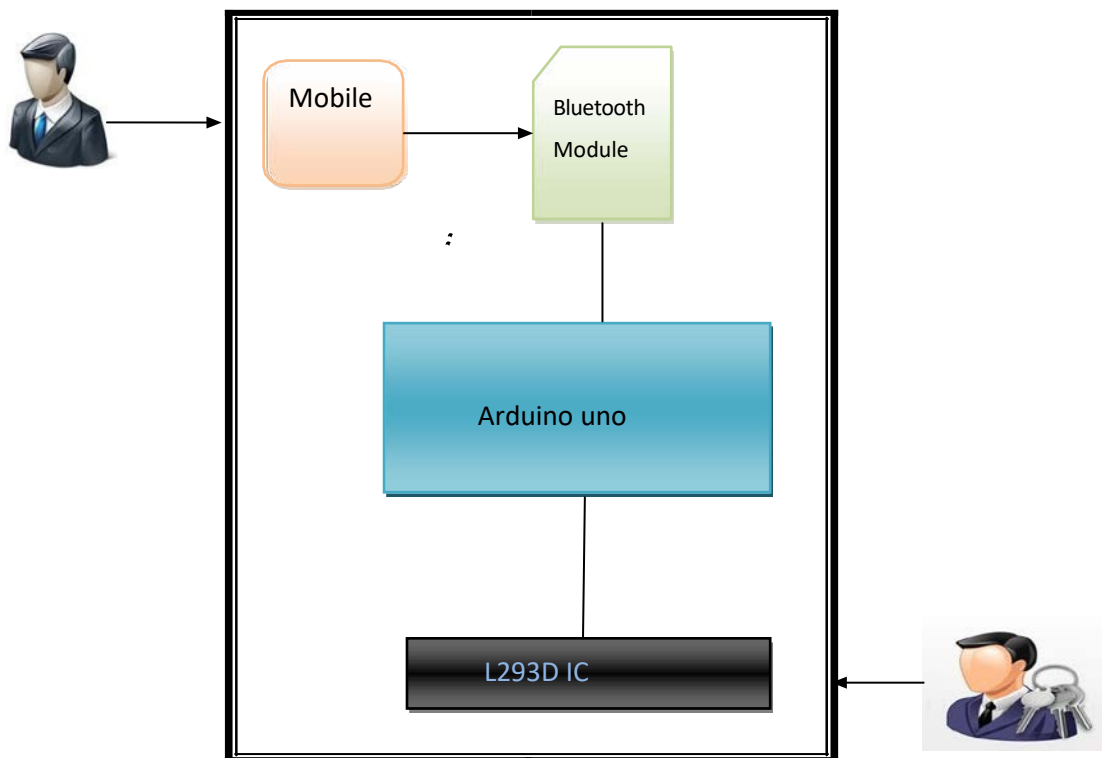


Figure 3.3: Use Case Model

Logical Data Model

A logical data model describes the data in as much detail as possible, without regard to how they will be physical implemented in the database. Features of a logical data model include: Includes all entities and relationships among them. All attributes for each entity are specified

Our search robo Logical Data model Shown in figure:

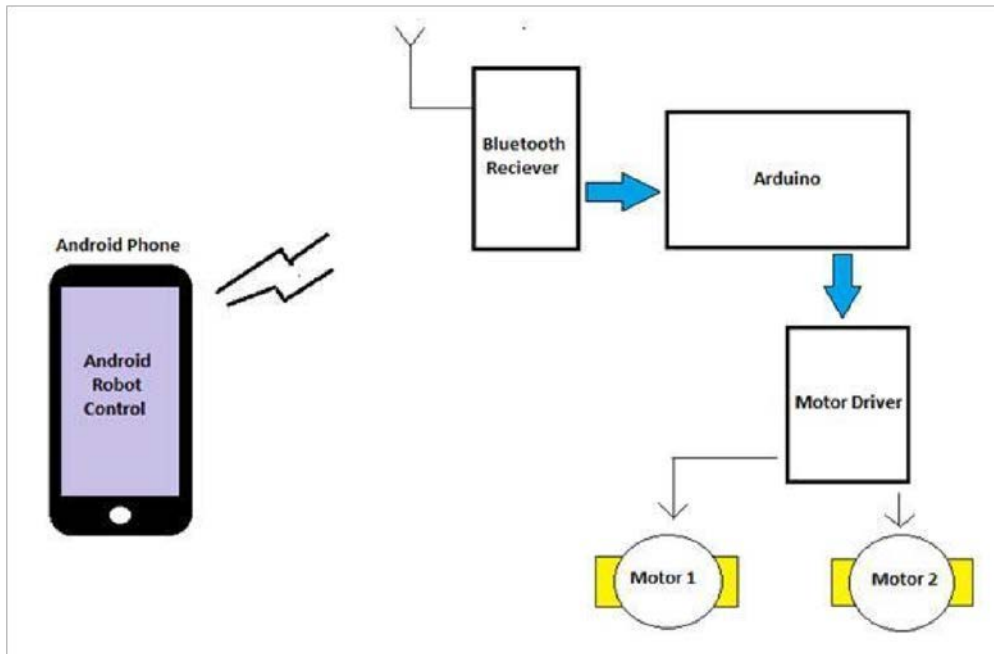


Figure 3.4: Logical Diagram Model

We designed a search robot system which can meet the requirements of teaching and experiments. Completed the design of search robot I have done some important system design and implementation. Which will be next future of robotic system. We will have a system that will be the based on human computer interactions. This search robot will be the next automation system in industry. Individual two controlling function, a voice function and remote control function. The principle analysis of voice control and remote control mobile robot, hardware design and the relevant procedures preparation were completed.

CHAPTER 4

Design Specification

Front-end Design

Front-end Design involves build the hardware using virtual arduino uno, Bluetooth module, and motor, led light, sensor, gas detector and wire and creating Bluetooth apps using MIT 2 inventor [9].

Build-up the Hardware

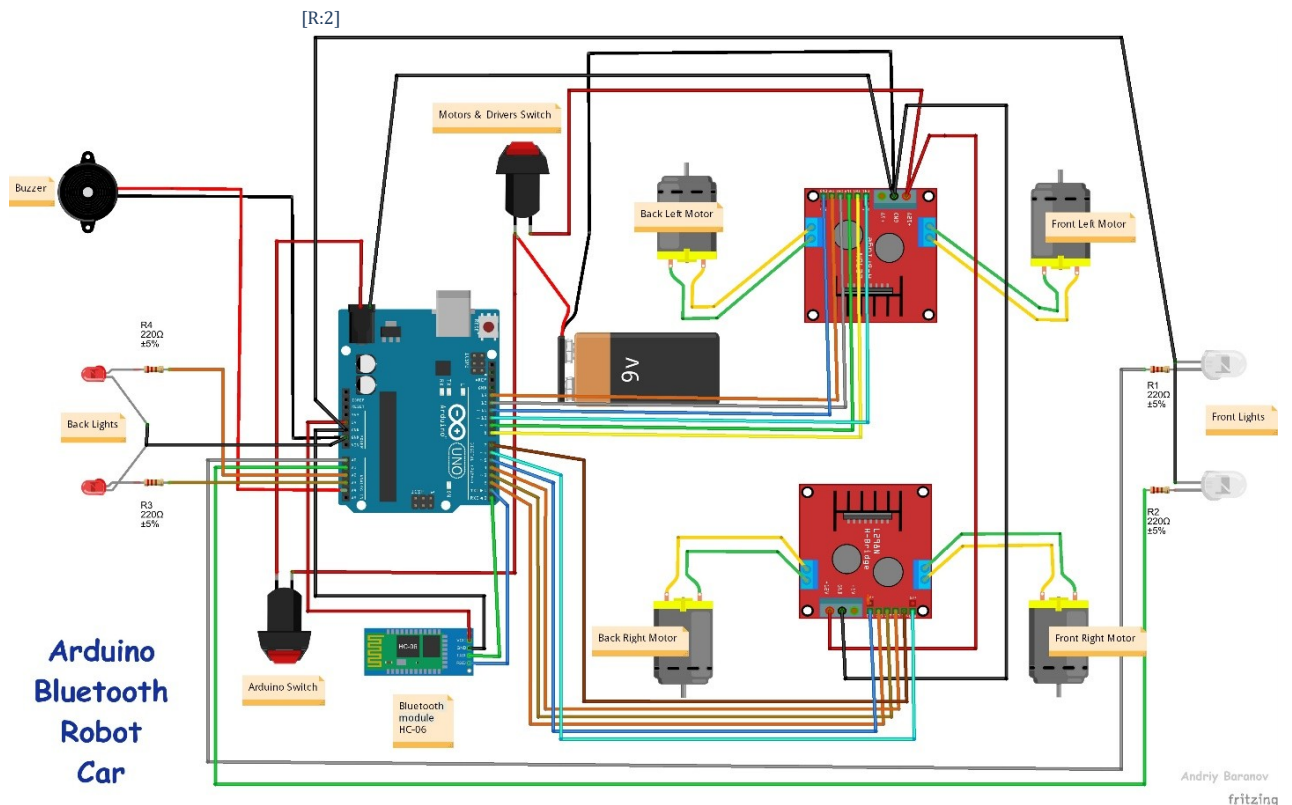


Figure 4.1 Front-end Design

Setup the joystick buttons

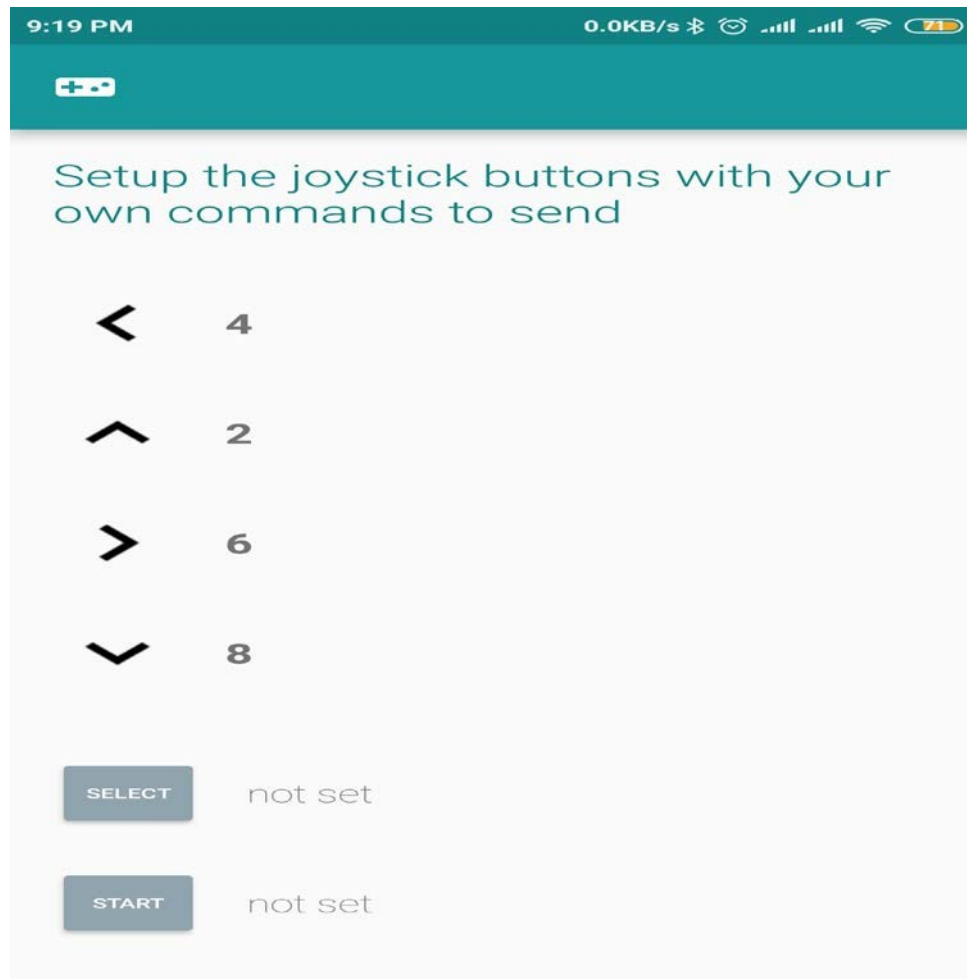


Figure 4.2.1: Setup the joystick buttons

We can setup the joystick buttons with our won commands, this car which side move. We can setup Arduino Bluetooth Module.

Creating Bluetooth Apps

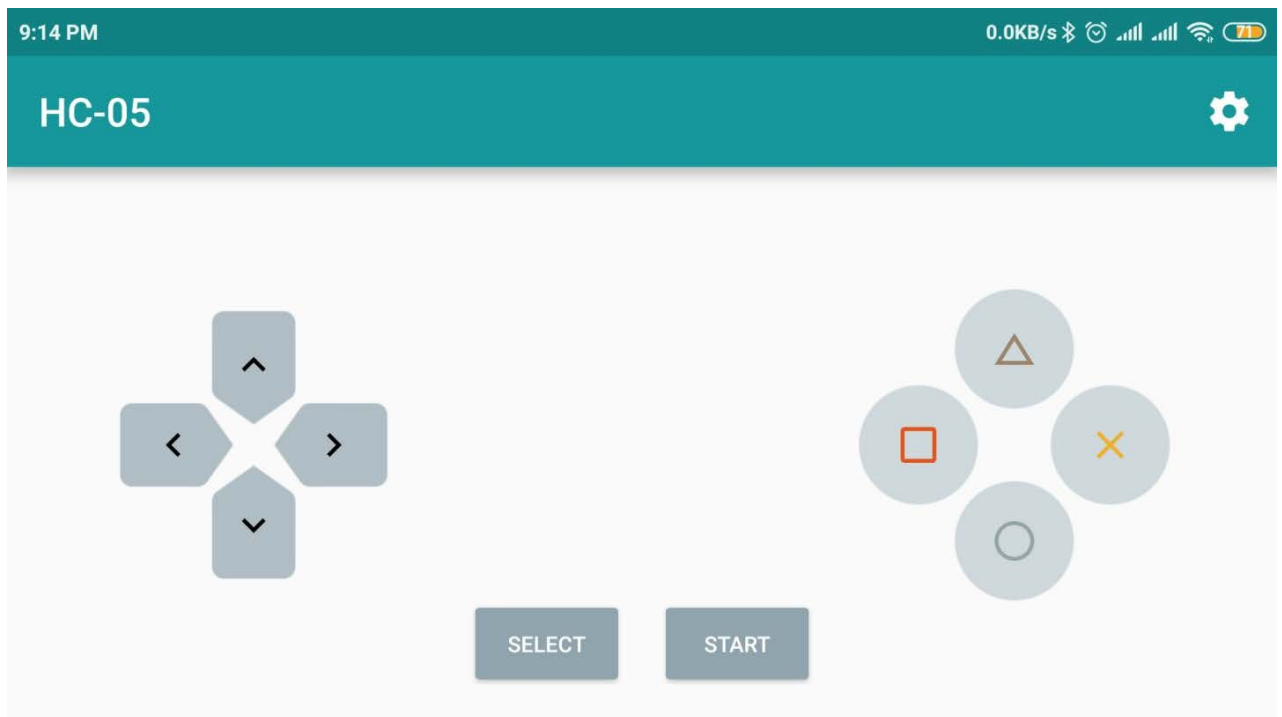


Figure 4.2.2: Front-end design of Bluetooth apps

Back-end Design

The Back-end Design is a how the robotics works, change and update new function. The developer anything any program creates and uploads the board, using any programming language. Example JAVA, python,C, C++ etc.

Creating Apps

Incident to raise when the button of the material is the list is shown using the open block. This event occurs before the list of items is displayed, and can be used to prepare the list before it is shown.



Figure 4.4.1: creating apps

If a value is true, then do some statements. Then connect to the Bluetooth device with the specified address and the Serial Port Profile (SPP). Returns true if the connection was successful. Then the addresses and names of paired Bluetooth devices.

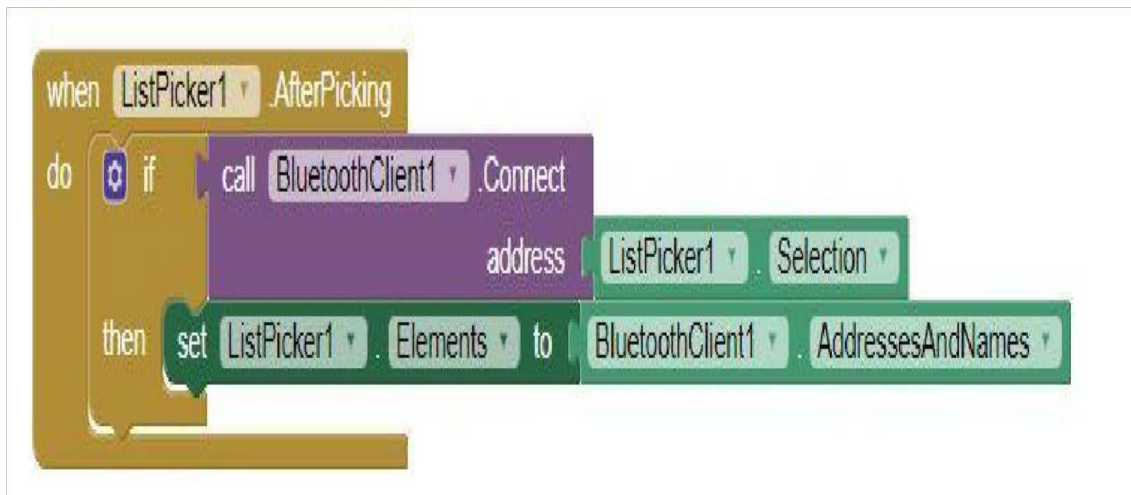


Figure 4.4.2: Bluetooth Device paired

Timer has gone off. If a value is true, then do the first block of statements. Otherwise, do the second block of statement.

Forward button

We tapped and released the forward button than send text to the connected Bluetooth device and text string.

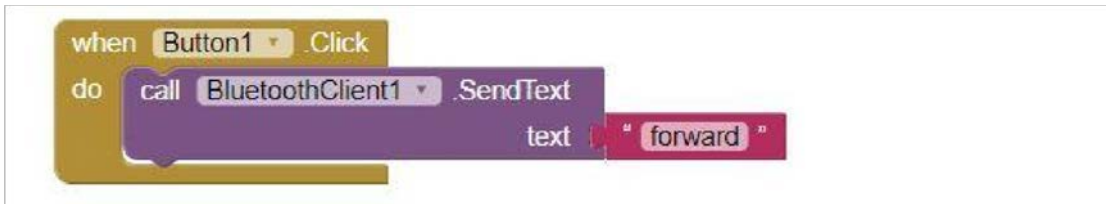


Figure 4.4.3: Forward Button Connect

Left button:

User tapped and released the left device and text string.

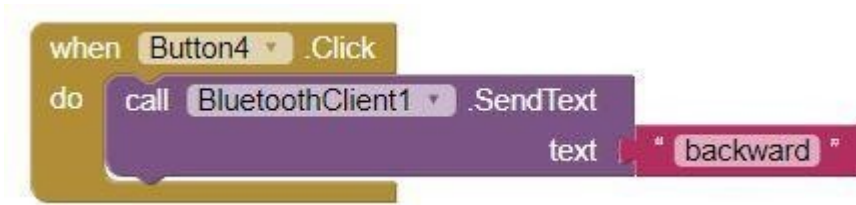


Figure 4.4.4: Backward Button Connect

Stop button:

User tapped and released the stop button than send text to the connected Bluetooth device and text string.

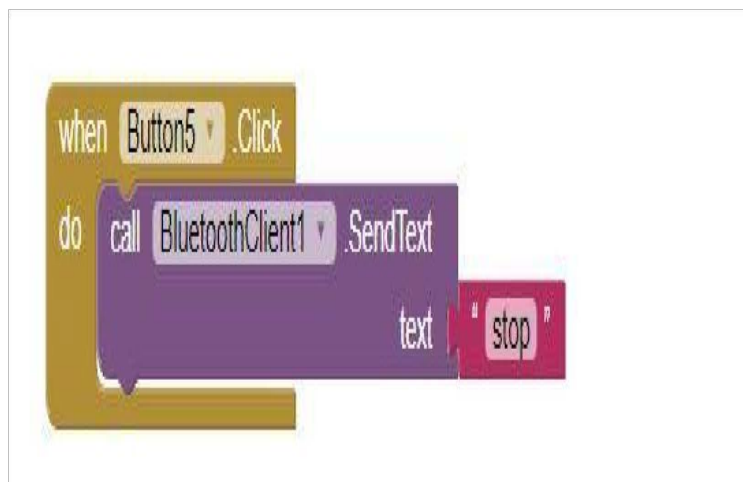


Figure 4.4.5: Stop Button Connect Speech

Implementation Requirement:

All the Implementation requirements are given below:

Table 4.1: Implementation Requirement

Arduino Uno	Chases	Hard board	Register
Bluetooth Module	Smart phone	LED	MQ-5(gas detector)
L293D IC	Jumper ware	drill machine	Switch
L293D IC	Cable	Battery with charger	Volt register
L293D IC	Nut bolt	16*2 display	soldering iron
Wheel	PVC pipe	Potentiometer	male to male connector
Base board	Motor driver	Pin	jumper wire

CHAPTER 5

Implementation and Testing

Implementation of Database: The database implement or Expansion is the method of fixing of database software, Outline and customizations, racing, testing, integrate with all applications, and all type of training the users. Its various stages and process are.

Implementation of Apex-end Design: I used arduino mega, dc motor, Bluetooth module, Gear motor, LED, jumper wire, male to male connector, LDE, base board, 6*2 display and chases. For the Implementation of Apex-end Design I use ARDUINO Mega, Bluetooth module, Led etc. There are the Implementation of Apex-end Design, such as:

Arduino Uno to Bluetooth Module Connection: We have done some significant system diagram and implementation. Which will be next future of robotic system? We will have a system & design that will be the based on human computer interactions function. This Search robot will be the next automation process in industry. In this project we will using the android application interacts with the Bluetooth module and then send the digital data to arduino. At first I connect Arduino mega TX, RX pin to Bluetooth module RXD, TXD pin, such as TX to RXD, RX to TXD.

Than next connect Arduino mega power 5V, Bluetooth module VCC to GND, GND like as 5V to VCC and GND to GND. All connection shown in figure [8].

HC-05 FC-114

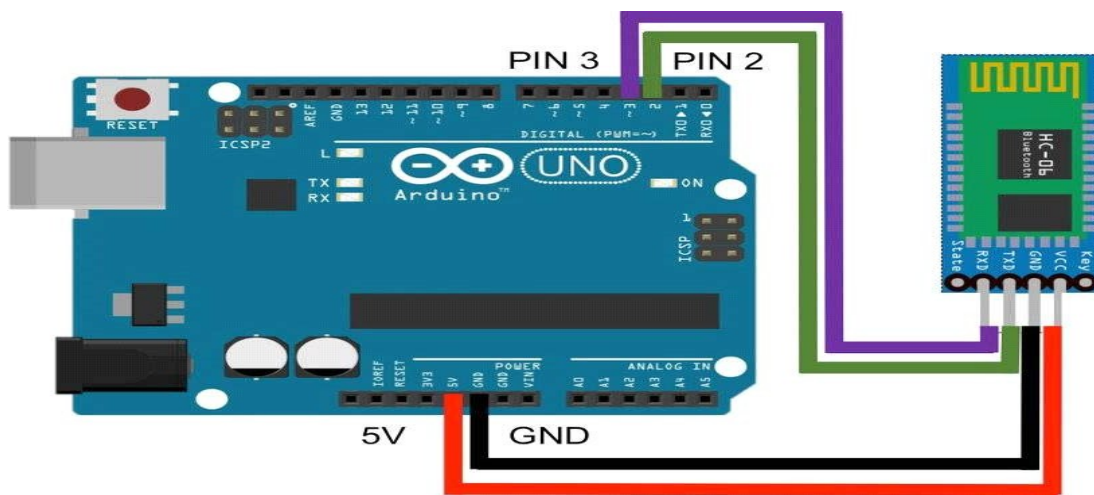
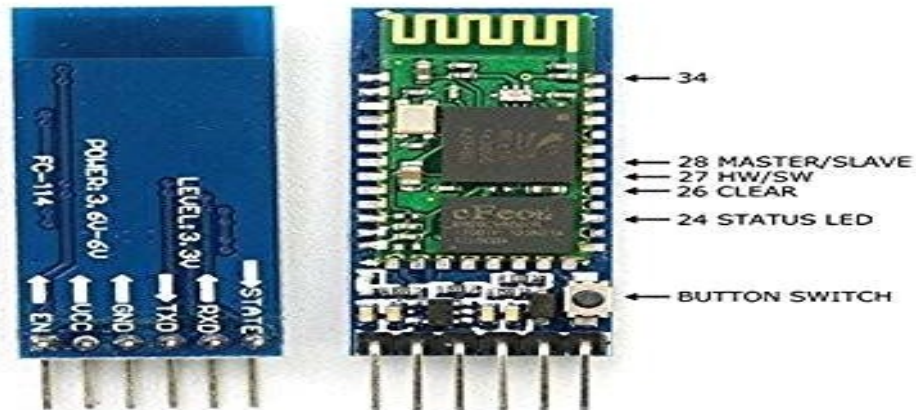


Figure5.1: Arduino Uno to Bluetooth Module Connection

Arduino Uno to Power Supply Connection:

ARDUINO UNO have internal power supply, we use VIN and GND pin. ND connect batty negative site, VIN connect 9 volt battery positive site.



Figure5.2.1: Arduino Uno to IC3 Connection

Arduino mega to lm 35 Connection:

We use lm 35 to indicate automatically our relative temperature. In lm 35 have three pin positive,GND & output pin. In this system volt pin connecting in 5v, GND or negative connecting in GND & last pin connecting in port 0.

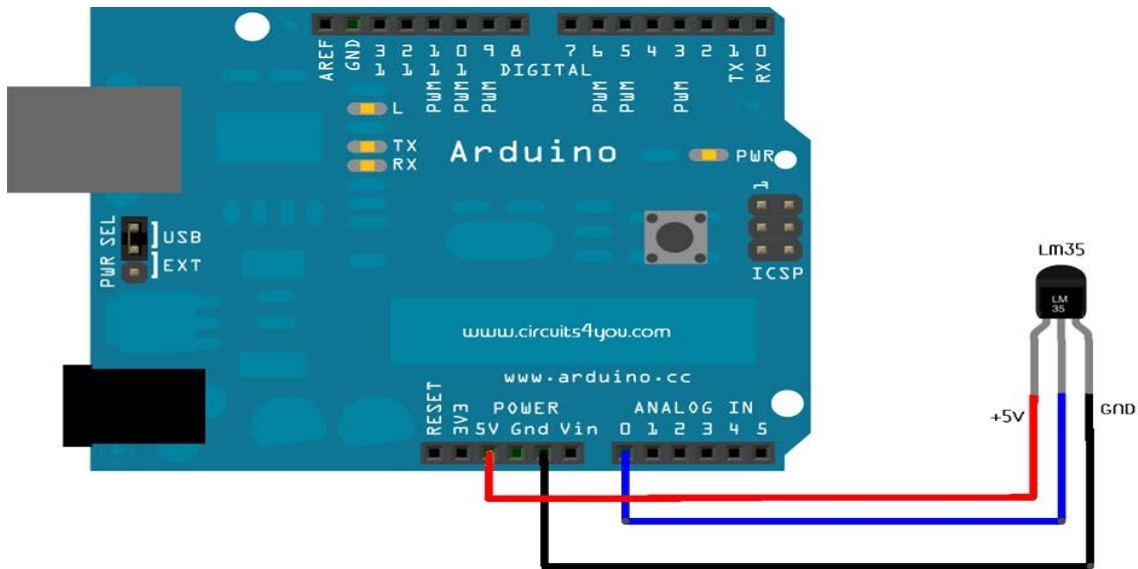


Figure5.2.2: Arduino mega to LM35 Connection.

Arduino mega to auto led Connection:

We using resistor (330), Ldr & Led to indicate automatically our relative light. In led & ldr have two pin one are connected in resistor & other connected in GND. In resistor connected in 5v & other connected in pin 13.

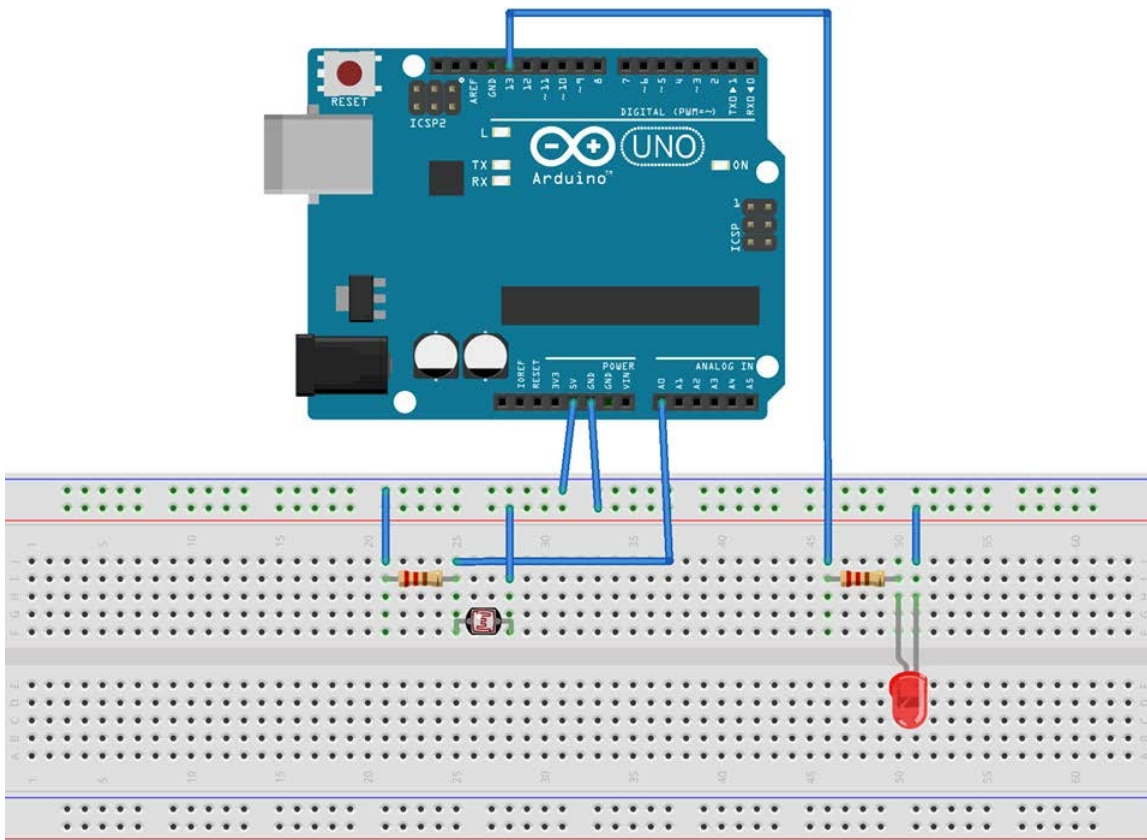


Figure5.2.3: Arduino mega to auto led Connection.

Arduino mega & auto MQ-5 Connection:

In this term we will use Arduino mega, Led & 6*2 displays to indicate automatically our relative light. Mainly mq-5 search harmful gas, the display show the gas & the LED using signal light.

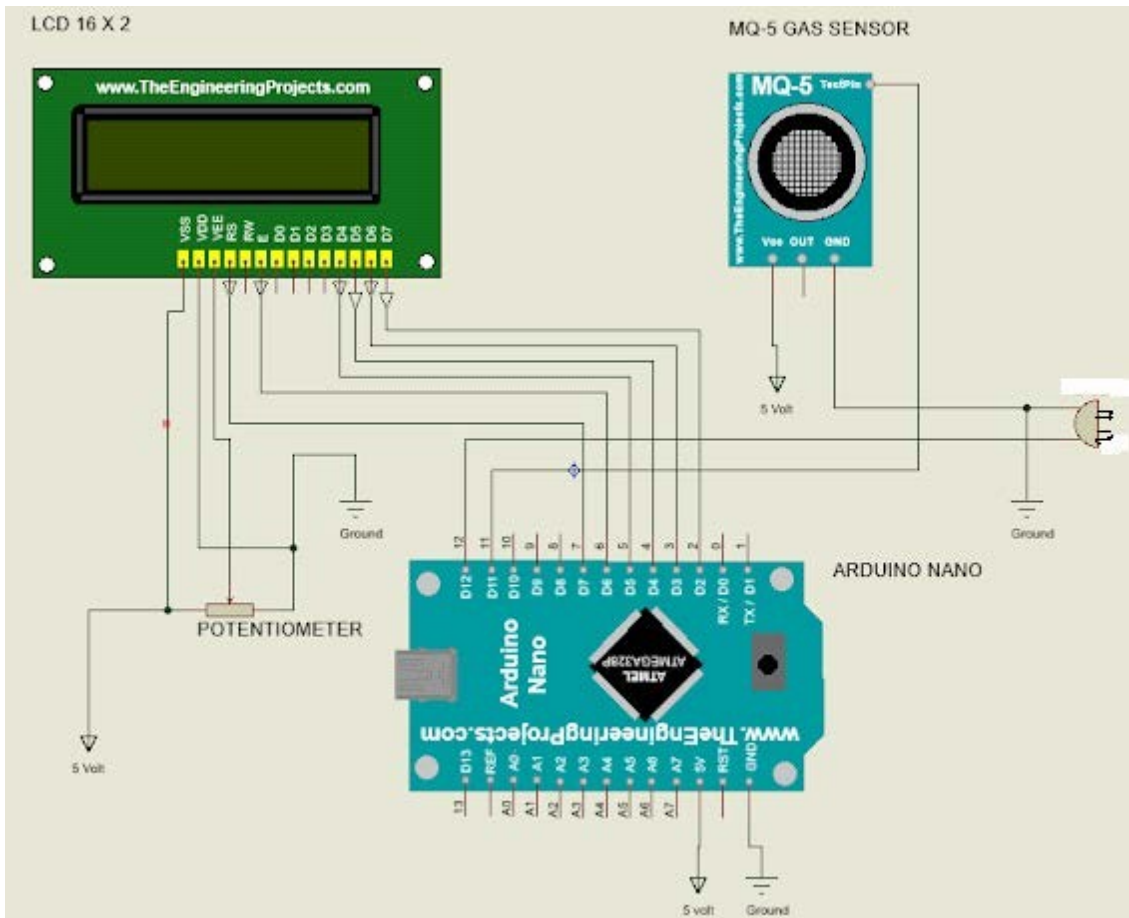


Figure5.2.4: Arduino mega & auto MQ-5 Connection.

Bluetooth Module CH-05 Using Motor Controlling Process : in this importance part we using four dc motor, two motor driver, one ch-05 Bluetooth Module, Bluetooth Module, led & battery.in this part we using lot of connection lot of pin.in this connection making this project in a little car.

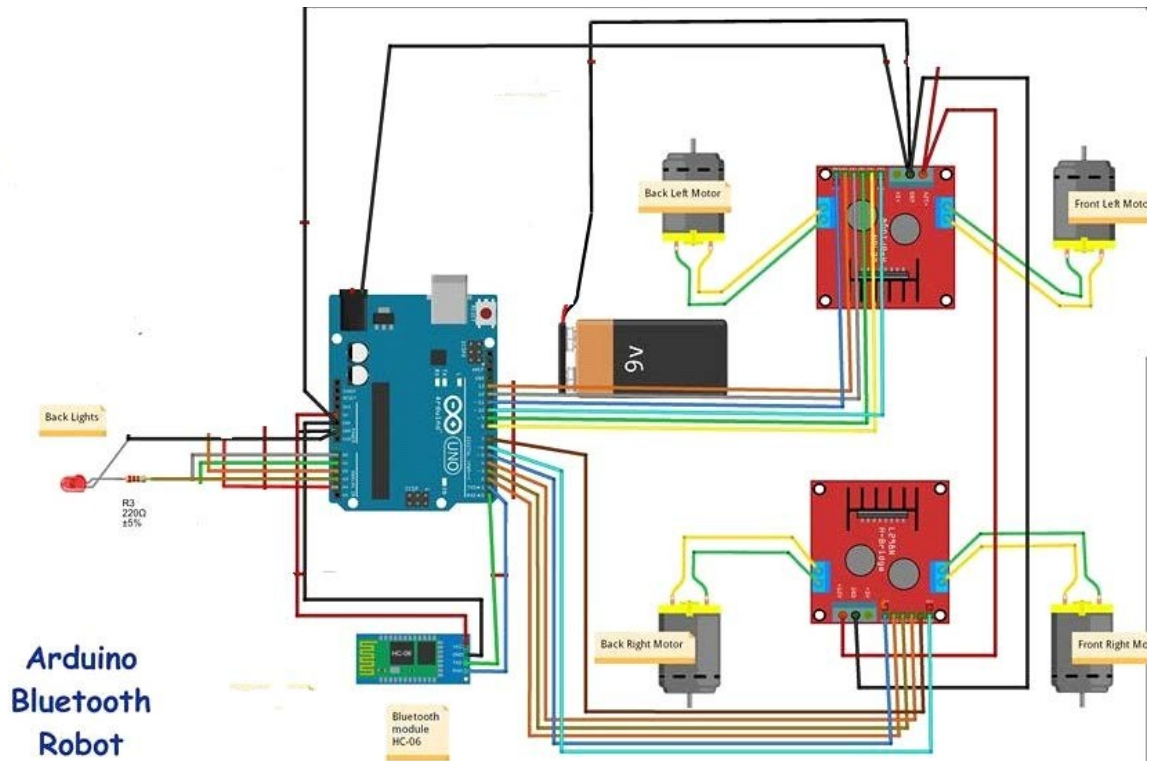


Figure5.2.5: Bluetooth Module& CH-05 Using Motor Controlling Process.

Implementation of Interaction:

Our search robot social interaction plays an importance role in extending the use of the robot in human daily life. Through in our effective social.

Interaction, robots will be capable to perform many tasks in our society. These applications need to outline social robots that are capable to behave with humans as partners is not peers. This paper presents Search robo, a robotic platform we developed it our Robotics Lab for our experiment on human-robot social interaction. The different developed interaction modules are also described.

Testing Implementation now depends on the test good quality or design testing .In our project Testing Implementation is a final step. So now test implement it, Search robo output function (that means forward, backward, left, right, led). Than my robotics code upload the ARDUINO MEGA board. Use USB cable to upload data, connect computer to ARDUINO MEGA. Shown in figure them:

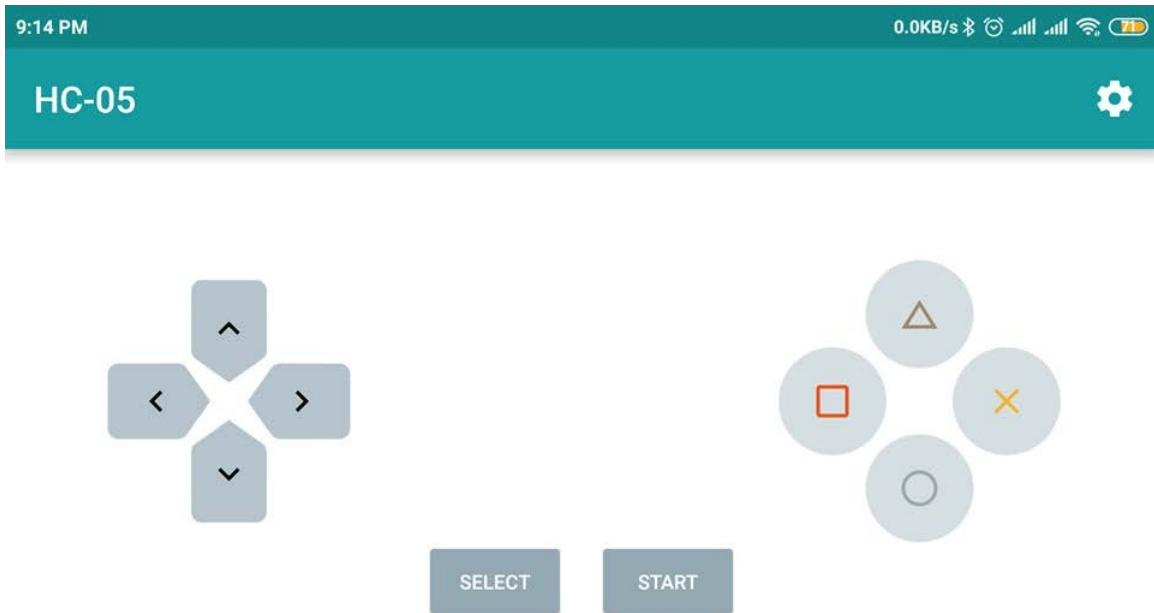


Figure5.3: Bluetooth Module CH-05 Using Motor Controlling Process.

5.4 Test Results and Reports

Complete our project now tested & displays every function. At first we open my android phone and on the Bluetooth Transceiver Module. Than install our resell in Bluetooth apps, search the Bluetooth device HC -05. If it found HC -05, than connect them and we press the controlling function. This is the call or controlling function:

.Forward

.Backward

. Left

.Right

. Led

.Gas

.Stop

.Display

CHAPTER 6

Conclusion and Future Scope

: Conclusion

In this modern era science has become the part and parcel of our life. And this robotic science is one of biggest gift of modern science. Our Search Robo is a part of this robotic science. It will help us to detect poisonous gas from those places where we can not reach. Through this project we can find the gas whether it's type is harmful or not. It will help to protect human being from being affected. Our plan is making this robot more effective in future and working is under processing.

: Future Scope

Scope for Further Developments We could have done some more work; we need to continue with it

- ✓ Making it water resistant as it can work under water.
- ✓ Making a fireproof cover for its internal part's safety.
- ✓ Adding crane as it can take samples from the instant environment.
- ✓ Increasing the accuracy of device performance.

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APPENDICES:

Part A: Reflection of Research

This appendix described the whole project reflection. We are getting a little time for working with any other project but in this project we got a lot of time to do so unique. We think a lot about this project, this thinking need more time to grow this idea. This is a unique idea which got some new and interesting features. We complementing and helping each other from the beginning of the work and continued the same work till the end of the project. That was an amazing experience for the group member's. It was a great experience work in a team like this. The team work helps us to learn so many things that teach us how to divide the work in a team to build up a complete project or work. We meet together on meeting discussed about the project sitting together and also discussed new ideas of every person to make this thing better.

Part B: Related Issues

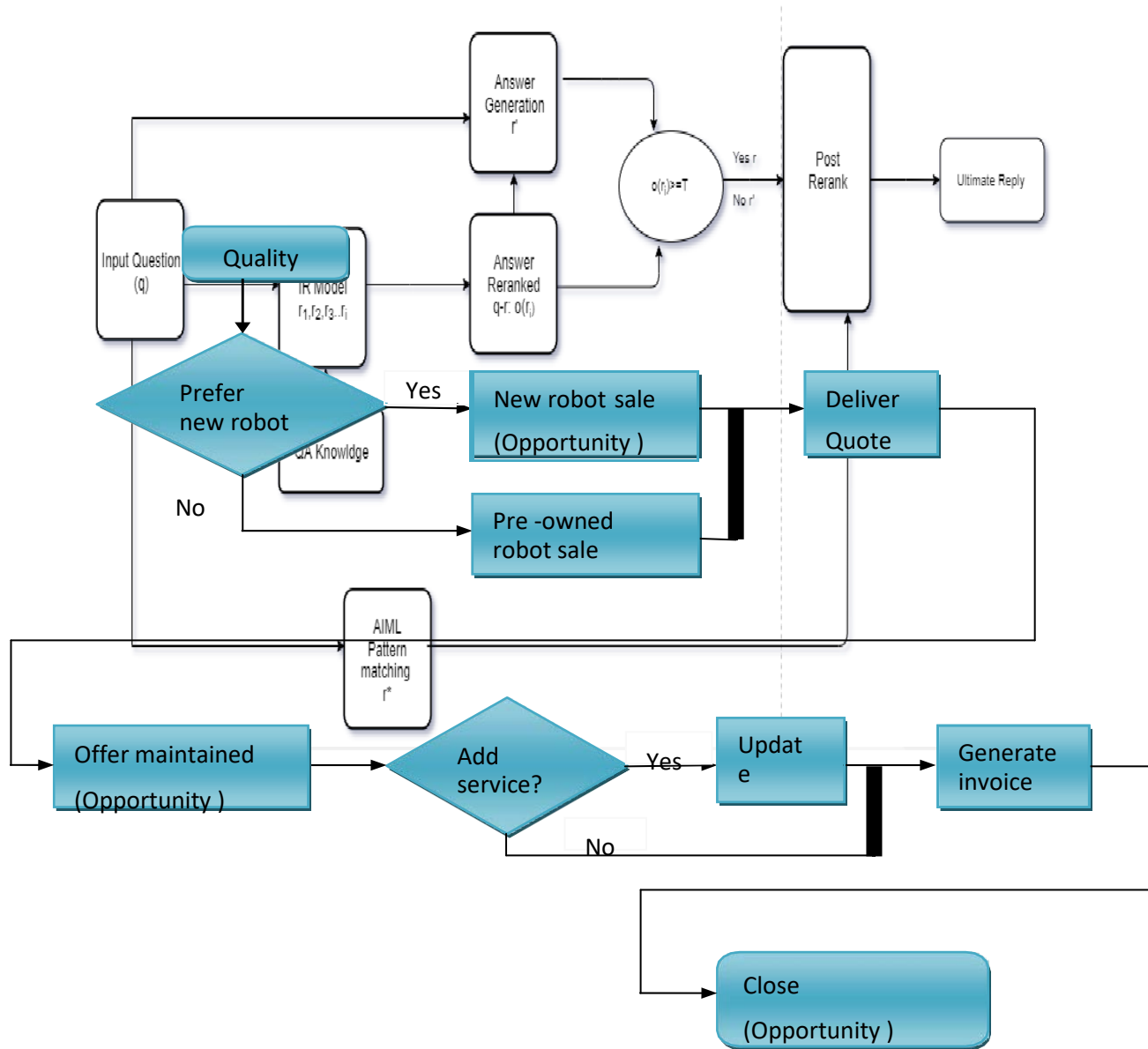


Figure 3.1: Business Process Model

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