DESIGNING AND IMPLEMENTING A ROBOT FOR ROAD CLEANING AND FIRE FIGHTING

BY

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This Report is presented in Partial Fulfilment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

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DHAKA, BANGLADESH

MAY, 2018

APPROVAL

This Project titled "Designing and implementing a robot for Road cleaning and Fire fighting" submitted by Md. Emdadul hossen ID : 151-15-5214 to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfilment 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 5-may- 2018.

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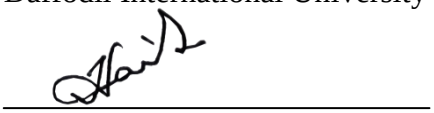

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DECLARATION

I hereby declare that, this project has been done by myself under the supervision of Gazi Zahirul Islam, Assistant professor, Department of CSE Daffodil International University. I 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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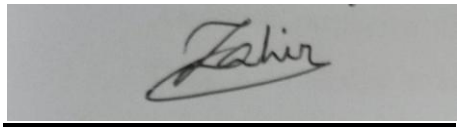

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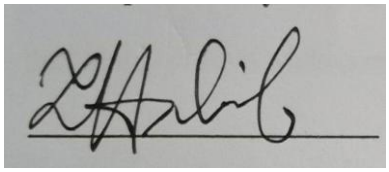

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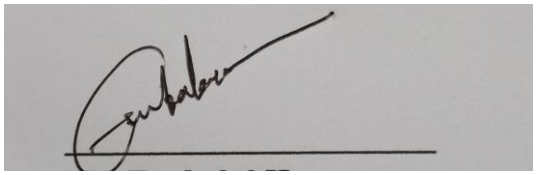

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ACKNOWLEDGEMENT

First I express our heartiest thanks and gratefulness to almighty God for His divine blessing which made it possible to complete the final year project successfully.

I am really grateful and wish our profound I indebtedness to Gazi Zahirul Islam, Assistant professor Department of CSE Daffodil International University, Dhaka. Deep Knowledge & keen interest of our supervisor in the field of "*Robotics*" to carry out this project. His endless patience, scholarly guidance ,continual encouragement , constant and energetic supervision, constructive criticism , valuable advice ,reading many inferior draft and correcting them at all stage have made it possible to complete this project.

I would like to thank our entire class in Daffodil International University, who took part in this discuss while completing the course work.

Finally, I must acknowledge with due respect the constant support and patience of my parents.

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ABSTRACT

I have implemented and build an Android Mobile controlled fire fighting road cleaner robot that can move through a mode floor plan structure of a house, find a lit candle and then extinguish it in the shortest time possible. This robot will simulate a real-world operation of a robot performing a fire security, cleaner function in an actual home on a simulated floor plan. The designation and condition at the contest are major factor in the design process control body at the robot. There are many ways an industry can catch fire. For example, in cotton mills, garments, fuel storages, etc., electric leakage causes huge damage also it‘s a worst-case scenario, which cause heavy loss not only financially but also surroundings get affected. Nowadays the Fire Extinguishers are implemented in industries, which are mostly manual one or sensible annunciates. I achievement to automate the system in future being which will help present the damage due to fire Robotics is the emerging solution to protect the human and their wealth and background. And I achievement to use that motion for the better meat at human.

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TABLE OF CONTENTS

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LIST OF FIGURES

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CHAPTER 1
INTRODUCTION

1.1 Introduction

An embedded system, the right definition is the system designed using Arduino uno, L293D IC, gear motor, dc motor, laptop battery and horn may be both combined to perform the specified task. Here I using the Arduino uno to perform the action that is continuously monitor the specified area whether there is any fire and automatically it goes near to the flame and extinguish the fire. I using HC-05 Bluetooth module. The HC-05 module can reach a range of up to 9 meters (30 ft).

1.2 Motivation [R:1]

With the development in the field 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, fire accidents have become common and very dungarees sometimes may lead to danger that make it hard for the firemen to protect human life. In such cases, a 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 fire fighting 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. not. Present in the house. By means of this fire fighting robot, people and capital can be saved from fire accidents. Waste clearance is a central problem in developing countries especially in Dhaka city due to heavy population. Immediately in Dhaka, sanitary workers are using the oldest devices like brooms, iron plates and bamboo baskets for primary collection of solid waste. Thousands of workers die from or are afflicted with respiratory diseases, urinary, skin & eye infection, lung cancer, tuberculosis etc.

As a solution to manual primary waste disposal, a cost effective garbage cleaning robot is developed. I call it in the fire fighting road cleaner robot.

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1.3 Objective

The main aim of this project is to design a fire fighting robot using Android application for remote operation. The fire fighting robot has a water tanker to pump water and spray it on fire; it is controlled through wireless communication. For the desired operation, Arduino uno 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, two motors are interfaced to the Arduino uno where in two 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 actuality accepting adequate range, while the receiver has a Bluetooth device fed to the Arduino uno to drive gear motors through the motor driver IC (L293D) for particular operation. 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 fire fighting 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.

The robot runs on four wheels each driven by individual motors. These individual motors help complete the necessary force to run the vehicle. Four 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.

1.4 Expected Outcome

The Robots analysis outcomes are expected to supply in several aspects to the main targets mentioned in the Challenge (ICT for the Enterprise and Manufacturing) and to

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be high impact both in terms of technology/knowledge development of manufacturing process across a broad range of sectors. The Robots analysis activity goes in the direction fixed by Objective ICT. Smart Factories: Energy-aware, agile manufacturing and customization, in 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 production integration for a completely automatic factory.

1.5 Report Layout [R:1]

In Chapter 2, all details about the background of this project. I discussed about the body background and the content background. There is some other application nearly like this project. Then I compare with those applications in this chapter. During this project I faced some problem and it has step by step solved. I take some challenge to complete my project. I also discussed about in this chapter.

In chapter 3, I discussed about requirement analysis of this project. And proposed a Use Case Model with description.

In chapter 4, I discuss about front-end design and back-end design. An interaction design detail is here with some figure.

Chapter 5, there are discussion about the implementation of database, front-end design and interaction design. I test my project and make video.

In chapter 6, summary of this my fire fighting road cleaner robot and I discussed about think I can develop in future project.

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CHAPTER 2
BACKGROUND

2.1 Introduction

Robotics is the science of designing and building machines that can be programmed to perform more than one function commonly performed by humans. The Robot is program update day by day. 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 theme of the Robot, and there is a vast amount of possibilities when designing a Robotics qualification.

2.2 Related work [R:2]

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 fire fighting 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.

Closely related types of work now done by robots include cutting, grinding, polishing, drilling, sanding, painting, spraying, and otherwise treating the surface of a product. As with welding, activities of this kind are usually performed by one-armed robots that hang from the ceiling, project outward from a platform, or reach into a product from some other angle.

There are some accessible advantages for using a robot to perform tasks such as these. They are often boring, difficult, and sometimes dangerous tasks that have to be repeated over and over again in exactly the same way. Why should a human be employed to do such repetitive work, robotics engineers ask, when a machine can do the same task just as efficiently?

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moving a body section into position, welding it into place, installing and tightening bolts, turning the body for the next operation, and so forth. In many assembly plants today, the assembly line of humans has been replaced by an assembly line of robots that does the same job, but more safely and more efficiently than was the case with the human team.

2.3 Comparative studies

The use of robotic systems in fire fighting is being more studied due to fire fighters commonly being exposed to dangerous actions to save lives. A robotic system is a mechanical device that performs a task using sensors to perceive its environment, computer programs to control the robot based on its environment, and a human operator to assist with robot operation.

There are a array of robotic systems being developed to support fire fighters due to the wide range of fire events including fires affected structures, vehicles, aircrafts, ships, and wild lands. In addition to the wide range of fire scenarios, the functionality included in the robotic system may need to vary to support fire fighters in tasks such as sizing up the fire, identifying trapped people, locating the fire, monitoring conditions, controlling fire spread, and suppression. This article provides an overview of robotic systems that have been developed for fire fighting as well as some design aspects of these robots.

There are two general types of robotic systems that have been developed for fire fighting, cleaning fixed systems and mobile systems. Fixed systems, such as automated dust, fire monitors, are being used in applications location there is a significant fire danger and the fire needs to be extinguished rapidly. Some example applications include aircraft landing areas, warehouse storage and tunnels. These

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2.4 Scope of the problem

Fire fighting and rescue activity are considered risky mission. They are an ideal target for robot technology to keep away fire fighters from danger. Moreover, it makes possible to rescue much more victims. Some fire departments have already developed and deployed fire fighting 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 author proposes five important elements to develop useful and reasonable priced robots for fire departments. The robots should make possible to save and rescue much more lives.

Fire fighting and rescue activity are considered risky mission. They are an ideal target for robot technology to keep away fire fighters from danger. Moreover, it makes possible to rescue much more victims. Some fire departments have already developed and deployed fire fighting and rescue robots. However, the performance of the robots is not enough. The author considers and examines them from two points of view:

2.5 Challenges

As the world's 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's a good solution to a complex problem, but it's not without its fair share of challenges.

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Skill sets and Experience

There's a growing gap in the skill sets of workers in the manufacturing industry. In a study done by Accenture, it was found that 75% of manufacturing companies reported a shortage of skilled workers that required more than a diploma.

As person boomers get older and retire, there's a growing need for people to replace them, but you cannot simply give people the skills needed to replace these jobs. However, you can give them to a robot.

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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

.

The concept involves renting the robots for a decreased rate than simply buying them outright. In this way, companies can quickly and effectively implement robots into the

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Sterraclimb - a service robotics company that makes a robot capable of lifting heavy items and climbing stairs on its

Safety Concerns

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Hand guiding - The ability to know when a person is in contact with the robot for guidance and training.Power and force limiting - Sensors and technology that restricts the amount of force applied. These include mechanical solutions, electrical ones, and elastic actuators.

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CHAPTER 3
REQUIREMENT ANALYSIS

3.1 Business Process Model [R:2]

I give a graphical representation of my project for the business process model. I use If-Else logic, AND, OR operation. I can express my whole system in details by a single diagram. The following diagram shows a business process model.

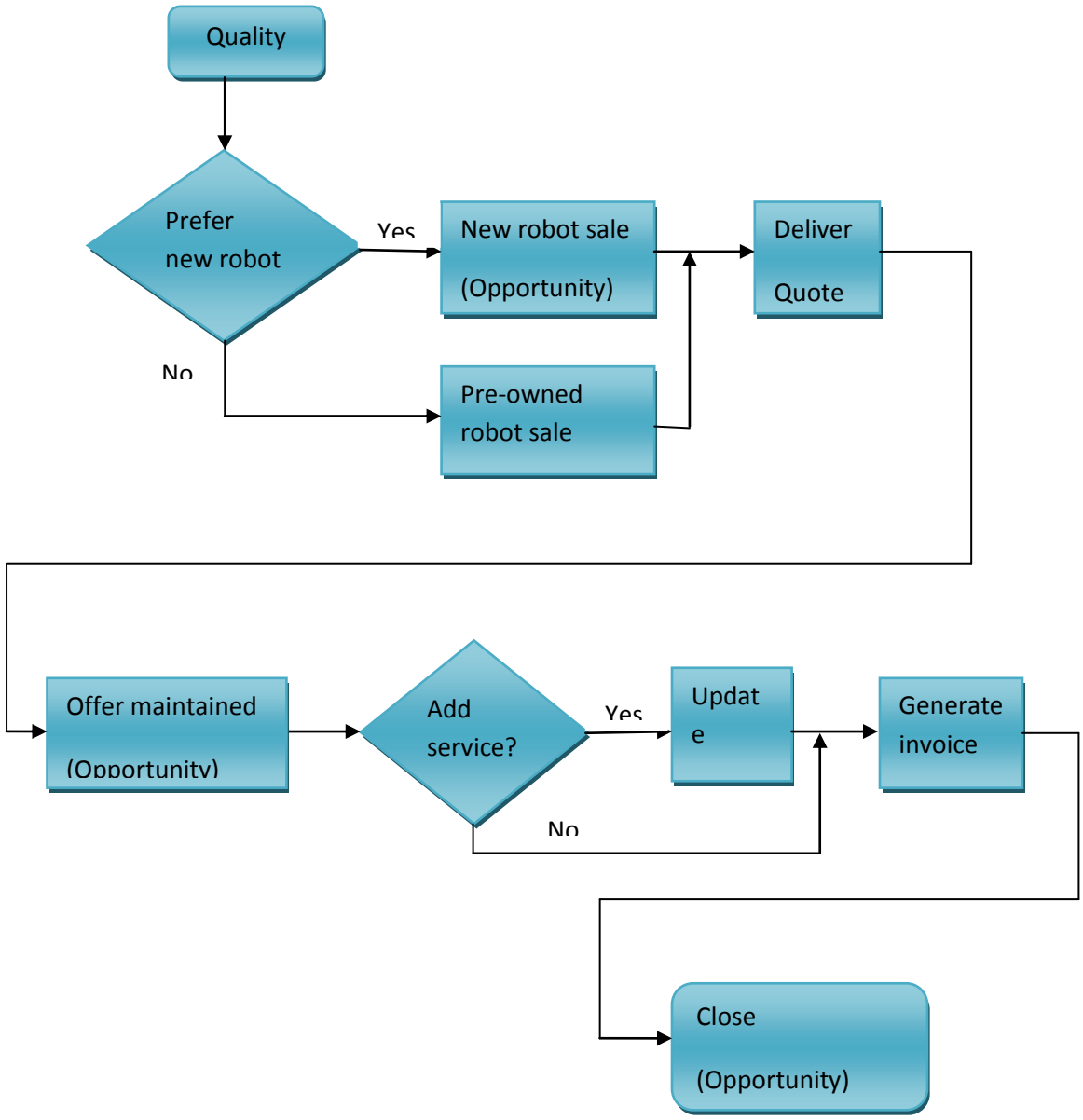

Figure 3.1: Business Process Model

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3.2 Requirement Collection and Analysis [R:2]

Many devices use my fire fighting road cleaner robot.

List of requirement:

- Arduino uno
- Bluetooth module
- L293D IC
- Gear motor
- DC motor
- Wheel
- Base board
- Chases
- Smart phone
- Jumper ware

3.2.1 ARDUINO UNO

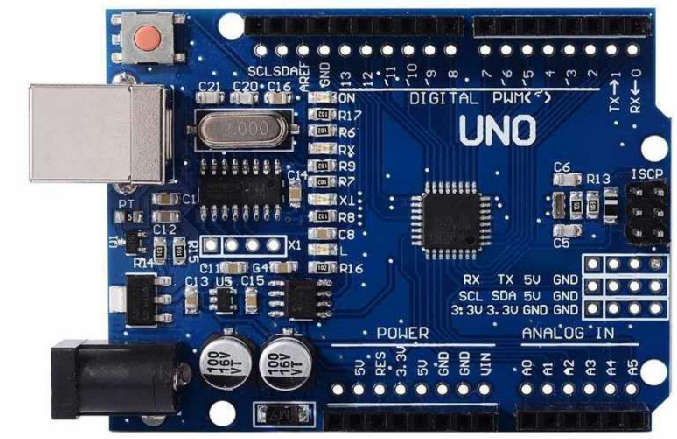

Figure 3.2: Arduino uno

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 fire fighting 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.

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battery to get started.. You can tinker with your UNO without warring too much about doing something wrong, worst case scenario you can replace the chip for a few dollars 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 fire fighting 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.

3.2.2 Bluetooth Module [R:3]

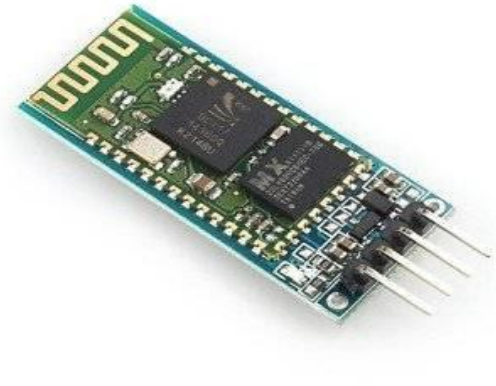

Figure 3.3: Bluetooth Module

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Feature). Add figure no in description.

Pin Description

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

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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 i.e. the module remains on and communication also takes place.

VCC: Supply Voltage 3.3V to 5V

GND: Ground pin

TXD & RXD: These two pins acts as an UART interface for communication

STATE: It acts as a status indicator. When the module is not connected to / paired 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/paired with any other Bluetooth device, the signal goes high. At this high state, the led blinks with a constant delay say for example 2s delay which indicates that the module is paired.

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 BT device. If the module is connected to any other Bluetooth device, it starts to communicate with that device and fails to work in AT command mode (Figure 3.3).

3.2.3 L293D IC

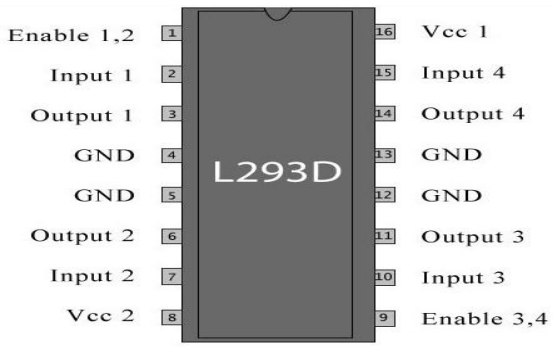

Figure 3.4: L293D IC

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L293D is a dual H-bridge motor driver integrated circuit (IC). Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-current signal. This higher current signal is used to drive the motors.

L293D contains two inbuilt H-bridge driver circuits. In its common mode of operation, two DC motors can be driven simultaneously, both in forward and reverse direction. The motor operations of two motors can be controlled by input logic at pins 2 & 7 and 10 & 15. Input logic 00 or 11 will stop the corresponding motor. Logic 01 and 10 will rotate it in clockwise and anticlockwise directions, respectively.

3.2.4 Gear Motor and Wheel

Figure 3.5: Gear Motor and Wheel

A gear 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. Gear motors can be found in many different applications, and are probably used in many devices in your home.

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3.2.5 DC Motor

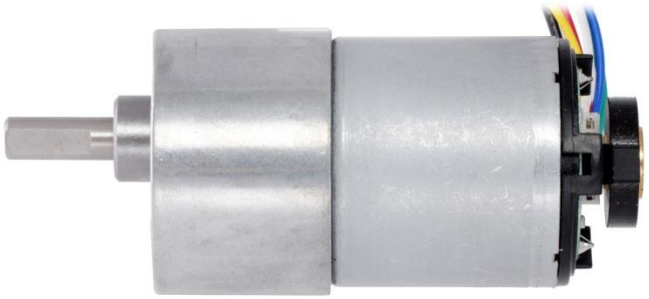
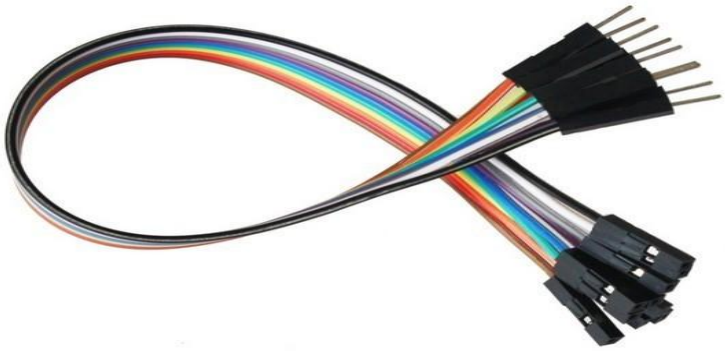


Figure3.6: DC Motor

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields.

3.2.6 Jumper ware [R:5]



A jump wire is an electrical wire or group of them in a cable with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

Figure 3.7: Jumper ware

3.3 Use Case Modelling and Description

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

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computer interactions. This fire fighting 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

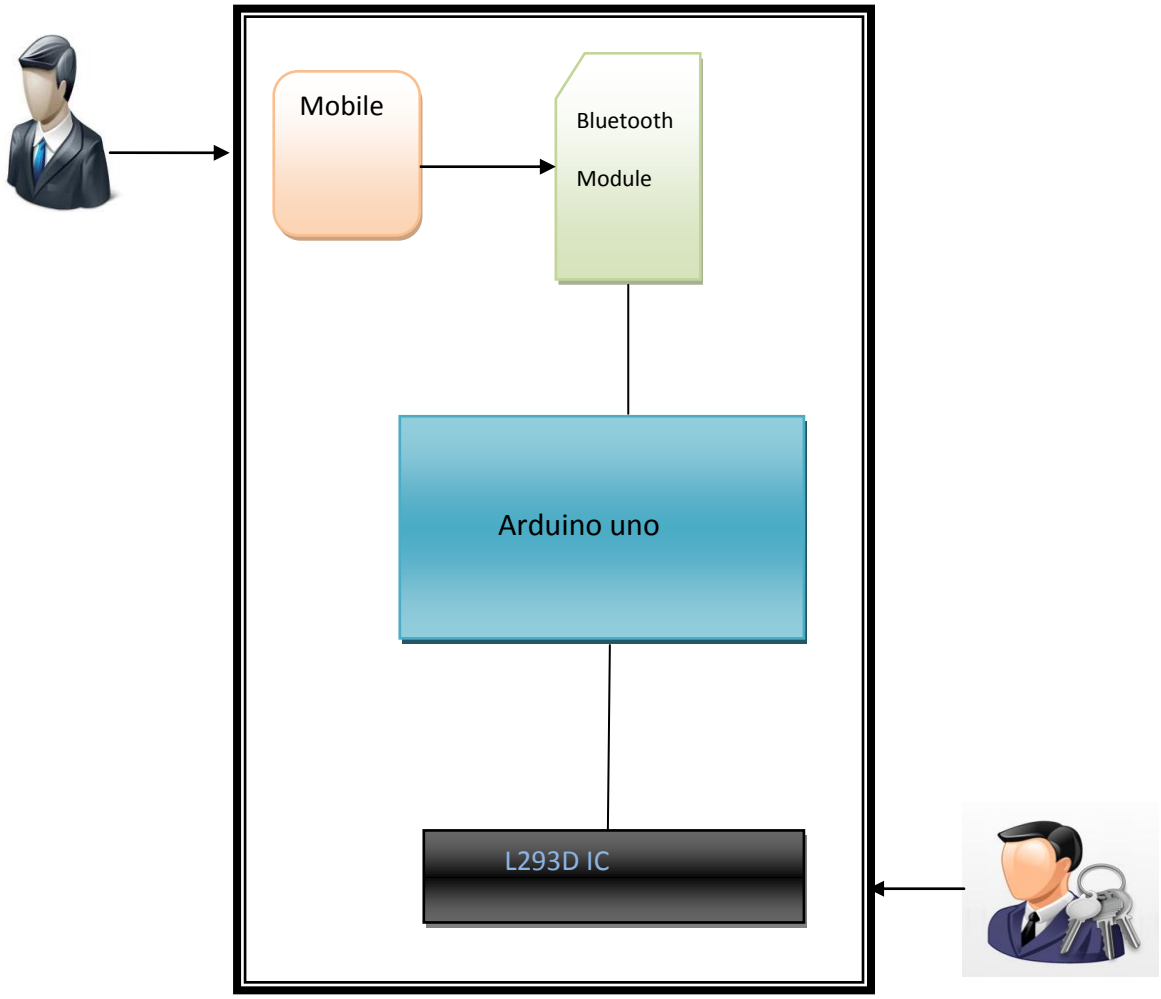

Figure 3.8: Use Case Model

3.4 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.

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My fire fighting road cleaner Logical Data model Shown in figure

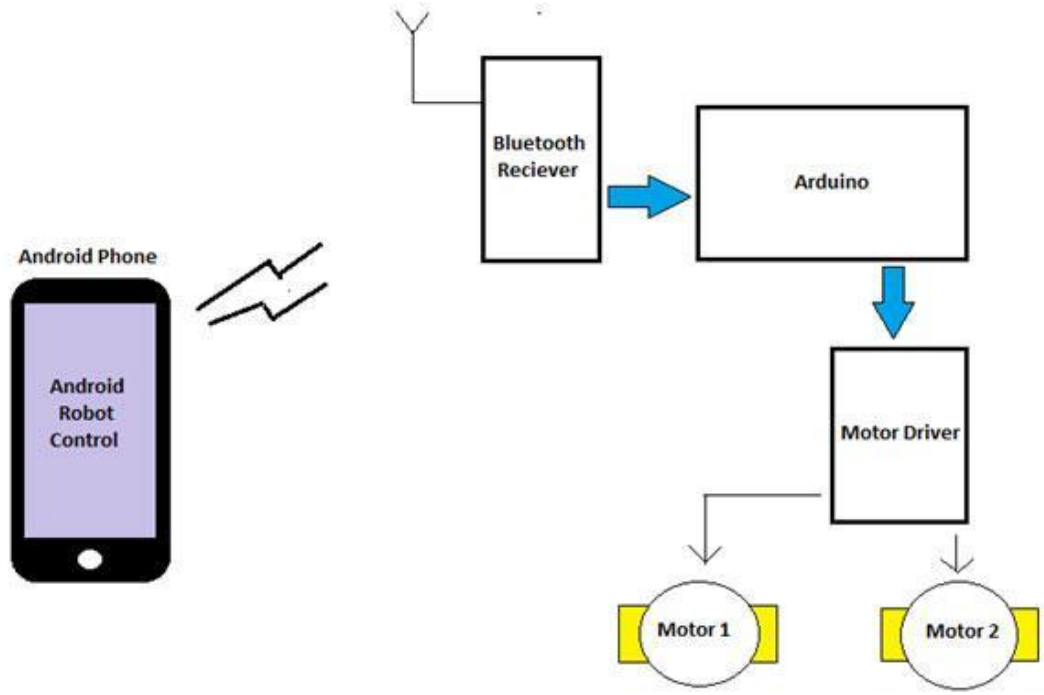

Figure 3.9: Logical Diagram Model

3.5 Design Requirement

I designed a fire-fighting road cleaner robot system which can meet the requirements of teaching and experiments. Completed the design of fire-fighting road cleaner 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 fire fighting 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.

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.

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CHAPTER 4
DESIGN SPECIFICATION

4.1 Front-end Design

Front-end Design involves build the hardware using virtual arduino uno, Bluetooth module, motor, horn, pump, and wire and creating Bluetooth apps using MIT 2 inventor.

4.1.1 Build-up The Hardware [R:2]

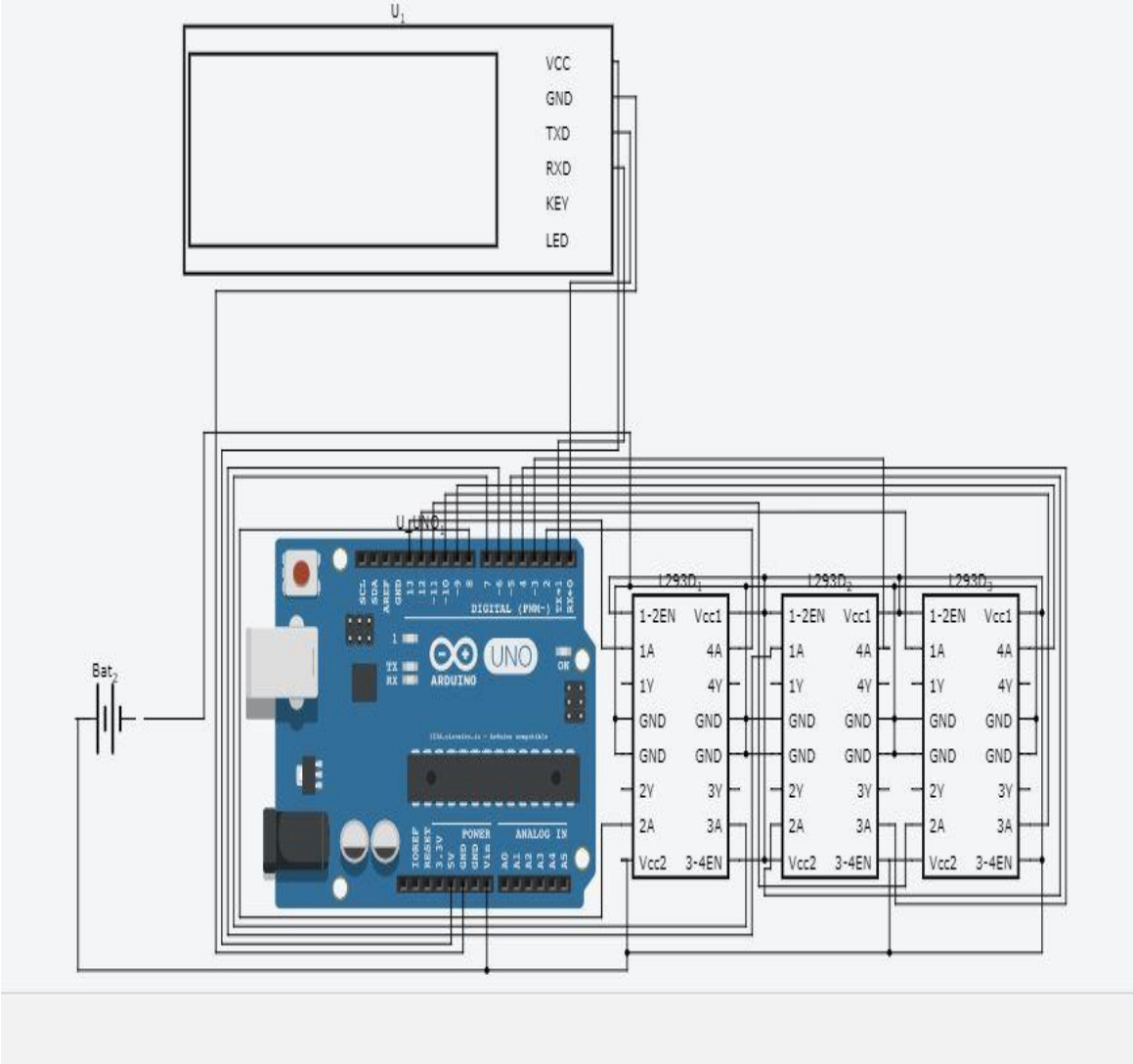

Figure: 4.1 Robotics Hardware

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4.1.2 Creating Bluetooth Apps

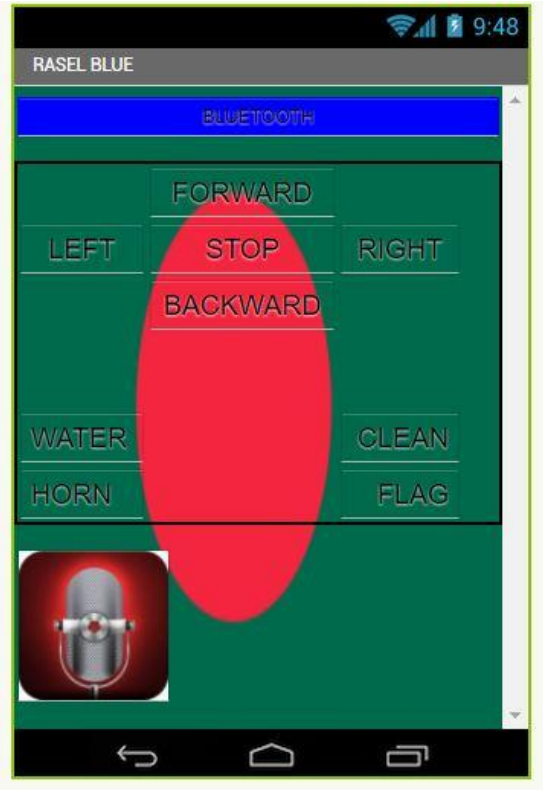

Figure 4.2: Front-end design of Bluetooth apps

4.2 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, C, C++ etc.

4.2.1 Creating Apps

Event to raise when the button of the component 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 4.3: Item Display

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

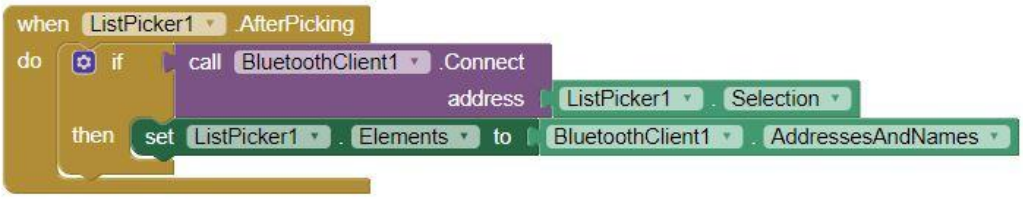

Figure 4.4: Bluetooth Device paired

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

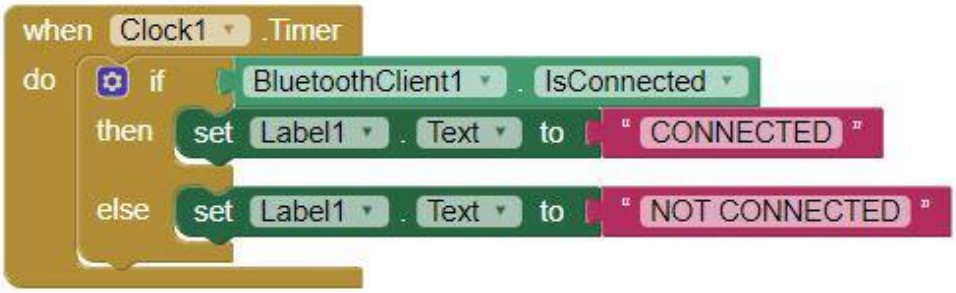

Figure 4.5: Timer set

Forward button:

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

Figure 4.6: Forward Button Connect

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Left button:

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

Figure 4.7: Left Button Connect

Right button:

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

Figure 4.8: Right Button Connect

Backward button:

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

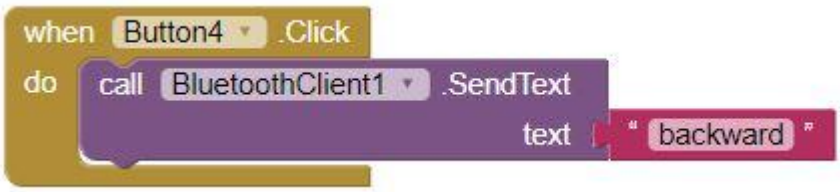

Figure 4.9: Backward Button Connect

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Water button:

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

Figure 4.10: Water Button Connect

Horn button:

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

Figure 4.11: Horn Button Connect

Clean button:

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

Figure 4.12: Clean Button Connect

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Flag button:

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

Figure 4.13: Flag Button Connect

Stop button:

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

Figure 4.14: Stop Button Connect

Speech button:

User tapped and released the speech button. Than solicits speech input from the user. After the speech is converted to text, the after getting text event will be raised.

Figure 4.15: Speech Recognizer Connect

Simple event to raise when voice record is invoked but before the voice record activity is started.

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Figure 4.16: Voice Record

Simple event to raise after the voice record activity has returned. Send text to the connected Bluetooth device.

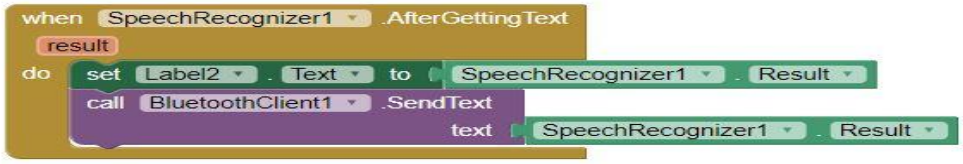

Figure 4.17: Voice Record Activity

4.3 Implementation Requirement [R:4]

Implementation requirements is the carrying out, execution, or practice of a plan, a method, or any design, idea, model, specification, standard or policy for doing something. As such, implementation requirement is the action that must follow any preliminary thinking in order for something to actually happen.

At first implementation the whole project, we needed to gather knowledge. Provides step-by-step coverage of the various stages required to achieve successful implementation, including system design, financial justification and working with suppliers.

I develop my project with arduino uno, Bluetooth module, L293D IC, gear motor, dc motor, jumper wire, male to male connector, multimiter, soldering iron, base board, and chases etc.

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CHAPTER 5
IMPLEMENTATION AND TESTING

5.1 Implementation of Database

The database implementation or deployment is the process of installation of database software, configuration and customization, running, testing, integrating with applications, and training the users.

Its different stages and processes are:

5.2 Implementation of Front-end Design

I used arduino uno, Bluetooth module, L293D IC, gear motor, dc motor, jumper wire, male to male connector, base board, and chases.

For Implementation of Front-end Design I use ARDUINO UNO, Bluetooth module and three pieces L293D IC.

There are three types of Implementation of Front-end Design, such as:

- Arduino uno to Bluetooth module connection
- Arduino uno to L293D IC connection
- Arduino uno to power supply connection

5.2.1 Arduino uno to Bluetooth Module Connection

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 fire fighting 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.

At first I connect Arduino uno TX, RX pin to Bluetooth module RXD, TXD pin, such as TX to RXD, RX to TXD.

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Than second connect Arduino uno power 5V, GND to Bluetooth module VCC,GND such as 5V to VCC and GND to GND. All connection shown figure:

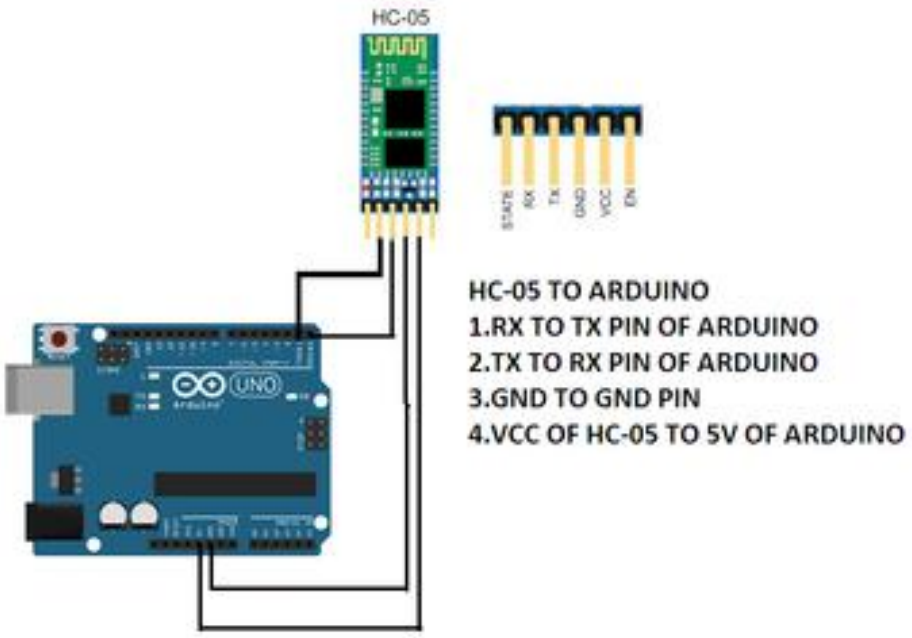

Figure5.1: Arduino uno to Bluetooth Module Connection

5.2.2 Arduino uno to L293D IC Connection

I gave the connect one Arduino uno to three L293D IC.

Such as: Arduino uno to IC1

Arduino uno to IC2

Arduino uno to IC3

5.2.2.1 Arduino uno to IC1

Pin Mode (12, OUTPUT);//connect to input 2 of l293d

Pin Mode (9, OUTPUT); // connect to input 15 of l293d

Pin Mode (11, OUTPUT); // connect to input 7 of l293d

Pin Mode (10, OUTPUT); // connect to input 10 of l293d

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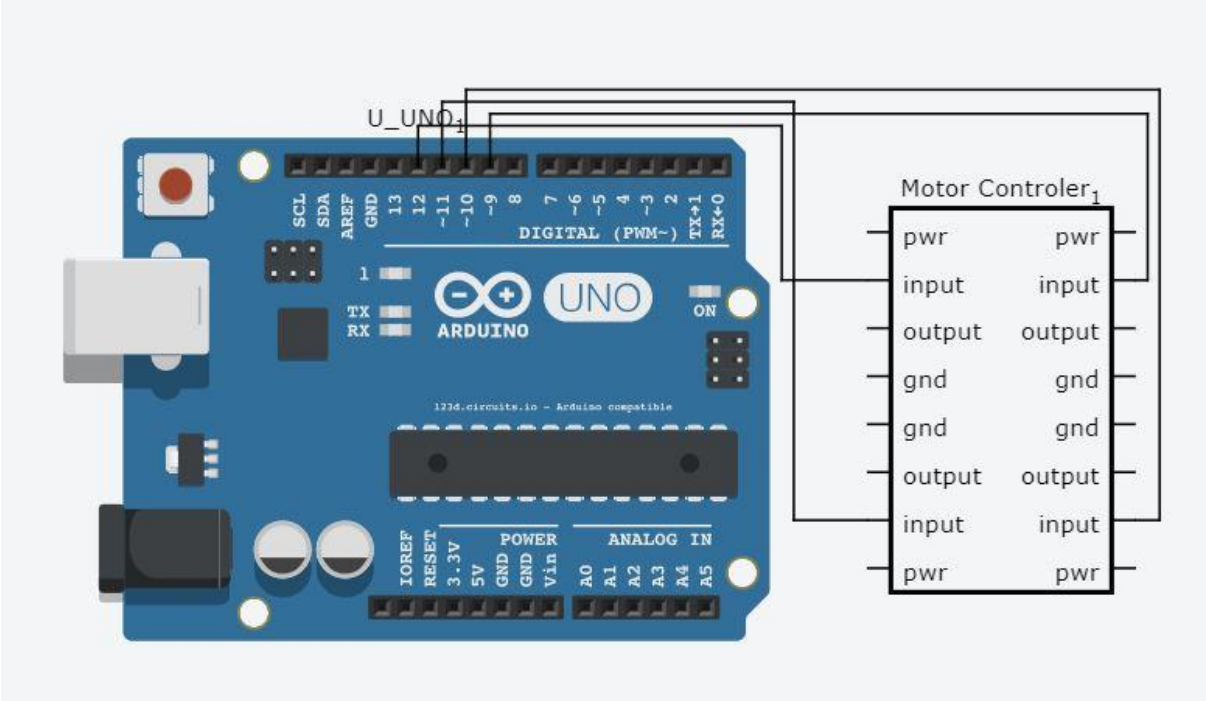

Figure 5.2: Arduino uno to IC1 Connection

5.2.2.2Arduino uno to IC2

Pin Mode (6, OUTPUT); // connect to input 2 of l293d

Pin Mode (3, OUTPUT); // connect to input 15 of l293d

Pin Mode (5, OUTPUT); // connect to input 7 of l293d

Pin Mode (4, OUTPUT); // connect to input 10 of l293d

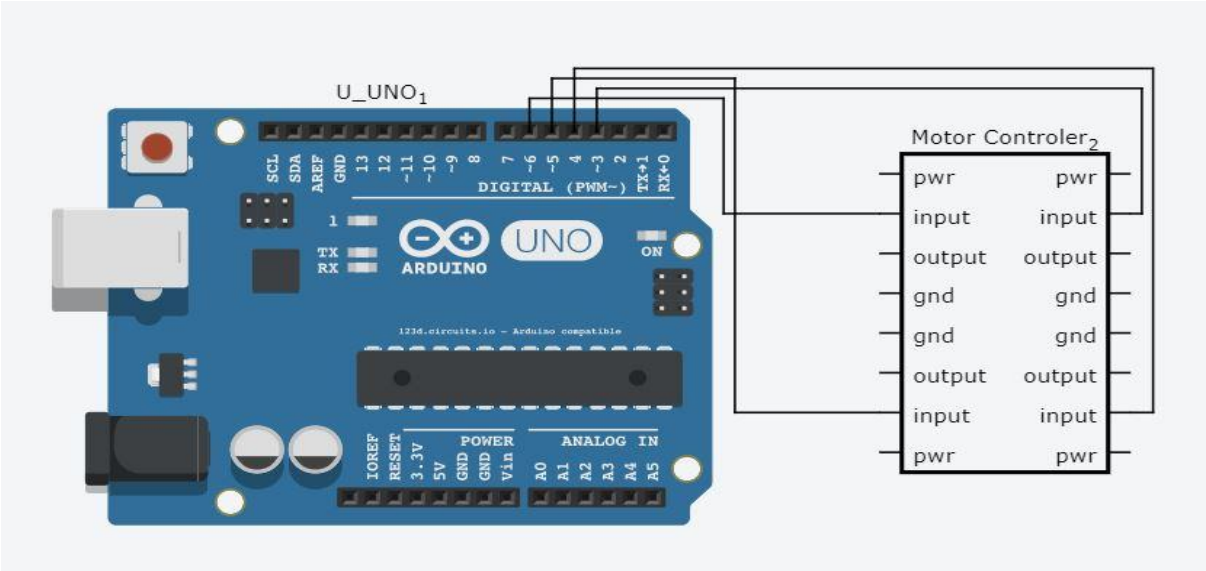

Figure 5.3: Arduino uno to IC2 Connection

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5.2.2.3 Arduino uno to IC3

Pin Mode (13, OUTPUT); // connect to input 2 of l293d

Pin Mode (2, OUTPUT); // connect to input 15 of l293d

Pin Mode (8, OUTPUT); // connect to input 7 of l293d

Pin Mode (7, OUTPUT); // connect to input 10 of l293d

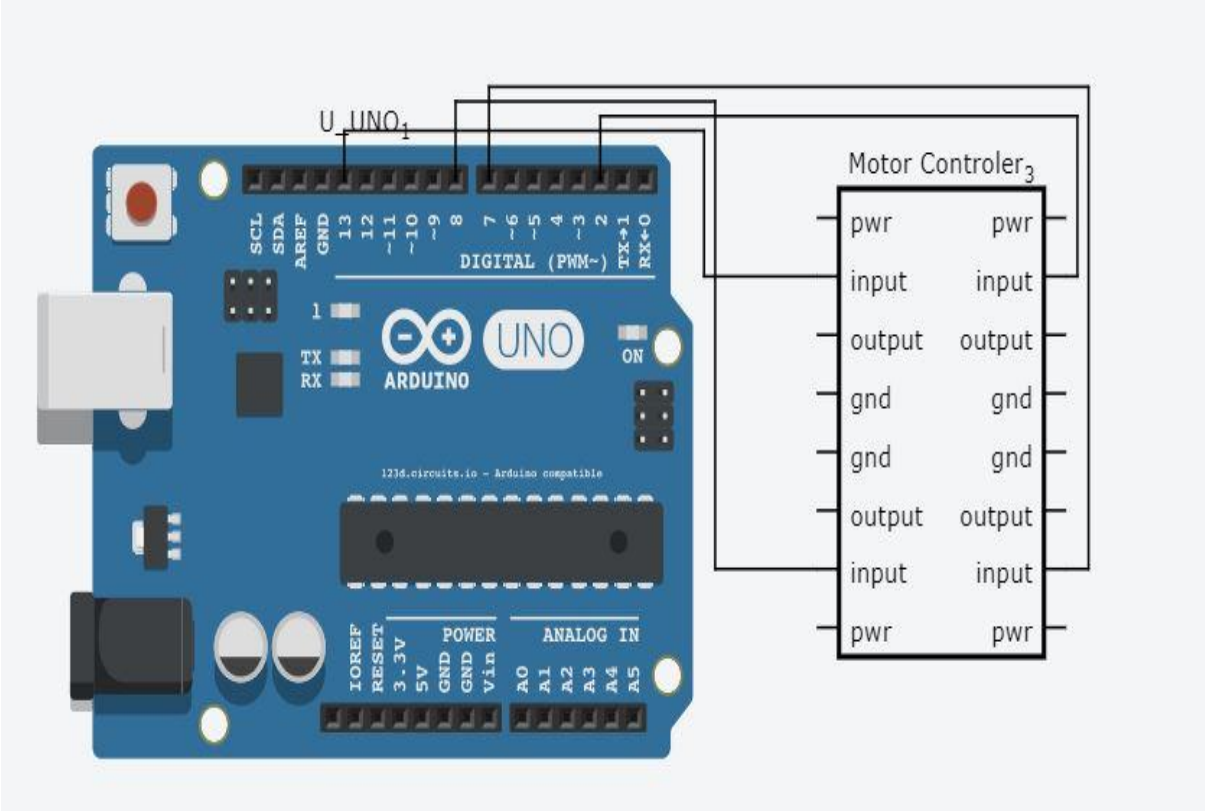

Figure5.4: Arduino uno to IC3 Connection

5.2.3Arduino uno to power supply connection

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

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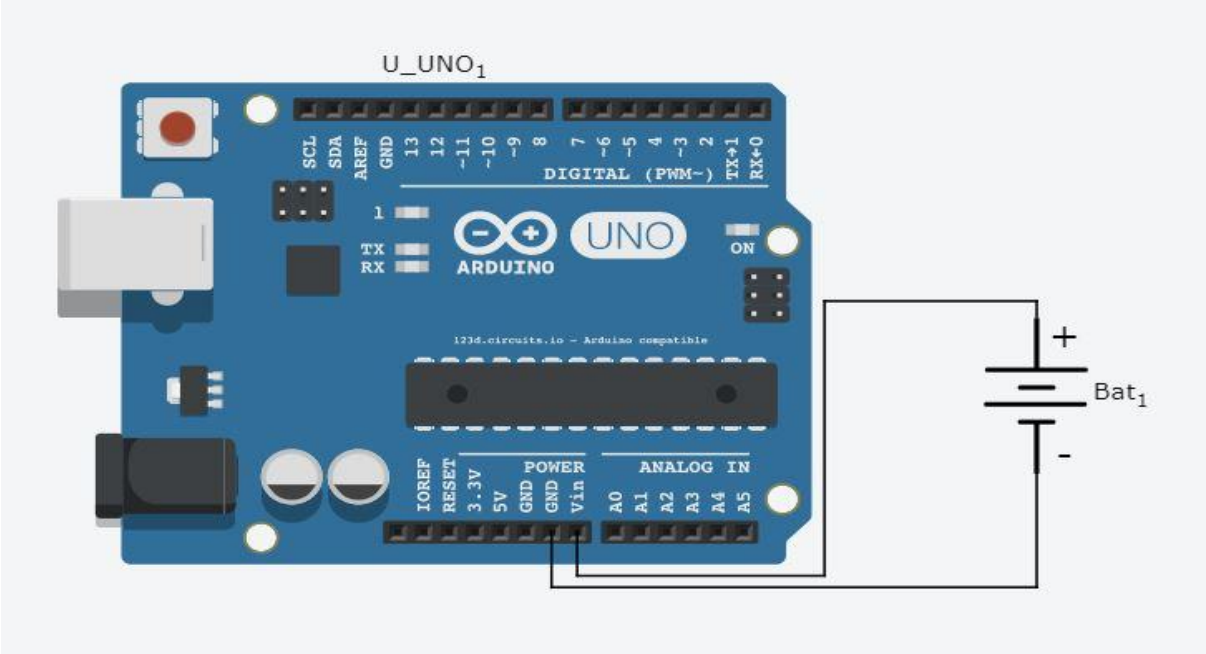

Figure 5.5: Arduino uno to Power Supply Connection

Now combine the Arduino uno, Bluetooth module and three L293D IC.

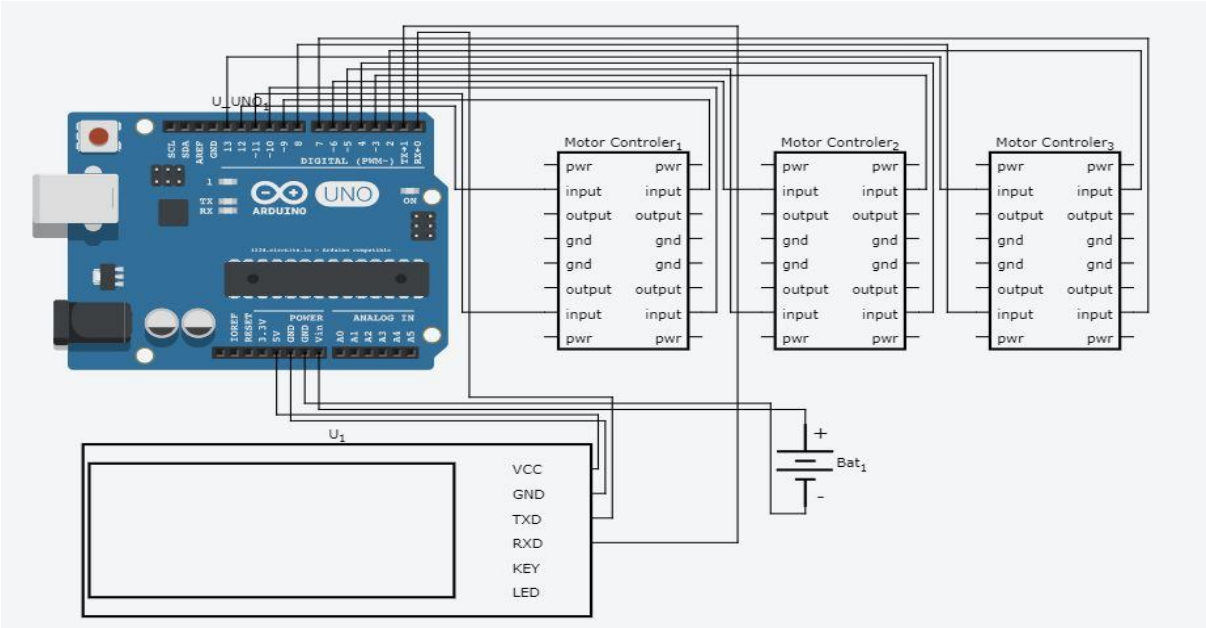

Figure 5.6: Combine the Arduino uno, Bluetooth Module and three L293D IC.

5.3 Implementation of Interaction

My fire fighting road cleaner robot social interaction plays an important role in spreading the use of the robot in human daily life. Through effective social

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interaction, robots will be able to perform many tasks in the human society. These applications need to develop social robots that are able to behave with humans as partners if not peers. This paper presents Maggie, a robotic platform developed at Robotics Lab for research on human-robot social interaction. The different developed interaction modules are also described.

5.4 Testing Implementation

Now Testing Implementation depends on the test good quality or design. Testing Implementation is a final step of my project. So now test implement it, fire fighting road cleaner robot output function (that means forward, backward, left, right, horn, water pump, cleaner and flag on). Than my robotics code upload the ARDUINO UNO board. Use USB data cable, connect computer to ARDUINO UNO. Shown in figure them:

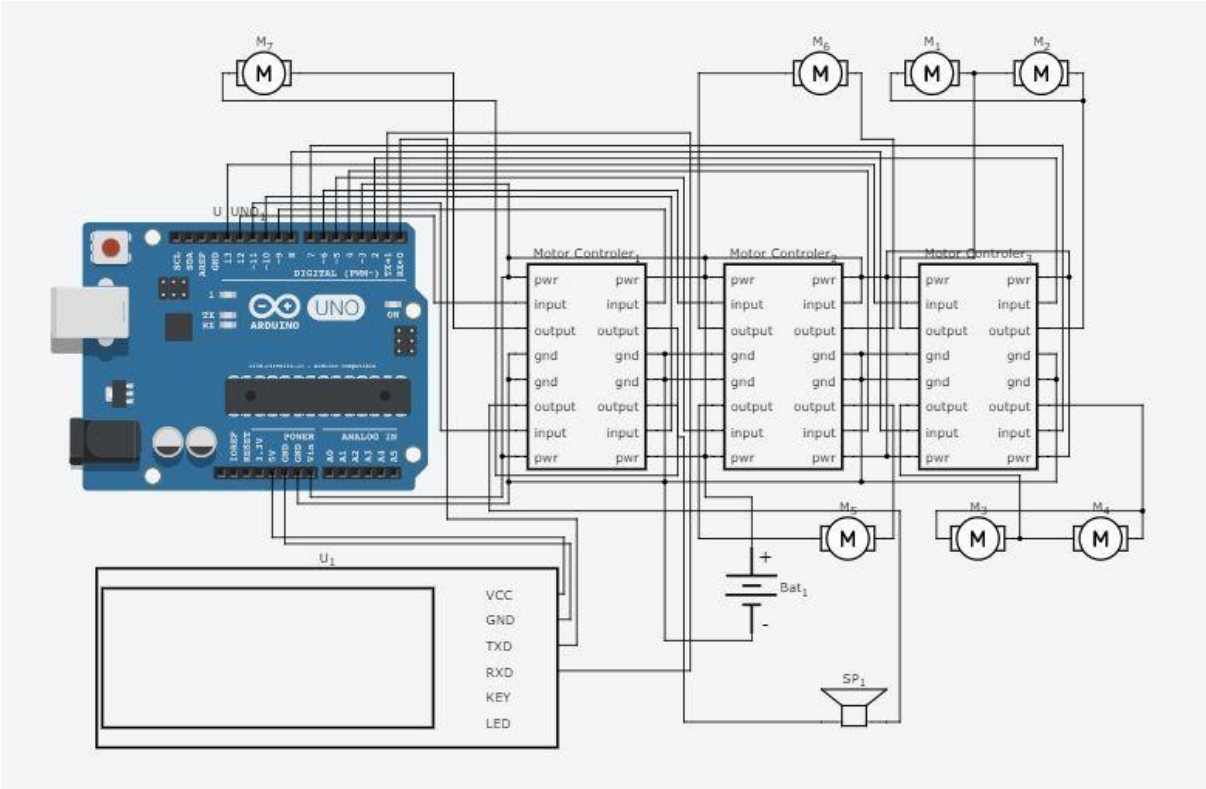

Figure 5.7: Testing Implementation

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5.5 Test Results and Reports [R:2]

So complete my project now tested every function. At first I open my android phone and on the Bluetooth. Than install my rasel Bluetooth apps, search the Bluetooth device HC 05. If found HC 05, than connect them and press the controlling function.

This is call or controlling function:

- Forward
- Backward
- Left
- Right
- Clean
- Horn
- Water
- Stop
- Flag on

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CHAPTER 6
CONCLUSION AND FUTURE SCOPE

6.1 Discussion and Conclusion

In my fire fighting road cleaner robot is a social work getting more opportunity every day. Anyone means client can easily control the robot.

Today we find most robots working for people in industries, factories, warehouses and road. My Robots are useful in many ways. For instance, in garments godowns, cotton mills, and fuel storage tanks, electric leakages may result in immense fire & harm. In the worst of cases & scenarios, fire causes heavy losses both financially and by taking lives, the industry competition. Apart from this, this Fire fighting robotic project will also help generate interest along with the innovations in the field of robotics while operating towards a sensible and obtainable solution to save lives and mitigate the danger to property.

6.2 Scope for Further Developments [R:5]

My future Development project is Automatic Fire Extinguishing Robot without Manual Control. The robot has fire sensors interfaced in its control circuitry which senses the presence and intensity of fire and take the responsive action accordingly. The robot is designed to detect intensity of fire and operate first at place where the intensity of fire is more. It is also an automatic robot as it does not need to be operated from any remote control. One only needs to deploy the robot in a fire prone zone and the robot will automatically initiate action once it detects a fire breakout. This Robot finds its applications in Rescue operations during fire accidents where the possibility for service men to enter the fire prone areas is very less.

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APPENDIX A

PROGRAMMING CODE :

```
1.  #include <SoftwareSerial.h>
2.  SoftwareSerial BT(0, 1); //TX, RX respetively
3.  String readdata;
4.  void setup() {
5.  BT.begin(9600);
6.  Serial.begin(9600);
7.  //L293D IC NO1
8.  pinMode(12, OUTPUT); //connect to input 2 of l293d
9.  pinMode(9, OUTPUT); // connect to input 15 of l293d
10. pinMode(11, OUTPUT); // connect to input 7 of l293d
11. pinMode(10, OUTPUT); // connect to input 10 of l293d

12. //L293D IC NO2
13. pinMode(6, OUTPUT); // connect to input 2 of l293d
14. pinMode(3, OUTPUT); // connect to input 15 of l293d
15. pinMode(5, OUTPUT); // connect to input 7 of l293d
16. pinMode(4, OUTPUT); // connect to input 10 of l293d

17. //L293D IC NO3
18. pinMode(13, OUTPUT); // connect to input 2 of l293d
19. pinMode(2, OUTPUT); // connect to input 15 of l293d
20. pinMode(8, OUTPUT); // connect to input 7 of l293d
21. pinMode(7, OUTPUT); // connect to input 10 of l293d
22. }
```


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```
23.  //---------------------------------------------------------------------//
24.  void loop() {
25.  while (BT.available()){  //Check if there is an available byte to read
26.  delay(10); //Delay added to make thing stable
27.  char c = BT.read(); //Conduct a serial read
28.  readdata += c; //build the string- "forward", "reverse", "left"  "right" "water" "horn" "clean" and flag"
29.  }

30.  if (readdata.length() > 0) {
31.  Serial.println(readdata); // print data to serial monitor
32.  // if data received as forward move robot forward
33.  if(readdata == "forward")
34.  {
35.  digitalWrite(12, HIGH);
36.  digitalWrite (9, HIGH);
37.  digitalWrite(11,LOW);
38.  digitalWrite(10,LOW);
39.  delay(100);
40.  }
41.  // if data received as reverse move robot reverse
42.  else if(readdata == "backward")
43.  {
44.  digitalWrite(12, LOW);
45.  digitalWrite(9, LOW);
46.  digitalWrite(11, HIGH);
47.  digitalWrite(10,HIGH);
48.  delay(100);
49.  }

50.  // if data received as right turn robot to right direction.
51.  else if (readdata == "right")
```


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```
52.     {
53.     digitalWrite (12,HIGH);
54.     digitalWrite (9,LOW);
55.     digitalWrite (11,LOW);
56.     digitalWrite (10,LOW);
57.     delay (100);
58.     }

59.     // if data received as left turn robot to left direction
60.     else if ( readdata == "left")
61.     {
62.     digitalWrite (12, LOW);
63.     digitalWrite (9, HIGH);
64.     digitalWrite (11, LOW);
65.     digitalWrite (10, LOW);
66.     delay (100);
67.     }

68.     else if ( readdata == "water")
69.     {
70.     digitalWrite (6, HIGH);
71.     digitalWrite (3, LOW);
72.     digitalWrite (5, LOW);
73.     digitalWrite (4, LOW);
74.     delay (100);
75.     }

76.     else if ( readdata == "horn")
77.     {
78.     digitalWrite (6, LOW);
79.     digitalWrite (3, HIGH);
80.     digitalWrite (5, LOW);
```


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```
81.     digitalWrite (4, LOW);
82.     delay (100);
83.     }
84.     else if ( readdata == "clean")
85.     {
86.     digitalWrite (13, HIGH);
87.     digitalWrite (2, LOW);
88.     digitalWrite (8, LOW);
89.     digitalWrite (7, LOW);
90.     delay (100);
91.     }

92.     else if ( readdata == "flag")
93.     {
94.     digitalWrite (13, LOW);
95.     digitalWrite (2, HIGH);
96.     digitalWrite (8, LOW);
97.     digitalWrite (7, LOW);
98.     delay (100);
99.     }



100.    // if data received as stop, halt the robot
101.    else if (readdata == "stop")
102.    {
103.    digitalWrite (12, LOW);
104.    digitalWrite (9, LOW);
105.    digitalWrite (11, LOW);
106.    digitalWrite (10, LOW);
107.    digitalWrite (6, LOW);
108.    digitalWrite (3, LOW);
```


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```
digitalWrite (5, LOW);
digitalWrite (4, LOW);
digitalWrite (13, LOW);
digitalWrite (2, LOW);
digitalWrite (8, LOW);
digitalWrite (7, LOW);
delay (100);
}
readdata="";}} //Reset the variable
```


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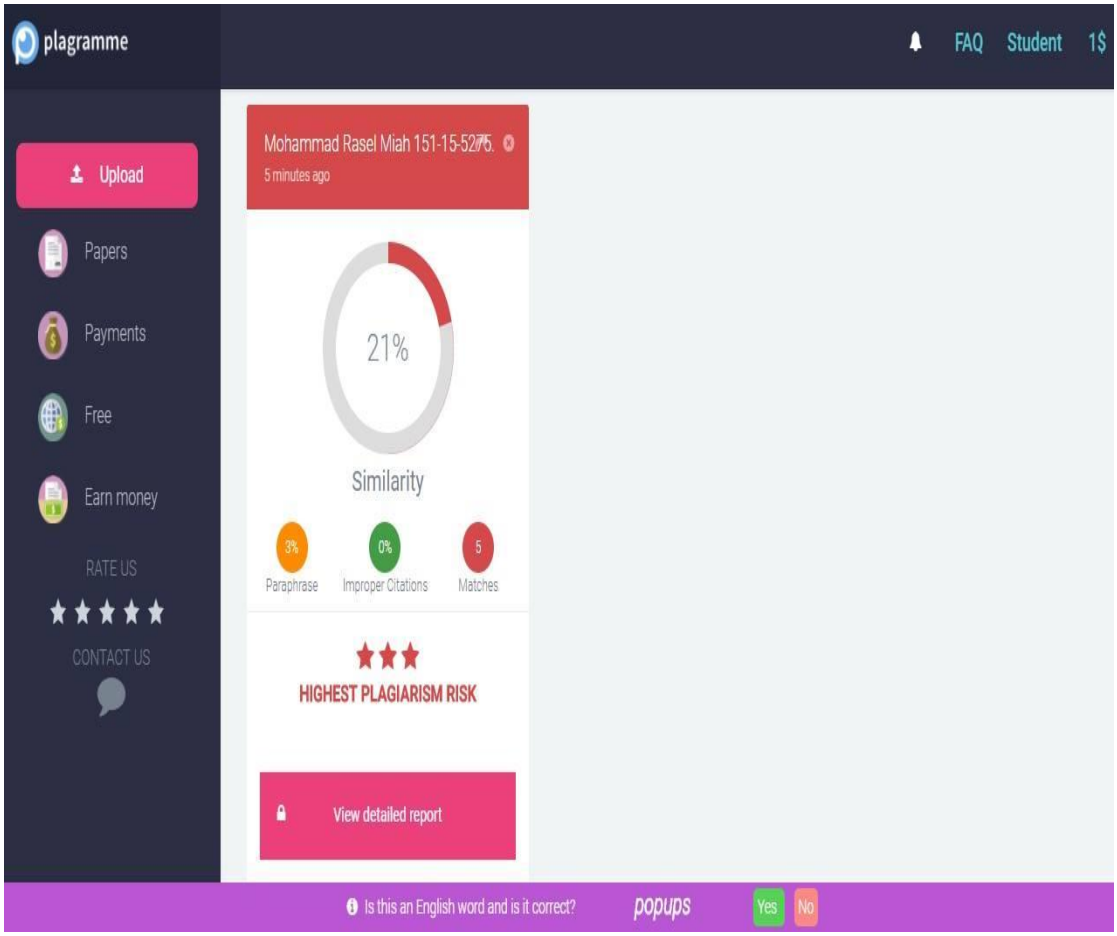
Plagiarism Check :



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