

# VOICE CONTROLLED CAR

by

Nishant Kushwaha(RA1611003030134)

Aryan Upadhyay(RA1611003030185)

Ankit Gupta(RA161103030141)

Rishabh Joshi(RA1611003030184)

Submitted to the Department of Computer Science Engineering

In partial fulfillment of the requirements

For the degree of

Bachelor of Technology

In

Computer Science and Engineering



**SRM**  
INSTITUTE OF SCIENCE & TECHNOLOGY  
— Deemed to be University —

SRM Institute of Science and Technology

April, 2018

## TABLE OF CONTENT

Page

CERTIFICATE.....	I
DECLARATION.....	II
ACKNOWLEDGEMENTS.....	III
ABSTRACT.....	IV
LIST OF ABBREVIATIONS .....	V
LIST OF FIGURES .....	VI
CHAPTER 1 INTRODUCTION.....	1-3
CHAPTER 2 LITERATURE SURVEY .....	4-6
CHAPTER 3 EXISTING SYSTEM .....	7-8
CHAPTER 4 PROPOSED SYSTEM AND METHADODOLOGY.....	9-12
CHAPTER 5 RESULTS .....	13-15
FUTURE SCOPE .....	16-17
CONCLUSION .....	18
REFERENCES... ..	19-21

## **CERTIFICATE**

This is to certify that Project Report entitled “Voice Controlled Car” which is submitted by Rishabh Joshi, Nishant Kushwaha, Aryan Upadhyay and Ankit Gupta in the partial fulfillment of the requirement for the award of final grade for the subject Multidisciplinary Design , is a record of the candidate’s own work carried out by him under my/our supervision. The matter embodied in this thesis is original and has not been submitted for the award of any other degree.

**Date:**

**Supervisor**

## **DECLARATION**

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text.

Signature

Name & Roll No.: Nishant Kushwaha (RA1611003030134)

Aryan Upadhyay (RA1611003030185)

Ankit Gupta (RA1611003030141)

Rishabh Joshi (RA1611003030184)

Date

## **ACKNOWLEDGEMENT**

It gives us a great sense of pleasure to present the report of the Multidisciplinary Project undertaken during B.Tech Second Year. We owe special debt of gratitude to Assistant Professor Shalika Mam , Department of Computer Science, SRMIST for her constant support and guidance throughout the course of our work. Her sincerity, thoroughness and perseverance have been a constant source of inspiration for us. It is only her cognizant efforts that our endeavors have seen light of the day.

We also do not like to miss the opportunity to acknowledge the contribution of all faculty members of the department for their kind assistance and cooperation during the development of our project. Last but not the least, we acknowledge our friends for their contribution in the completion of the project.

Signature:

Name & Roll no. : Nishant Kushwaha (RA1611003030134)

Aryan Upadhyay (RA1611003030185)

Ankit Gupta (RA1611003030141)

Rishabh Joshi (RA1611003030184)

Date :

## **ABSTRACT**

Until recently, the idea of communicating with electronic devices seemed pure fiction. Things like commanding the computer to open the doors, or telling a robot to do tasks happened only in movies. However, things are changing now and at a very fast rate. A growing number of people now talk to their mobile smart phones, asking them to send e-mail and text messages, search for directions, or find information on the Web. In addition to this, extending this idea, our project is going to move things further into the big world, and we aim to use human voice to control a car's movement. Imagine a life where you don't have to drive your cars and you can just travel places where you command your car to travel. In our project, we will be applying Arduino microcontroller circuit in a miniature prototype model car. The Arduino has an integrated Bluetooth module. Moreover, we will be developing an application using Android which will be used to input the commands using Human voice. Arduino will be programmed such that it controls the car movement and makes sure the car performs the required movement by controlling the hardware components. With the help of the android application, voice will be input and will be converted into text format and using Bluetooth the voice commands will be forwarded to the Bluetooth module integrated in the Arduino.

## **LIST OF ABBREVIATIONS**

IJETT	International Journal of Engineering Trends and Technology
IJSRD	International Journal for Scientific Research & Development
BT	Bluetooth
WiFi	Wireless Fidelity
IJIR	Imperial Journal of Interdisciplinary Research
ISSN	International Standard Serial Number

## **LIST OF FIGURES**

Figure 1: Circuit Diagram of proposed system

Figure 2: Installed car with all hardware components

Figure 3: Android application used

Figure4: Successful compilation of Arduino code

Figure 5: Successful uploading of Arduino code

Figure 6: Final car



# **CHAPTER 1**

## **INTRODUCTION**

In our project, we are applying Arduino microcontroller circuit in a miniature prototype model car. The Arduino has an integrated Bluetooth module. Moreover, we will be developing an application using Android which will be used to input the commands using Human voice. Arduino will be programmed such that it controls the car movement and makes sure the car performs the required movement by controlling the hardware components. With the help of the android application, voice will be input and will be converted into text format and using Bluetooth the voice commands will be forwarded to the Bluetooth module integrated in the Arduino.

Bluetooth is the technology we are using to connect our car with any android application. Bluetooth is used due to many of its advantages. It is simple to setup within seconds without using internet. Moreover, Android application using Bluetooth is compatible with any other device that supports Bluetooth, regardless of make, model or design. Less hardware is used, only a Bluetooth module is required in the project to connect with the smartphone's Bluetooth. In addition to this, security is the main feature of Bluetooth. Bluetooth has inherent security in two ways. The first is that it is not always broadcasting, unlike a Wi-Fi connection. When you want to connect two devices via Bluetooth you set them to be visible, also sometimes called "discoverable." This visibility is only necessary until the devices have been paired. Once paired, you can turn off visibility and keep the device closed to new connections. The second level of security is that in most cases you will need to authorize the connection using a PIN or code to connect two devices.

Arduino Uno is used in our car to program our car to perform movements and control the hardware. We have used it instead of other microcontrollers because the Arduino IDE which is compatible only with the Arduino boards makes it exponentially easier and faster to prototype. If you will compare the codes of the Arduino IDE with an AVR or ARM

microcontroller the difference is just mind blowing. The libraries and the available online materials also makes it a great platform for the beginners to work on. I have worked on AVR, ARM, MSP430 and Arduino and I personally find Arduino the best for fast prototyping and easy applications. The biggest advantage of Arduino is its ready to use structure. As Arduino comes in a complete package form which includes the 5V regulator, a burner, an oscillator, a micro-controller, serial communication interface, LED and headers for the connections. Another advantage of Arduino is its automatic unit conversion capability. There are many forums present on the internet in which people are talking about the Arduino. Engineers, hobbyists and professionals are making their projects through Arduino.

A DC gear motor is used to control and speed up our car. DC motors are often selected instead of AC motors for many reasons (see Table 1). DC motors and controllers are often the low-cost option when compared to inverter-duty AC motors and drives. This is especially true for fractional hp applications. Along the same lines, the simple design of DC motors makes service, maintenance and control well understood and easily supportable. Field excitation is not required, and brush replacement and motor service are well understood by the typical industrial electrician. Even speed control is simple: Just adjust the terminal voltage, often using a local potentiometer. DC motors have a higher power density and are, therefore, smaller than an equivalent AC motor. They have no field coil in the stator, so the field coil space is saved, reducing the overall motor size. This becomes a substantial benefit in some space-constrained applications.

Furthermore, regarding the hardware, we have used a 12V battery to power up our car. And a motor drive module to connect various parts like tyres to the gear motor. All the parts are interconnected using connecting wires .

For the software part, we have programmed Arduino Uno using Arduino Ide . Arduino programming is derived from C programming. Different modules are programmed to control different movements. When any specific movement is required, programming is done such that current only passes through the pins which make that movement happen.

And xml and java programming is used to make the android application for controlling the car. The app has been integrated with google voice feature to input voice and convert it into text format and send it to the Arduino using Bluetooth. Other than voice, a mini remote control also has been put into the app with buttons of 4 basic movements ,forward, backward, right , left and a stop button also has been put to stop the car immediately to prevent any accidents. From the android application , the user can search for the Bluetooth module of our car and pair it so that android app and our car are ready to work together.

The Main feature of our project is to eliminate wires and physical controls and use the concept of voice control to command movements to our car.

## **CHAPTER 2**

### **LITERATURE SURVEY**

#### **RESEARCH PAPER-1**

**S.D. Mulla, A.S. Mali, S.T. Shibe, S.S.Joshi [1]** present the concept of “Android Application Controlled Remote Robot Operation” Robot which is in the form of car which can be controlled by Bluetooth and android device. The components involved are Bluetooth module, 8051 Series Microcontroller, Dc motor and motor drivers. The robotic car can perform 4 basic operations that is move forward, backward, right and left based on the button pressed from the android device connected through Bluetooth.

#### **RESEARCH PAPER-2**

**Nelson Rai , Deepak Rasaily , Tashi Rapden Wangchuk, Manoj Gurung , Rit Kr. Khawas [2]** present the concept of “Bluetooth Remote Controlled Car using Arduino” This project is a remote controlled car. Its based on the main concept of Arduino, Bluetooth module and motor driver. This is a very simple and easy type form of remote control car, where the ordinary micro-controller has been replaced by Arduino and IR sensors has been replaced by a Bluetooth module. The remote can be any android or IOS cell phones. The car can perform basic moves upon receiving command from android application.

#### **RESEARCH PAPER-3**

**Sheetal Gandotra, Bhawna Sharma, Shreeya Mahajan, Tsering Motup, Tahira Choudhary & Paras Thakur[3]** present the concept of “Wireless car using IR sensors” This project demonstrates a car which can be controlled by a TV remote. Here, the proposed system uses an RF technology for remote operation. An IR sensor is interfaced to the control unit of the robot for detecting the infrared signals which are transmitted by the remote. An 8051 series of microcontroller is used for the preferred operation.

#### **RESEARCH PAPER-4**

**Amanpreet Kaur, Abhishek Mani Tripathi, Gopal Kushwaha , Inzmamul Haque[4]** present the concept of “Wifi controlled Car” This project controls a car’s movement using wifi with the help of NodeMCU boards which is an Arduino board with built in wifi. It will connect to the wifi and generate an IP address on the display. Using a smartphone or a computer, the respective IP address should be typed in the web browser address bar , and a webpage will be displayed using which cars movement can be controlled.

#### **RESEARCH PAPER-5**

**Shrutika Kanere , Rutuja Shinde , Vaibhavi Tornekar, Dnyaneshwari Zagade, Mrs. V.S.Sonar[5]** present the concept of “Clap Controlled Car” This Project demonstrates the controlling of a miniature model car by clapping. It uses Arduino Uno ,and microphone amplifier . The microphone receives the sound of clap and moves accordingly. The car is programmed such that when you clap once, the car goes straight, When you clap twice, the car turns slightly to the right, When you clap three times, the car turns slightly to the left. At the same time, if the car is functioning and it impacts with an object, it moves it with an arm connected to the third stepper motor.

#### **RESEARCH PAPER-6**

**Rowjatul Zannat Eshita , Tanwy Baru , Arzon Barua , Anik Mahamood Dip[6]** present the concept of LDR controlled car . This Project demonstrates the controlling of a miniature model car by using LDR. It uses Arduino Uno ,and Light amplifier . The ampliefir detects the light and moves accordingly. The car is programmed such that it moves in the direction from where it detects the light.

#### **RESEARCH PAPER-7**

**S R Madkar ,Vipul Mehta, Nitin Bhuwania, Maitri Parida [7]** present the concept of Robot Controlled Car Using Wi-Fi Module. This project controls a car’s movement using wifi with the help of NodeMCU boards which is an Arduino board with built in wifi. It will connect to the wifi and generate an IP address on the display. Using a smartphone or a

computer, the respective IP address should be typed in the web browser address bar , and a webpage will be displayed using which cars movement can be controlled.

#### **RESEARCH PAPER-8**

**Rahul Kumar, Ushapreethi P, Pravin R. Kubade, Hrushikesh B. Kulkarni [8]** present the concept of solar powered car. In this project, a car doesn't need any external source of power source. It gets power from sunlight and converts it into electrical energy. The car depends on a solar array that uses photovoltaic cells (PV cells) to convert sunlight into electricity. Unlike solar thermal energy which converts solar energy to heat, PV cells directly convert sunlight into electricity.<sup>[1]</sup> When sunlight (photons) strike PV cells, they excite electrons and allow them to flow, creating an electric current.

#### **RESEARCH PAPER-9**

**Subankar Roy, Tashi Rapden Wangchuk, Rajesh Bhatt [9]** present the concept of Air powered car. This car works in the direction of air in the atmosphere, it doesn't need any external source of power. The user cannot control the direction of car, it works in the direction of air, and water comes out as a byproduct from the car. The car can be used a machine for short distance transport and water generation.

#### **RESEARCH PAPER-10**

**Ritika Pahuja , Narender Kumar [10]** present the concept of steam controlled car. This car runs on steam and gets power by converting steam into electricity .Steam engine is used. A steam engine is an external combustion engine (ECE) where the fuel is combusted away from the engine, as opposed to an internal combustion engine (ICE) where the fuel is combusted within the engine. ECEs have a lower thermal efficiency, but it is easier to regulate carbon monoxide production.

#### **RESEARCH PAPER-11**

**Ibrahim Malik, Salman Pandey, Darshika Pandey [11]** present the concept of Water powered car. This car runs on water by converting energy obtained from water into electricity. Water is stored and the engine keeps on vibrating water to extract the energy and form a reaction to power up the car. The car is suitable for short distance journey .

## **CHAPTER 3**

### **EXISTING SYSTEM**

The existing system of our project has certain limitations and we have worked to rectify those limitations by innovating and using various technologies. Some of the different existing systems are explained below followed by how we overcame those limitations.

The first existing system of our car is controlled by wires and the car moves on a specified path using only fixed movements programmed into it. The wire is used to supply power to it using an external battery. This system has limitations like the car is not portable and cannot be used for long distance. And since it is wired, it reduces flexibility and usability of the car. The car is not efficient and cannot be used in daily life.

The second existing system is a car which is controlled by infrared due to which direct point to point communication was required. In this system, a separate remote control is needed to control the car and only users with the specific remote can control the car and thus it is a limitation as it cannot be used by general public. Hence, reducing usability and the price is high for this system.

Another system is an Android Application Controlled Remote Robot Operation” Robot which is in the form of car which can be controlled by Bluetooth and android device.. The robotic car can perform 4 basic operations that is move forward , backward, right and left based on the button pressed from the android device connected through Bluetooth. The limitation is it cannot perform complex moves and not efficient,

Next system is a wifi controlled Car” This project controls a car’s movement using wifi .. It will connect to the wifi and generate an IP address on the display. Using a smartphone or a computer, the respective IP address should be typed in the web browser address bar, and a

webpage will be displayed using which cars movement can be controlled. This system is not available to mass public, it is expensive and not flexible and portable

Clap Controlled Car” This Project demonstrates the controlling of a miniature model car by clapping. It uses Arduino Uno ,and microphone amplifier . The microphone receives the sound of clap and moves accordingly. The car is programmed such that it performs certain basic movements depends on the number of claps.This system is not efficient , and has many sources of errors and cannot be used in outside world due to noise interference from surrounds. Also another limitation is that it is expensive.



# **CHAPTER 4**

## **PROPOSED SYSTEM AND METHODOLOGY**

### **PROPOSED SYSTEM**

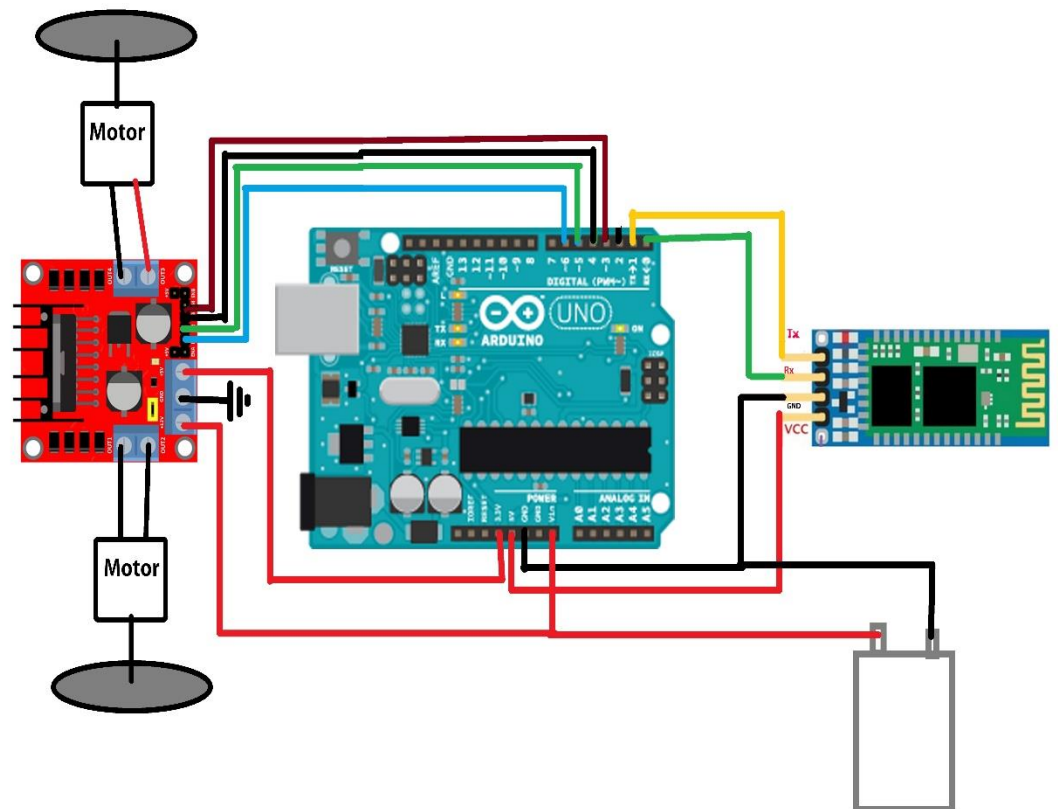
Our proposed system is a Voice controlled Car which eliminates any limitation faced in the existing systems till date. We aim to use human voice to control a car's movement. Imagine a life where you don't have to drive your cars and you can just travel places where you command your car to travel. Our car perform complex moves and basic moves with ease , which increases flexibility and usability of our proposed system by the mass public in the open world. In addition to this , Our proposed system uses Arduino uno and an android application which received the commands using voice recognition. We have eliminated the use of wires, making our car portable. We have used voice recognition so that user can drive our car hands free and save time, and this will change the industry of transportation.

### **MEDTHODOLOGY**

In our project, we will be applying Arduino microcontroller circuit in a miniature prototype model car. The Arduino has an integrated Bluetooth module. Moreover, we will be developing an application using Android which will be used to input the commands using Human voice. Arduino will be programmed such that it controls the car movement and makes sure the car performs the required movement by controlling the hardware components. With the help of the android application, voice will be input and will be converted into text format and using Bluetooth the voice commands will be forwarded to the Bluetooth module integrated in the Arduino.

Our proposed system requires the following hardware and software requirements. For the software requirements, it uses android programming done in android studio. Android studio is used to avoid any errors in the development phase. To prevent any errors log messages are used and android debugger to analyse what is happening in the background of our car and to detect where and how the errors arise. Next software requirement is Arduino programming which is done Arduino ide. With the help of Arduino coding, we have programmed our car to not only perform basic moves but it can perform complex moves

also. Whenever a specific move needs to be performed with the help of Arduino coding, that pin of the motor driver is supplied current. Now, our proposed system requires the following hardware components: Arduino Uno, Bluetooth Transceiver Module, Motor Driver Module, DC Gear motor, 12V battery, Connecting wires and a Android Device.



**Fig 1: The circuit diagram our proposed system**

The final car which is made following the above circuit diagram looks as shown below:

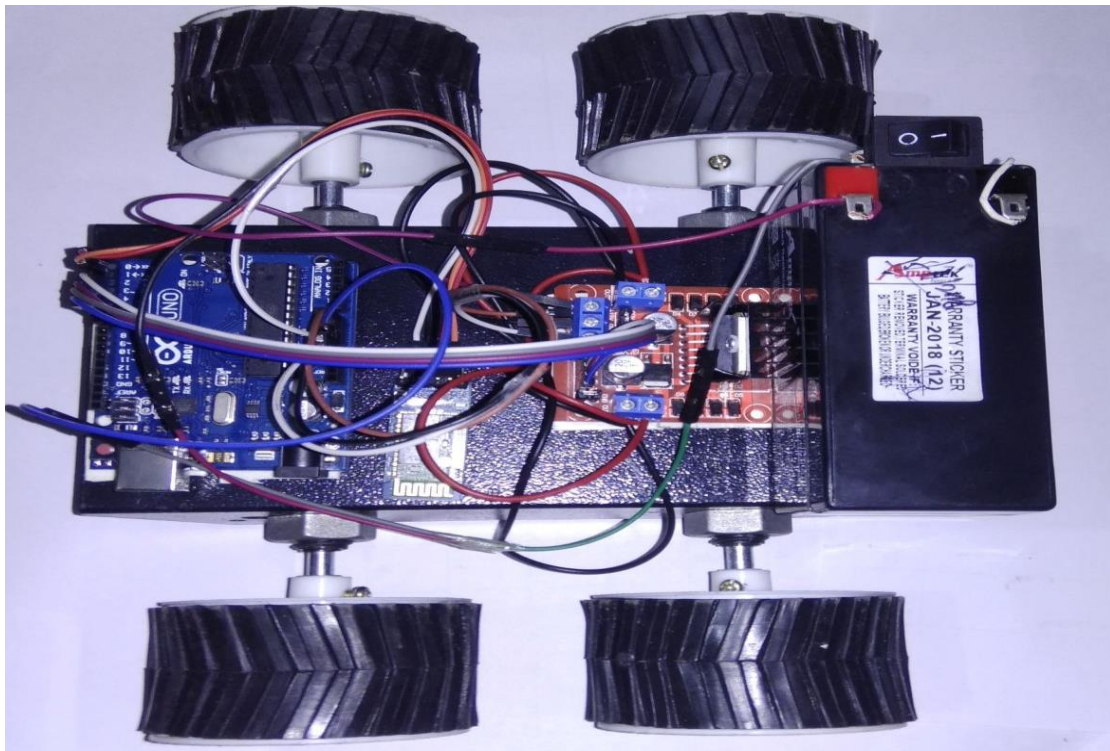


Fig 2: : Installed car with all hardware components

For the working of our car , firstly , using the android application the Bluetooth of the android phone paired with Bluetooth module of our so that our proposed system is ready for functioning. Next the user input the voice command using google voice recognition for which a button has been integrated in the application. The voice recognition module of our android application converts the voice commands into text format and thus, by using Bluetooth the specific text is transferred to the Arduino uno where it performs the required movement after detecting the command. The moves for a specific command has already been programmed in the Arduino and as soon as it receives and matches the command, the Arduino coding controls the hardware to make the car follow the pre- coded movements.

For taking care of the safety of our proposed system, a mini remote control also has been put into the app with buttons of 4 basic movements ,forward, backward, right , left and a stop button also has been put to stop the car immediately to prevent any accidents.

The android application developed for our proposed system is shown below-

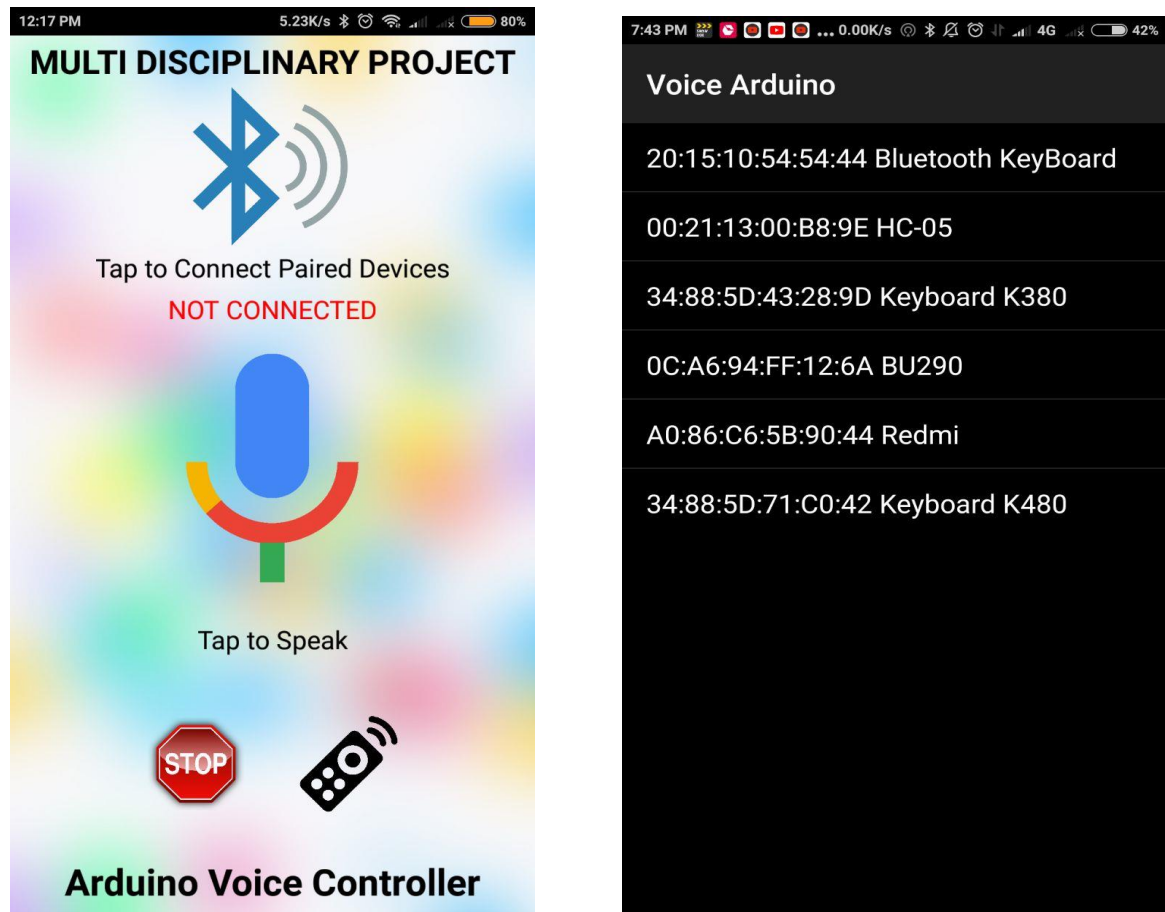


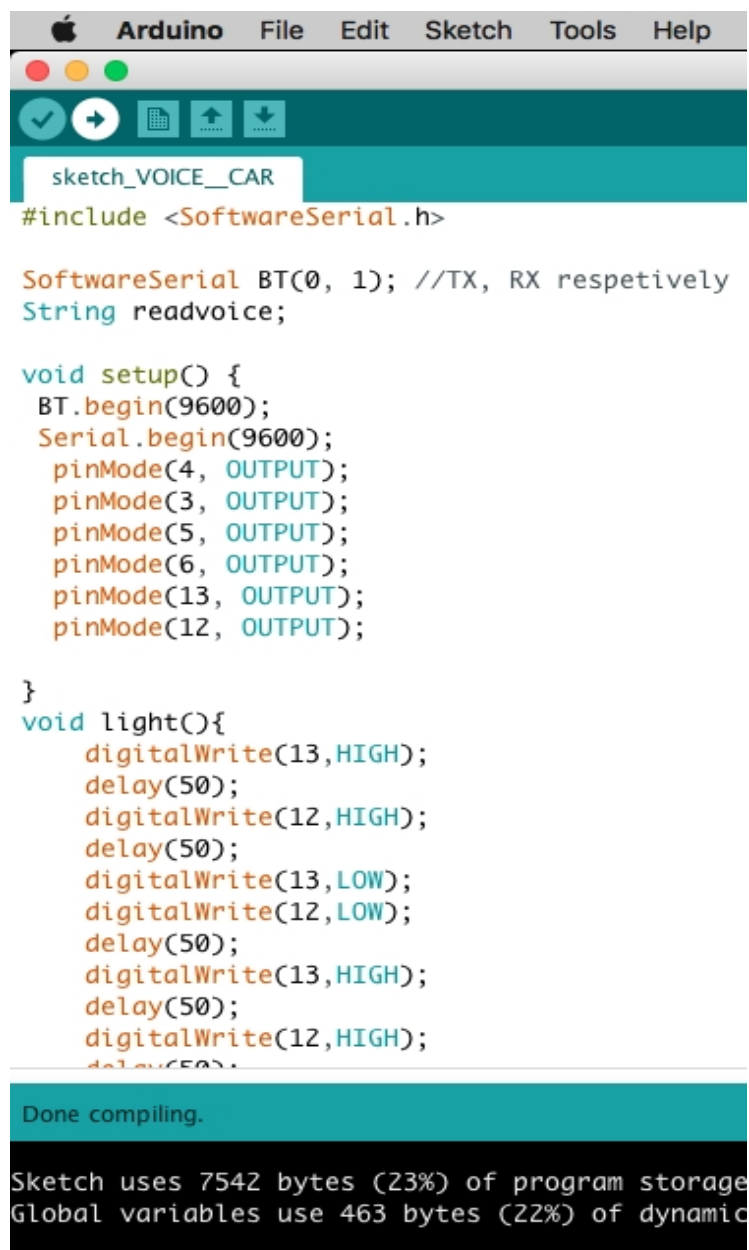
Fig 3,4 : Android application used

## CHAPTER 5

### RESULTS

The Arduino coding after successfully compiling without any error is then uploaded to the Arduino Uno board where the programmed instructions then make sure the car can perform the desired moves.

The Successful compilation of the code is shown below:



```
Arduino  File  Edit  Sketch  Tools  Help

sketch_VOICE_CAR
#include <SoftwareSerial.h>

SoftwareSerial BT(0, 1); //TX, RX respectively
String readvoice;

void setup() {
  BT.begin(9600);
  Serial.begin(9600);
  pinMode(4, OUTPUT);
  pinMode(3, OUTPUT);
  pinMode(5, OUTPUT);
  pinMode(6, OUTPUT);
  pinMode(13, OUTPUT);
  pinMode(12, OUTPUT);
}

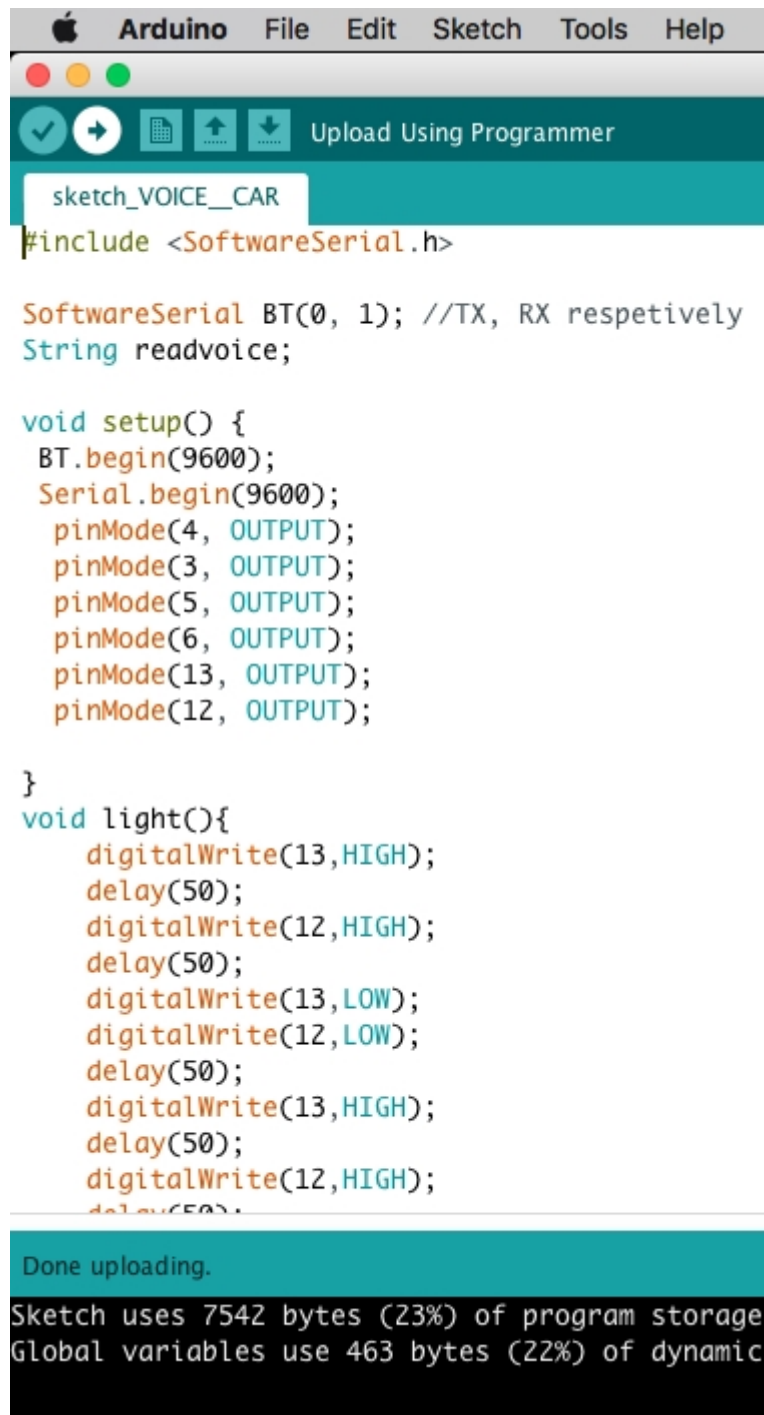
void light(){
  digitalWrite(13,HIGH);
  delay(50);
  digitalWrite(12,HIGH);
  delay(50);
  digitalWrite(13,LOW);
  digitalWrite(12,LOW);
  delay(50);
  digitalWrite(13,HIGH);
  delay(50);
  digitalWrite(12,HIGH);
  delay(50);
}
```

Done compiling.

Sketch uses 7542 bytes (23%) of program storage  
Global variables use 463 bytes (22%) of dynamic

Fig 4: Successful compilation of Arduino code

The successful upload of the code into the Arduino is show below:



The screenshot shows the Arduino IDE interface. At the top, there is a menu bar with 'Arduino', 'File', 'Edit', 'Sketch', 'Tools', and 'Help'. Below the menu bar is a toolbar with icons for checking, uploading, and downloading. A teal banner across the top of the code editor area says 'Upload Using Programmer' with a checkmark icon. Below this banner, the sketch name 'sketch\_VOICE\_\_CAR' is displayed in a white box. The main area of the IDE contains C++ code for an Arduino sketch. The code includes a header file, declares a SoftwareSerial object and a String variable, and defines setup and light functions. At the bottom of the IDE, a status bar shows 'Done uploading.' and memory usage statistics: 'Sketch uses 7542 bytes (23%) of program storage' and 'Global variables use 463 bytes (22%) of dynamic'. The code is as follows:

```
#include <SoftwareSerial.h>

SoftwareSerial BT(0, 1); //TX, RX respetively
String readvoice;

void setup() {
  BT.begin(9600);
  Serial.begin(9600);
  pinMode(4, OUTPUT);
  pinMode(3, OUTPUT);
  pinMode(5, OUTPUT);
  pinMode(6, OUTPUT);
  pinMode(13, OUTPUT);
  pinMode(12, OUTPUT);
}

void light(){
  digitalWrite(13,HIGH);
  delay(50);
  digitalWrite(12,HIGH);
  delay(50);
  digitalWrite(13,LOW);
  digitalWrite(12,LOW);
  delay(50);
  digitalWrite(13,HIGH);
  delay(50);
  digitalWrite(12,HIGH);
  delay(50);
}
```

Fig 5: Successful uploading of Arduino code



After successfully configuring the hardware and software , the resulting car is show below:

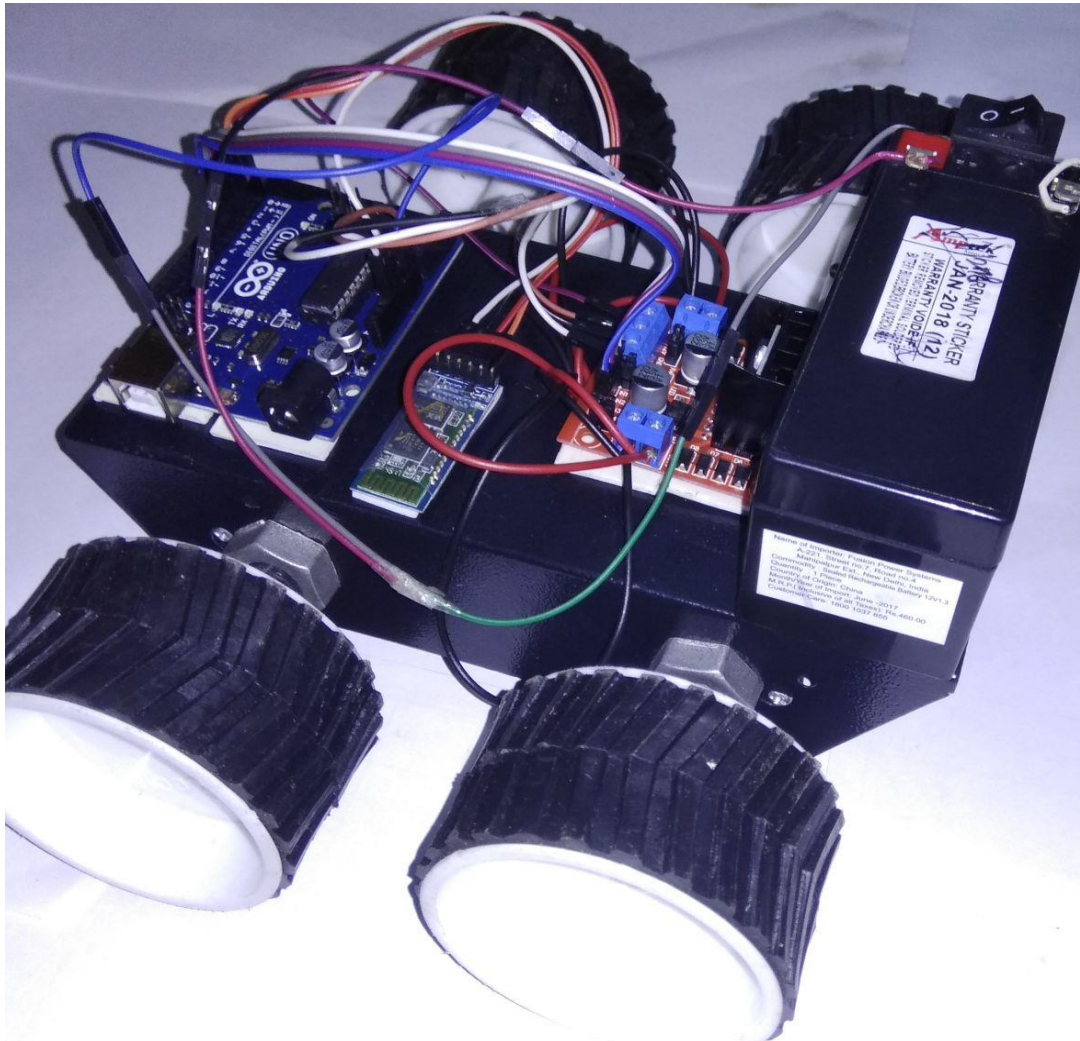


Fig 6: Final Car

## **FUTURE SCOPE**

Until recently, the idea of communicating with electronic devices seemed pure fiction. Things like commanding the computer to open the doors or telling a robot to do tasks happened only in movies. However, things are changing now and at a very fast rate. A growing number of people now talk to their mobile smart phones, asking them to send e-mail and text messages, search for directions, or find information on the Web. In addition to this, extending this idea, our project is going to move things further into the big world, and we aim to use human voice to control a car's movement. Imagine a life where you don't have to drive your cars and you can just travel places where you command your car to travel.

Our Project has a wide future scope , and moreover, it is widely accepted by the industries and the customers as our car is Wireless , Easy to use, Can be controlled by an app from any phone, any movement can be integrated, and cost is nearly equal to any remote controlled car.

In addition to this, in future, with the help and integration of artificial and deep learning, our car can not only follow commands but move on its own by scanning and learning about the environment. This will lead to the customer just setting up the destination and the car will take the customer to the destination by its own. In addition to this, with the help of GPS and blockchain technologies, our can keep live track and monitoring of the traffic of the city to prevent any accidents and also sending and receiving data continuously by the blockchain servers installed all around the city. Thus, our can will need no interference by a human being for its functioning and it will learn and improve itself which while set the next benchmark for robotic trasnsportation.

We can modify the car as per our requirement. If we want to use this for surveillance purpose so we can implement the camera or thermal sensors along with others sensors. Further if we want to improve the accuracy of the rover, we can implement sonar sensors so controlling rover from remote



place can be possible. We can also implement GPS system so it can be semi-autonomous. The proposed work can be enhanced with the help of more security function like passwords and so on.

Furthermore the technology we have used in our can be used in all modes of transportation all around the planet and outside of our planet in future. Be it railway transport, air transport, water transport, all types of transportation will take care of itself in future just by the idea of our project. The future scope of our project is limitless and has no end.

## CONCLUSION

We achieved total Voice control communication between the mobile -via android application- and the model prototype car. In our project we have used the most general and simple concept of Bluetooth and a never done before concept of voice recognition to control our car. As the mobile devices are becoming more advanced, using them for controlling Robotic vehicles and other wireless devices is likely to be a huge trend.

Due to lack of time and funds, more features to make our project large scale and bring it to mass public for daily use could not happen. Anyways, It can be concluded that this idea of smart living will let us control our surroundings remotely and wirelessly in the coming future. The knowledge is ever expanding and so are the problems which the mankind strive to solve. In this spirit, it is hoped that the current activity will lead to further enhancements. And why not work toward a future which will revolutionize our lifestyle and our coming generations towards a greater tomorrow? Give it a thought.

## REFERENCES

- [1] **S.D. Mulla, A.S. Mali, S.T. Shibe, S.S.Joshi** “Android Application Controlled Remote Robot Operation”, IJSRD - International Journal for Scientific Research & Development| Vol. 3, Issue 02, 2015 | pp.2406-2408 | ISSN (online): 2321-0613/January-2017
- [2] **Nelson Rai , Deepak Rasaily , Tashi Rapden Wangchuk, Manoj Gurung, Rit Kr. Khawas** “Bluetooth Remote Controlled Car using Arduino”, International Journal of Engineering Trends and Technology (IJETT) /Volume 33/Number 8/pp.381-384/March-2016
- [3] **Sheetal Gandotra,Bhawasna Sharma, Shreeya Mahajan, Tsering Motup, Tahira Choudhary & Paras Thakur** “Wireless car using IR sensors”, Imperial Journal of Interdisciplinary Research (IJIR) /Vol-2/Issue-9,/ pp.144-147/ISSN: 2454-1362/2016/February-2015
- [4] **Amanpreet Kaur, Abhishek Mani Tripathi, Gopal Kushwaha , Inzmamul Haque** “Wifi controlled Car”, International Journal of Computer Science and Mobile Computing(IJCSMC)/ Vol. y5, Issue. 5/pp.105 – 109/ ISSN 2320–088X/May-2015
- [5] **Shrutika Kanere , Rutuja Shinde , Vaibhavi Tornekar, Dnyaneshwari Zagade, Mrs. V.S.Sonar,** “Clap Controlled Car”, International Journal of Advanced Research in Computer and Communication Engineering, Vol. 6, Issue 3/ pp.44-46/ISSN (Online) 2278-1021/June-2015
- [6] **Rowjatul Zannat Eshita , Tanwy Baru , Arzon Barua , Anik Mahamood Dip,** “LDR controlled car”, American Journal of Engineering Research (AJER), e-ISSN: 2320-0847 p-ISSN : 2320-0936/Volume-5/Issue-3/pp-195-199/May-2014
- [7] **S R Madkar ,Vipul Mehta, Nitin Bhuwania, Maitri Parida.** “Wifi Module Controlled car”, International Journal of Engineering Trends and Technology (IJETT) /Volume 33/Number 8/pp.381-384/March-2014
- [8] **Rahul Kumar, Ushapreethi P, Pravin R. Kubade, Hrushikesh B. Kulkarni,** “Solar Powered Car”, International Journal of Engineering Trends and Technology (IJETT) /Volume 33/Number 8/pp.381-384/2014

- [9] **Subankar Roy, Tashi Rapden Wangchuk, Rajesh Bhatt**, “Air Powered Car”, IJSRD - International Journal for Scientific Research & Development| Vol. 3, Issue 02, 2015 | pp.2406-2408 | ISSN (online): 2321-0613/December -2013
- [10] **Ritika Pahuja , Narender Kumar**, “Steam Controlled Car”, International Journal for Scientific Research & Development| Vol. 3, Issue 02,| pp.2406-2408 | ISSN (online): 2321-0613/May -2013
- [11] **Ibrahim Malik, Salman Pandey, Darshika Pandey**, “Water Powered Car”, International Journal for Scientific Research & Development| Vol. 3, Issue 02,| pp.2406-2408 | ISSN (online): 2321-0613/March -2013
- [12] **T. Butnaru, F. Gîrbacia, F. Tîrziu and D. Talab**, “Fiction Powered Car”, International Journal for Scientific Research & Development| Vol. 3, Issue 02,| pp.2406-2408 | ISSN (online): 2321-0613/2013
- [13] **Andrey A. Loukianov, Hidenori Kimura, Masanori Sugisaka**, “Smart Phone Controlled Robot Using ATMEGA328 Microcontroller”, IJIRC Vol. 3, Issue”, International Journal for Scientific Research & Development| Vol. 3, Issue 02,| pp.2406-2408 | ISSN (online): 2321-0613/June-2012
- [14] **Ricardo Tesoriero, José A. Gallud, María D. Lozano, Víctor M. R. Penichet**, “Android App Based Robot”, International Journal for Scientific Research & Development| Vol. 3, Issue 02,| pp.2406-2408 | ISSN (online): 2321-0613/January -2012
- [15] **Muhammad Gulfam and Mirza Waleed Iftikhar Baig** , “WG11 Android based Surveillance Robot Control” ,IJMSE,Vol. 3, pp. 17-22, 2012
- [16] **Aiman Ansari, Yakub Ansari, Saquib Gadkari, Aarti Gokul**, “Android based Surveillance Robot”, International Journal for Scientific Research & Development| Vol. 3, Issue 02,| pp.2406-2408 | ISSN (online): 2321-0613/March -2011
- [17] **Muhammad Gulfam and Mirza Waleed Iftikhar Baig**, “Smart phone based robotic smart phone based robotic”, International Journal for Scientific Research & Development| Vol. 3, Issue 02,| pp.2406-2408 | ISSN (online): 2321-0613/february -2011

- [18] **Ritika Pahuja, Narender Kumar**, “Android Phone Controlled Robot Using Bluetooth”, International Journal for Scientific Research & Development| Vol. 3, Issue 02,| pp.2406-2408 | ISSN (online): 2321-0613/2011
- [19] **Arvind Kumar Saini, Garima Sharma, Kamal Kishor Choure**, “BluBO: Bluetooth Controlled Robot”, International Journal for Scientific Research & Development| Vol. 3, Issue 02,| pp.2406-2408 | ISSN (online): 2321-0613/November-2010
- [20] **Vijay Kumar Saini<sup>1</sup>, Garima Sharma, Kamal Kishor Choure**, “Soil Powered Car”, International Journal for Scientific Research & Development| Vol. 3, Issue 02,| pp.2406-2408 | ISSN (online): 2321-0613/2010
- [21] **Yoshikazu K., Takayuki K., Yasuyuki S., Kiyoshi K., and Hiroshi**, “HERMES - a versatile personal robotic assistant”, International Journal for Scientific Research & Development| Vol. 3, Issue 02,| pp.2406-2408 | ISSN (online): 2321-0613/March -2009
- [22] **Jeonghye Han, Jaeyeon Lee, and Youngjo Cho**, “Formal Verification of Robot Movements”, International Journal for Scientific Research & Development| Vol. 3, Issue 02,| pp.2406-2408 | ISSN (online): 2321-0613/January-2009
- [23] **Marcelo B. Perotoni , Beatriz E. Garibello, Silvio E. Barbin**, “Evolutionary role model and basic emotions of service robots”, International Journal for Scientific Research & Development| Vol. 3, Issue 02,| pp.2406-2408 | ISSN (: 2321-0613/December-2008
- [24] **Lenser, S., and Veloso, M**, “Low Cost Planner Antenna for a Mobile Robot”, International Journal for Scientific Research & Development| Vol. 3, Issue 02,| pp.2406-2408 | ISSN (online): 2321-0613/March -2008