AVISHKAR'16

PROJECT REPORT

GROUP-21

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ACKNOWLEDGEMENT

We would like to express our special thanks of gratitude to our instructor **Dr. Hitesh Shrimali** as well as our mentor **Dr. Shubhajit Roy Chowdhury** who gave us the golden opportunity to do this wonderful project of Bluetooth Controlled Car, which also helped us in doing a lot of Research and we came to know about so many new things. we are really thankful to them.

Group 21

PROJECT NAME:

Bluetooth Controlled Car

ABSTRACT:

Nowadays the technology in this world is growing on a very fast pace. Day by day, there is a great engineering going on to make our daily tasks easy. In every sector, there can be seen a rapid spurt in the research and innovation.

One such sector is automobile sector. Vehicles have become a necessity rather than an option. So to combat the needs of people, companies are trying innovative ideas through first applying them on prototypes and then seeing the market response.

One such innovation has been given a try in our project that gives user, the accessibility to operate his/her vehicle through a Bluetooth enables smart phone.

INTRODUCTION:

As the name suggests, the project is based on controlling a small model of car with the help of Bluetooth in a smart phone. The phone interacts with the help of an app called 'Databot'.

The car has three modes of operation namely:

1. Manual Mode
2. Accelerometer mode
3. Autonomous mode

In the manual mode, the car can be operated by the interactive keys displayed on the smartphone screen. The user has full control of the car with him. The car will work according to every peer to peer data sent from the phone to the Bluetooth module.

In the accelerometer mode, the car can be controlled by the accelerometer of the phone. It will go in the direction in which the phone is calibrated. For example, if the phone is tilted in forward direction, it will go in forward direction and so on.

In the autonomous mode, the car will go on by itself with the help of the SONAR sensors mounted on the front of the car. The user no longer needs to take care of the car every moment.

WORKING:

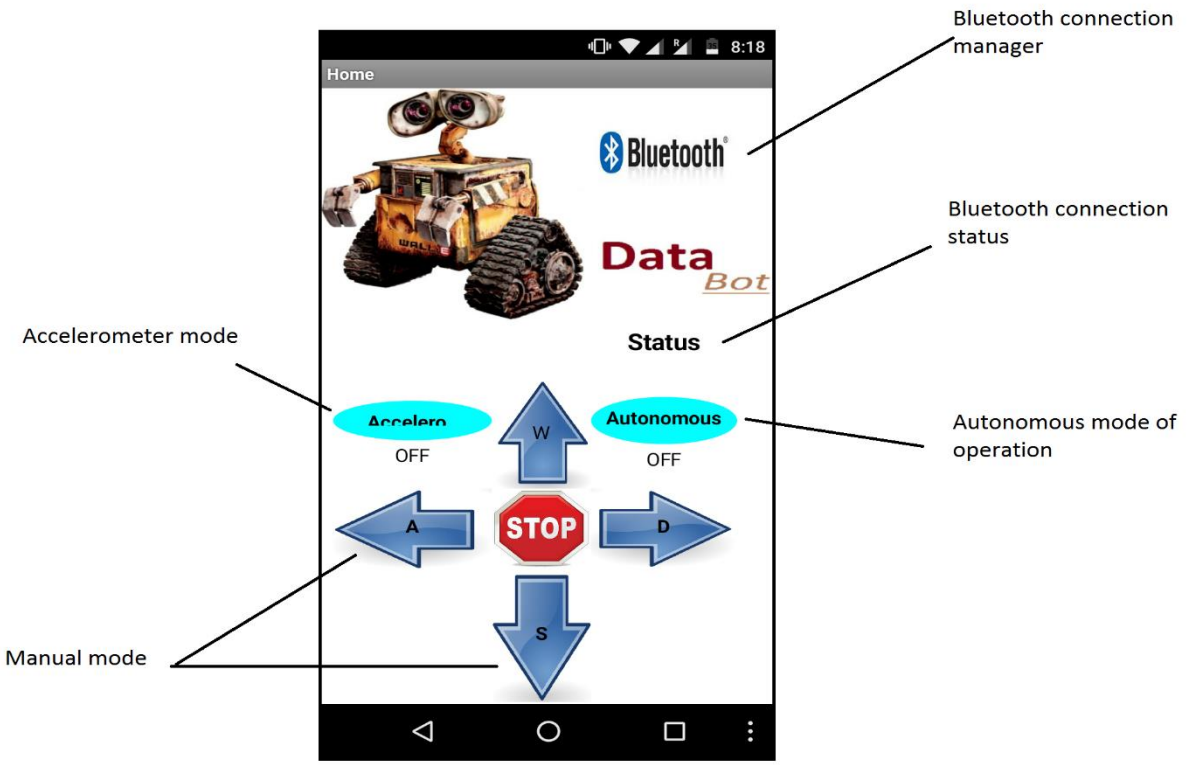
First of all, the Bluetooth module with the Arduino board is connected to the phone which has the app installed using phone's Bluetooth. The Bluetooth module will receive any signal sent from phone and transfer it to arduino board which further processes it and gives instructions to the motor driver accordingly. After successful connection, the user can directly make the car move around using manual mode. The user can change the mode of operation directly from the app using the toggle keys displayed as shown and the car will work accordingly.

Manual Mode: the user can control the car using five keys given on the phone screen namely- W,S,A,D,STOP.

Accelerometer mode: the user can control the car using the orientation of the phone as described earlier. The signal is converted from the coordinates to the respective electrical analogue.

Autonomous mode: the SONAR sensors mounted on the front and both sides come in to play. By default, the front sensor checks the proximity and asserts if anything approaches upto 20cm from it. After that the car stops and the side sensors check the distance of any obstacle from them. Both the values are compared and the direction in which greater distance is available, the car moves in that direction and then again the above mentioned steps are repeated.

To stop the car from autonomous or accelerometer mode, simply the STOP button can be pressed.



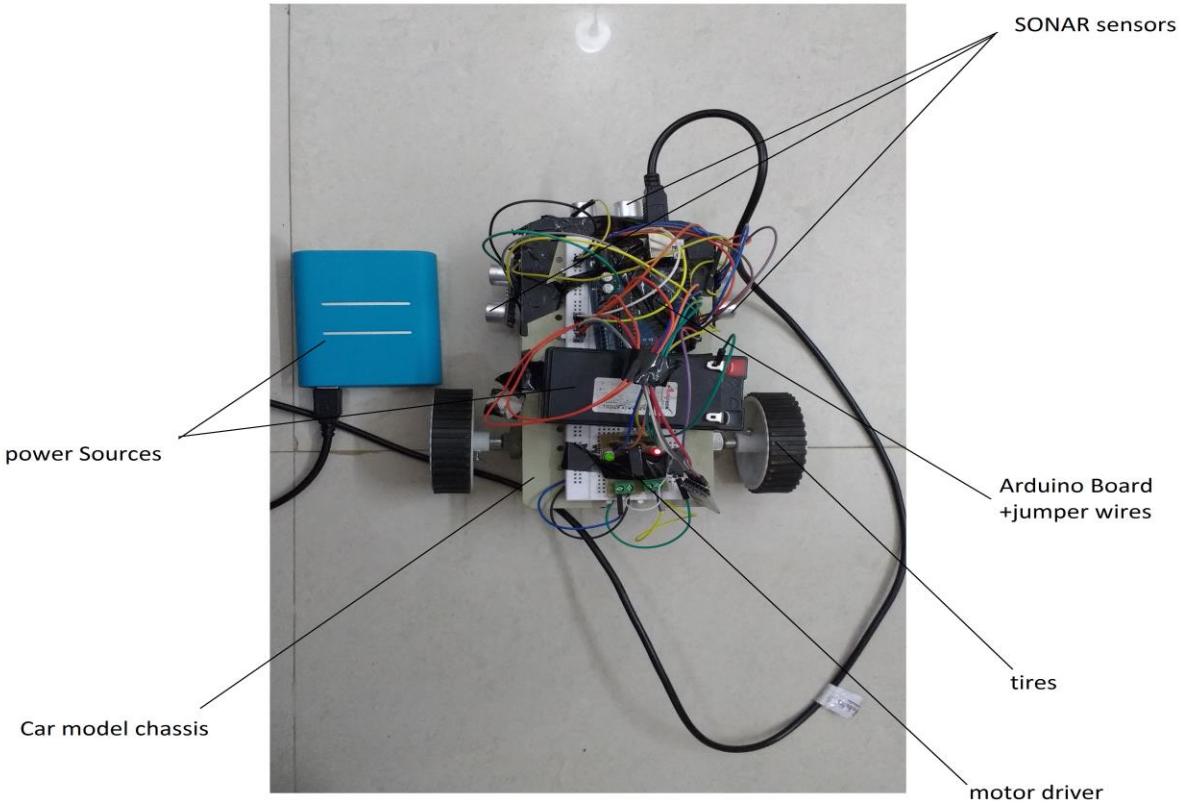
The databot app interface

(can be found at https://github.com/me-ydv-5/Bluetooth-Controlled-Car.git)

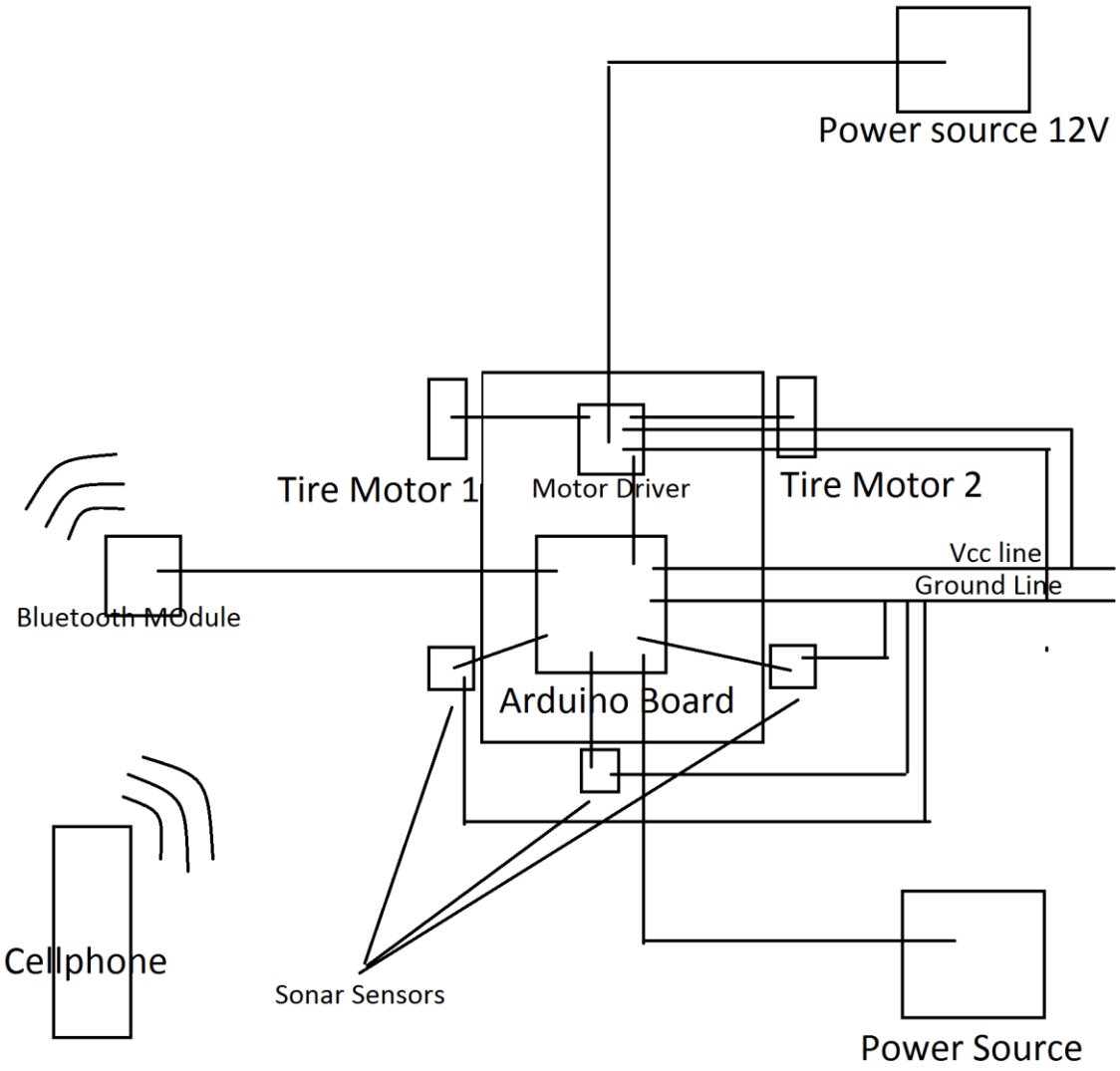
COMPONENTS USED:

1. Arduino Uno + cable
2. SONAR sensors
3. Breadboard
4. Power sources (12V + Supply for Arduino)
5. Jumper wires
6. Motors 12V
7. Motor drivers
8. Car model chassis + tires

LABELLING OF PARTS:



Bluetooth controlled car



Block Diagram for Connections

CIRCUIT CONNECTIONS:

SONAR sensors connection:

Connect echo and trig of sensors to the data pins except D0,D1(RX,TX). Connect Vcc to supply and Gnd to ground. Repeat for all the three sensors.

Bluetooth module connection:

Connect *TX of module to RX of arduino* and *RX of module to TX of arduino.* Connect Vcc and Gnd to respective terminal.

Motor Driver connection:

Connect data pins to arduino board and Vcc and Gnd to power source. Connect motors to the driver in the respective + - slots.

Arduino Connection:

Connect it to power source.

{remember to change the pin no. in the code accordingly}

ARDUINO CODE:

(can also be found at https://github.com/me-ydv-5/Bluetooth-Controlled-Car.git)

the following is the code for arduino

```
#define echoPinN 4// Echo Pin N
#define trigPinN 5// Trigger Pin N
#define echoPinE 2// Echo Pin E
#define trigPinE 3 // Trigger E
#define echoPinW 6 // Echo Pin W
#define trigPinW 7// Trigger W
#define LEDPin 13 // Onboard LED

int a1=10;
int a2=11;
int b1=8;
int b2=9;
int N=30;
int E=40;
int W=50;
int state=0;

int maximumRange = 300; // Maximum range needed
int minimumRange = 0; // Minimum range needed
long duration, distance; // Duration used to calculate distance
void check();
int checkN();
int checkW();
int checkE();
```

```
  void Movwest();
  void Moveast();
  void Movnorth();
  void Movsouth();
void Stop();
int maxofthree(int x,int y,int z);

void setup() {


 Serial.begin (9600);
 pinMode(trigPinN, OUTPUT);
 pinMode(echoPinN, INPUT);
  pinMode(trigPinE, OUTPUT);
 pinMode(echoPinE, INPUT);
  pinMode(trigPinW, OUTPUT);
 pinMode(echoPinW, INPUT);
 pinMode(LEDPin, OUTPUT); // Use LED indicator (if required)
pinMode(a1, OUTPUT);
digitalWrite(a1, LOW);
pinMode(a2, OUTPUT);
digitalWrite(a2, LOW);
pinMode(b1, OUTPUT);
digitalWrite(b1, LOW);
pinMode(b2, OUTPUT);
digitalWrite(b2, LOW);
}

void loop() {
/* The following trigPin/echoPin cycle is used to determine the
 distance of the nearest object by bouncing soundwaves off of it. */

 if (Serial.available()) {
    //wait a bit for the entire message to arrive
```

```
    delay(100);
while (Serial.available() > 0) {
      // display each character to the LCD
    p:
    state = Serial.read();
    Serial.println(state);
    if(state=='w')
     {

digitalWrite(a1,HIGH);
 digitalWrite(a2, LOW);
 digitalWrite(b1,HIGH);
 digitalWrite(b2,LOW);


     }
     if(state=='s')
     {
   digitalWrite(a2,HIGH);
 digitalWrite(a1, LOW);
 digitalWrite(b2,HIGH);
 digitalWrite(b1,LOW);



     }
     if(state=='d')
     {

     digitalWrite(a2,LOW);
 digitalWrite(a1,HIGH);
 digitalWrite(b2,HIGH);
 digitalWrite(b1,LOW);
        }
     if(state=='a')
     {
```

```
    digitalWrite(a1,LOW);
 digitalWrite(a2,HIGH);
 digitalWrite(b1,HIGH);
 digitalWrite(b2,LOW);

       }

    if(state=='q')
    {

  Stop();

    }
   if(state=='g') {
                while(state!='w'&&state!='a'&&state!='s'&&state!='d'&&state!='q'){

   delay(100);
/* The following trigPin/echoPin cycle is used to determine the
 distance of the nearest object by bouncing soundwaves off of it. */


 N:
 check();
 Serial.println(N);
digitalWrite(a1,HIGH);
 digitalWrite(a2, LOW);
 digitalWrite(b1,HIGH);
 digitalWrite(b2,LOW);
 delay(checkN());

if(N<20){
digitalWrite(a1,LOW);
 digitalWrite(a2, LOW);
```

```
digitalWrite(b1,LOW);
digitalWrite(b2,LOW);
check();

if((E>=W))
{
  digitalWrite(a1,LOW);
digitalWrite(a2,HIGH);
digitalWrite(b1,HIGH);
digitalWrite(b2,LOW);
delay(1000);
    digitalWrite(a2,LOW);
digitalWrite(a1,HIGH);
digitalWrite(b1,HIGH);
digitalWrite(b2,LOW);
 delay(2000);
 state = Serial.read();
 goto N;
}
else if(E<W)
{
    digitalWrite(LEDPin, LOW);
digitalWrite(a1,LOW);
digitalWrite(a2,HIGH);
digitalWrite(b1,HIGH);
digitalWrite(b2,LOW);
delay(1000);
    digitalWrite(a1,LOW);
digitalWrite(a2,HIGH);
digitalWrite(b1,HIGH);
digitalWrite(b2,LOW);
 delay(2000);
 state = Serial.read();
 goto N;
```

```
 }

                  }

                 }}


               }



}}



void check(){

          // tell servo to go to position in variable 'pos'

 digitalWrite(trigPinN, LOW);
 delayMicroseconds(2);

 digitalWrite(trigPinN, HIGH);
 delayMicroseconds(10);

 digitalWrite(trigPinN, LOW);
 duration = pulseIn(echoPinN, HIGH);

 //Calculate the distance (in cm) based on the speed of sound.
 N= duration/58.2;


 digitalWrite(trigPinE, LOW);
 delayMicroseconds(2);
```

```
digitalWrite(trigPinE, HIGH);
delayMicroseconds(10);

digitalWrite(trigPinE, LOW);
duration = pulseIn(echoPinE, HIGH);

//Calculate the distance (in cm) based on the speed of sound.
E = duration/58.2;



digitalWrite(trigPinW, LOW);
delayMicroseconds(2);

digitalWrite(trigPinW, HIGH);
delayMicroseconds(10);

digitalWrite(trigPinW, LOW);
duration = pulseIn(echoPinW, HIGH);



//Calculate the distance (in cm) based on the speed of sound.
W = duration/58.2;



}
int maxofthree(int x,int y,int z)
{
int max;
if(x>y)
max=x;
else
max=y;
if(max>z)
```

```
;
else
max=z;
return max;
}

int checkN(){

   digitalWrite(trigPinN, LOW);
 delayMicroseconds(2);

 digitalWrite(trigPinN, HIGH);
 delayMicroseconds(10);

 digitalWrite(trigPinN, LOW);
 duration = pulseIn(echoPinN, HIGH);
 Serial.println(duration/58.2);
 //Calculate the distance (in cm) based on the speed of sound.
 return  duration/58.2;
  }
 int checkW(){

   digitalWrite(trigPinW, LOW);
 delayMicroseconds(2);

 digitalWrite(trigPinW, HIGH);
 delayMicroseconds(10);

 digitalWrite(trigPinW, LOW);
 duration = pulseIn(echoPinW, HIGH);

 //Calculate the distance (in cm) based on the speed of sound.
```

```
return  duration/58.2;
 }
 int checkE(){

   digitalWrite(trigPinE, LOW);
delayMicroseconds(2);

digitalWrite(trigPinE, HIGH);
delayMicroseconds(10);

digitalWrite(trigPinE, LOW);
duration = pulseIn(echoPinE, HIGH);



//Calculate the distance (in cm) based on the speed of sound.
return  duration/58.2;
 }
 void Movnorth(){
 digitalWrite(a1,HIGH);
digitalWrite(a2, LOW);
digitalWrite(b1,HIGH);
digitalWrite(b2,LOW);}
 void Movwest(){
  digitalWrite(LEDPin, LOW);
digitalWrite(a1,LOW);
digitalWrite(a2,HIGH);
digitalWrite(b1,HIGH);
digitalWrite(b2,LOW);
delay(1000);
    digitalWrite(a1,LOW);
digitalWrite(a2,HIGH);
digitalWrite(b1,HIGH);
digitalWrite(b2,LOW);
 delay(1000);}
```

```
 void Moveast(){  digitalWrite(LEDPin, LOW);
digitalWrite(a1,LOW);
digitalWrite(a2,HIGH);
digitalWrite(b1,HIGH);
digitalWrite(b2,LOW);
delay(1000);
    digitalWrite(a2,LOW);
digitalWrite(a1,HIGH);
digitalWrite(b2,HIGH);
digitalWrite(b1,LOW);
 delay(1000); }
void Stop(){
 digitalWrite(a1,LOW);
digitalWrite(a2, LOW);
digitalWrite(b1,LOW);
digitalWrite(b2,LOW);}
void Movsouth(){
 digitalWrite(a2,HIGH);
digitalWrite(a1, LOW);
digitalWrite(b2,HIGH);
digitalWrite(b1,LOW);}
```

CONCLUSION

-Sahil Yadav B15130

From this project we learnt how the arduino works. We also saw how the Bluetooth module and motor driver can be used in a good manner with the arduino. We also learnt how to make an android app. The connections in the arduino board gave an insight of how the circuits in bigger electrical implements work. The working of arduino made us learn how we can program other boards like Beaglebone, Raspberry pi, etc. in a similar fashion. Also, we learnt the social aspect of dedicated team work which serves as an important part in one's corporate life.

CONCLUSION

BY : HIMANSHU MEWARA (B15215)

- We used ARDUINO UNO in this Bluetooth Controlled Car. It help me to learn basic coding of Arduino.
- As the Car is controlled by mobile application called 'DATABOT'. It help me to learn how to make an app using online site "MIT APP DEVELOPER".
- It help me to learn how to assemble all the different component s (arduino, breadboard, sonar, battery ,Bluetooth module etc.) of car as one unit.
- It also help me to learn to control a car using Bluetooth technology (Bluetooth module present in car and Bluetooth in mobile) .

BASIC APPLICATION OF CAR

- As the car is having obstacle detector called sonar. If we use sensor in front of wheel chair to avoid obstacle by this we can avoid the accident of many people and save many life.
- If use the obstacle sensor in front of automobiles. It avoid the obstacle and prevent the chances of accident .
- By further modification in car it become a line follower and help us to reach the destination.
- We can also use this car for fun purpose as a racing car which is controlled manually.

CONCLUSION

- Shekhar Shubham(B15333)

- My project was Bluetooth controlled car which uses arduino UNO as a microcontroller. My group have made this car in such a way so that it can operate in three mode .First mode was manual mode operated manually. Second mode was accelerometer mode in which we operate the car using the accelerometer sensor of android phone and the third one was autonomous mode in which car moves automatically avoiding obstacle coming in its path. For this purpose we have connected three SONAR for looking forward, right and left. First sonar detect the obstacle while second and third will calculate distance in right and left direction, the direction in which distance comes out to be maximum car moves in that direction. For operating these three modes we have developed an android application and installed in our mobile. This car moves on two wheel powered by DC motor with max speed 60 rpm. We have used motor driver to control these two DC motor. For our android application to access car we have connected a Bluetooth module to the arduino.
- For making this project all members in our group have been assigned specific work. My main work was to generate the code for this car and feed in the arduino. For this I must know the working of motor driver, Bluetooth module, SONAR and knowledge of library functions used in arduino. So I go through all the you tube videos and different websites. This helped me a lot.
- Finally we generate the code. In generating this code I gain knowledge about all the components used in my car. First I come to know how to made this android application. I come to know about C language used in coding and library functions for arduino. Then I come to know how to control motor driver which uses L293D IC. In this way I get idea about the working of this IC. And also I come to know about working of SONAR and Bluetooth module etc.
- I must say this project helped me lot in understanding basic concept of microcontroller. The AVISHKAR comes to be worth one. It enhances the level of students and gives the taste of practical engineering problems and their solutions.

CONCLUSION

-Anand Mohan Tiwari B15307

Our project was to make a **Bluetooth controlled car**. It has three mods of operation -:

i) Manual mode -: in this mode we control the car manually using our app which is connected by Bluetooth to car.
ii) Accelerometer mode -: in this mode we operate the car by the gesture of our phone.
iii) Autonomous mode -: in this mode once we give command from app, car runs automatically. It detects obstacles by its sonar and changes its direction.

Applications of Obstacle detector car -:

i) It can be used in parking system, for example if we have to park our car and there are a lot of car parked we use autonomous mode in which it automatically detects the location of cars and go where there is no car.
ii) We can also give command by manual mode if we are not in the car, for example sometimes we forget to park our vehicle when we go home or office. So from the upstairs we can give command easily and let it go wherever it requires.
iii) While driving sensors will warn the driver before accident, as it will collect the information from all sides and will send it to driver.
iv) If installed in downward direction it will also detect the depth if any, and will send information to driver so we can prevent our car from going out of road.

CONCLUSION

GANTAVYA GUPTA

B15410

Our project was just a demonstration of how a remote controlled car works, what are the possibilities of operating it with a manual mode or with sensors or in autonomous mode(without someone actually controlling it).

I planted the circuitry B/W Arduino and breadboard.I attached the motors into the structured bolted the wheels sonar sensors were implemented by us. We fed the code to Arduino, powered the motors with a 12v rechargeable lead-storage battery and used a power bank for Arduino.

We created a android.apk app which appealed to the Bluetooth module installed in the car with the help of MIT app developers site.

I learnt to properly assemble a circuit with tons of components and basics of app developing with help of my friends.

A seperate power bank was required for the Arduino because it requires 5v dc voltage but the battery was of 12v so it was hazardous to use the same power supply for Arduino.

CONCLUSION

-Rahul Kumar Chaudhary(B15419)

In the Avishkar project we made a Bluetooth controlled car. We made this project in a group and gain a experience of working in a group. In this project we learned experience of working on Arduino and learned how to program it. We came to know about various electronics component that is used in this project like Bluetooth module and sonar obstacle detector.

Although it was a nice experience but still we could have done better. But it was the first time of me as well as for our entire group member to be a part of such a nice project. But through this experience that we gain while making this project, we will do best in our upcoming project and life as well.

I an gain an interest of doing something new and exploring better. This was the best result that I gain through this experience that will continue all through my academic session as well as my whole life.