VISVESVARAYA TECHNOLOGICAL UNIVERSITY

MINI PROJECT REPORT ON

"GESTURE CONTROL AUTOMATED VEHICLE"

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CERTIFICATE

Certified that the mini project work entitled "**GESTURE CONTROL AUTOMATED VEHICLE**" carried out by **MATAM RISHI (1NH18EC070), PRASHANTH B (1NH18EC088), VB VASU (1NH18EC115), RISHEEK DS (1NH19EC412),** bonafide students of Electronics and Communication Department, New Horizon College of Engineering, Bangalore.

The mini project report has been approved as it satisfies the academic requirements in respect of mini project work prescribed for the said degree.

Project Guide HOD ECE

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External Viva

Name of Examiner Signature with Date

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ACKNOWLEDGEMENT

The satisfaction that accompany the successful completion of any task would be, but impossible without the mention of the people who made it possible, whose constant guidance and encouragement helped us succeed.

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INTRODUCTION

Robots are used to do the work that humans cannot do. Increase the use of robotics with restrictions that are not mandatory, for example fire protection task or protection Task. The device receives input from the user and operates out according to the input received. Human hand movements are received by the connected wire the accelerometer. The robots move by moving the User hand tilt. The goal of this wired control unit is achieved with Arduino, accelerometer. The Arduino The microcontroller receives the analog input values (x-axis, y Axis) from the accelerometer and converts this analog value to digital value. The input is received by the Arduino Uno microcontroller after titling. The robot turns left and right when we tilt ours Palm left and right. It moves forward when the palm of your hand tilted forward and the device will stop while it is according to the surface. This way we can use the device to exercise those tasks that will be useful to man. By doing Risk that we represent in relation to the signal, robots man-age that can be managed by your typical hand movement. Here the Program is planned using Arduino.

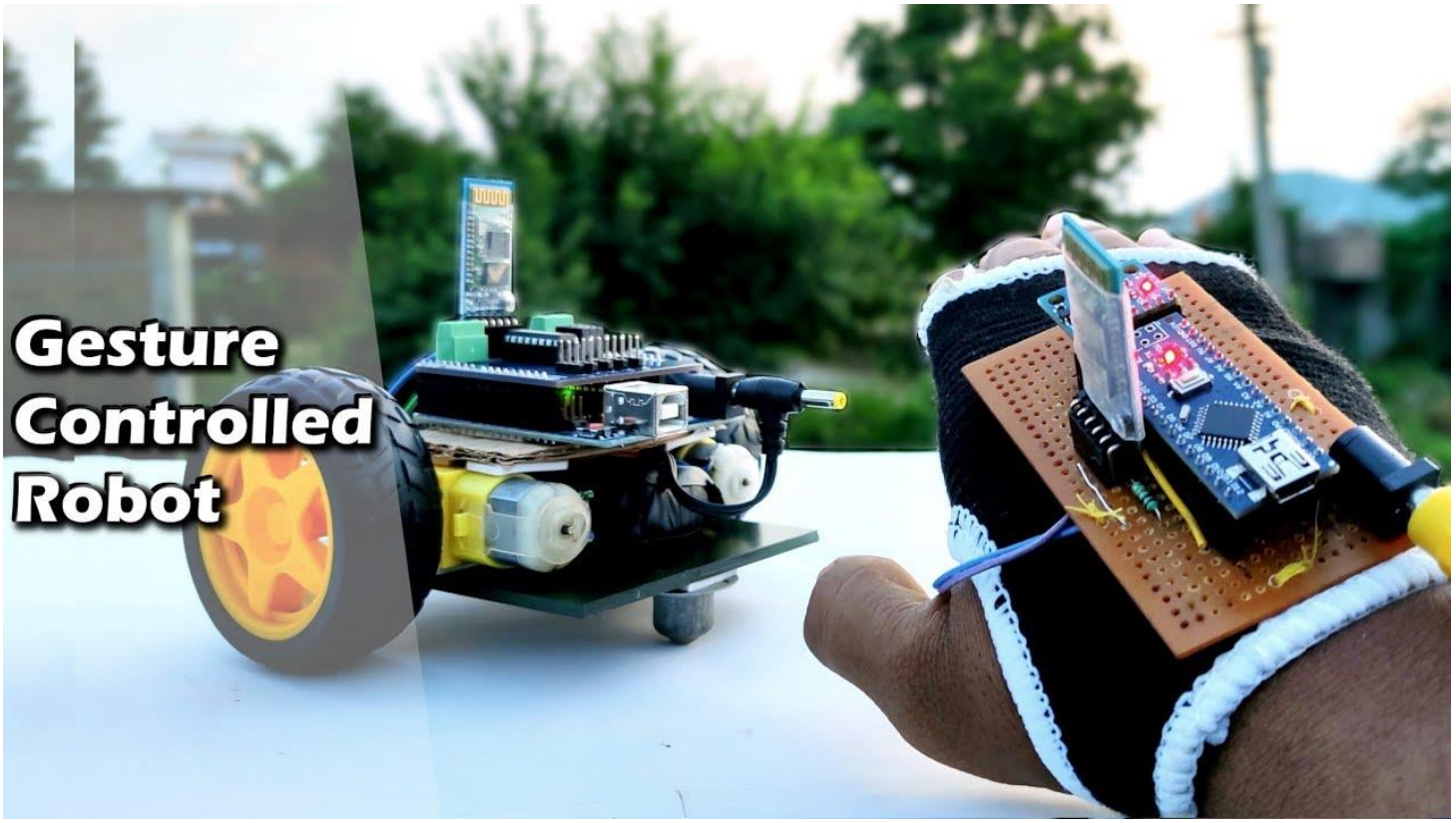
Many parameters of the robot are designed accordingly Requirement. There are several ways to control the robot arm such as voice control, keyboard control, gesture control, etc.

The implemented system consists of a transmitter and a receiver. The transmitter is nothing but a human hand with flex sensors & The receiver is a robot manipulator. Movement of the transmitter is transmitted wirelessly to the receiver via the X-Bee module. The robotic arm that is the receiver is nothing but a mechanical one System formed by various joints and ends and effectors, i.e. Gripper movements of these fingers or grippers can be carried out Use a stepper motor or servo motor if used by the user hand movement the same for every application on the transmitter side The movement is copied from the receiver, since the transmitter has Flex Sen-sors mounted on the glove on the transmitter that change its Resistance depends on the movement of the user. In research Group of intelligent robots, one of the biggest problems is autonomous driving of the robot. The object recognition method is for autonomous driving very important. It enables the robot to avoid obstacles. Human Beings mainly use the visual sense to recognize the other vehicles while driving.

With this visual information, we can drive safely. Street lights play an important role in our environment and also play a role play a vital role in providing light for security during the night Travel. In this scenario, when the street lights are working Functionality throughout the night that uses a lot of energy and reduces the service life of electrical equipment such as Lightbulb, etc. It is a heavy one, especially in city street lights Power consumption factor and also the most important Energy costs for a city. Intelligent lighting in this regard Control system can reduce street lighting costs by up to 70% and Increase the durability of the devices.

The entire system consists of three modules.

1. Controlling the robot with hand gestures.
2. Object recognition with webcam.
3. Regulation of street lighting electricity.



CHAPTER 2

LITERATURE SURVEY

In this section we have identified and discussed existing work via gesture control robots, current control and object Detection with webcam. Hand gesture-based surface for navigating a robot. A robot can be controlled by the user with his hand gestures. A 3-the axis accelerometer is used to record a user's hand trajectories. The flight path data are transmitted wirelessly via a RF module to a computer. The received trajectories are classified into six control commands for navigating a robot. The classifier uses the dynamic time warping algorithm for classification Hand tracks. The existing work also has the limitation that the simulation results show that the classifier could only achieve something 92.2% correct rate.

The control strategy enables us to perform dynamic walking the gait of a virtual under activated robot even suspended destabilizing external disturbances. This control strategy is based on two levels. The first uses a number of pragmatic ones rules to generate a sequence of active and passive phases that enable us to walk the dynamic robot. In the second stage we use these neural networks to generate the learned trajectories in the first phase. The existing work on this project has the disadvantage working with obstacle avoidance using neural networks.

Object tracking and detection are two fundamental tasks in monitoring with multiple cameras. This paper suggests a framework to accomplish these tasks in a non-overlapping multiple camera network. A new medium displacement object detection algorithm Segmentation is introduced and hidden objects are removed further separated with the help of depth information derived from Stereo view. The present work is complex detect the performance of non-exercising objects.

Object is the most important component in numerous image processing applications. There are many changes in the in recent years, there has been progress in the sharing effort code and records, it is of great importance to develop a library and benchmark to measure the state of the art. After review recent advances in large-scale online asset tracking experiment with different assessment criteria to understand how these algorithms can be executed. The

test image Sequences are commented with different attributes for performance evaluation and analysis. Through quantitative analysis we identify effective approaches for robust tracking and results offer potential future research directions in this area. Power electronics, machines, networks and markets over communication technology [6] are different types of energy technologies Smart Grid Link, which lead to trans disciplinary, Multi-domain system. Simulation packages for evaluation. The system integration of components normally only covers one subdomain. The co-simulation overcomes this by coupling the subdomain models that are described and solved in their native speaker environments with special solvers and validated libraries. This article describes the state of the art and conceptually describes the most important challenges for the simulation of intelligent energy Systems.

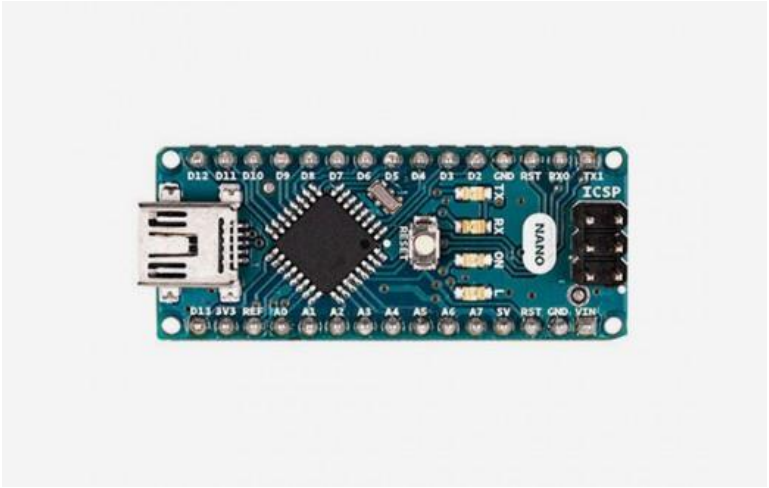
CHAPTER 3

HARDWARE AND SOFTWARE SPECIFICATIONS

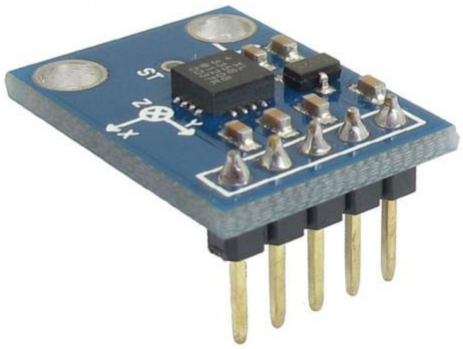
Software:

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

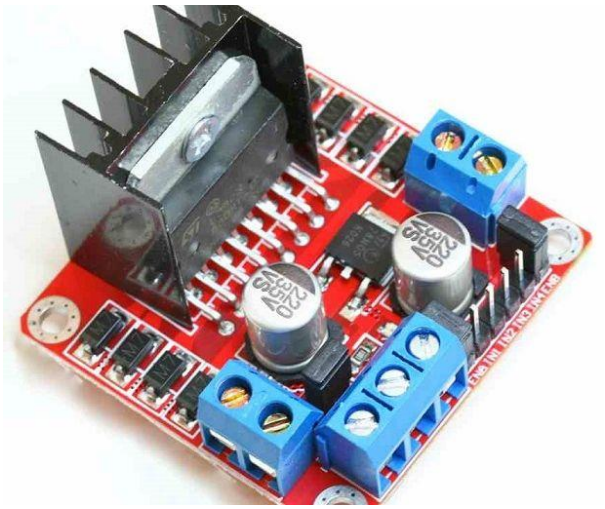
HARDWARE:



The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328 . It has more or less the same functionality of the Arduino Duemilanove, but in a different package. It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one.



The accelerometer was chosen as the measuring device because it can measure the tiny movements. MPU 6050 is a six degrees of freedom (DOF) accelerometer, which means it provides six values as Output - three from the accelerometer and three from the gyroscope. Only the accelerometer, however Values were used for this project.



The L298N Motor Driver is a controller that uses an H-Bridge to easily control the direction and speed of up to 2 DC motors. You can power the L298N with up to 12V by plugging your power source into the pin on the L298N labeled 12V.

HC 05/06 works on serial communication. The Android app is designed to send serial data to the Arduino Bluetooth module when a button is pressed on the app. The Arduino Bluetooth module at the other end receives the data and sends it to the Arduino through the TX pin of the Bluetooth module (connected to RX pin of Arduino). The code uploaded to the Arduino checks the received data and compares it. If the received data is 1, the LED turns ON. The LED turns OFF when the received data is 0. You can open the serial monitor and watch the received data while connecting.

An electric motor is an electrical machine which converts electrical energy into mechanical energy.

CHAPTER 4

PROPOSED SYSTEM

Gesture Controlled Robot is divided into two sections:

1. Transmitter part:

Accelerometer

Arduino Nano

Encoder

RF transmitter

In transmitter part an accelerometer and a RF transmitter unit is used. As we have already discussed that accelerometer gives an analog output so here we need to convert this analog data in to digital. For this purpose we have used 4 channel comparator circuit in place of any ADC. By setting reference voltage we gets a digital signal and then apply this signal to HT12E encoder to encode data or converting it into serial form and then send this data by using RF transmitter into the environment.

2. Receiver part:

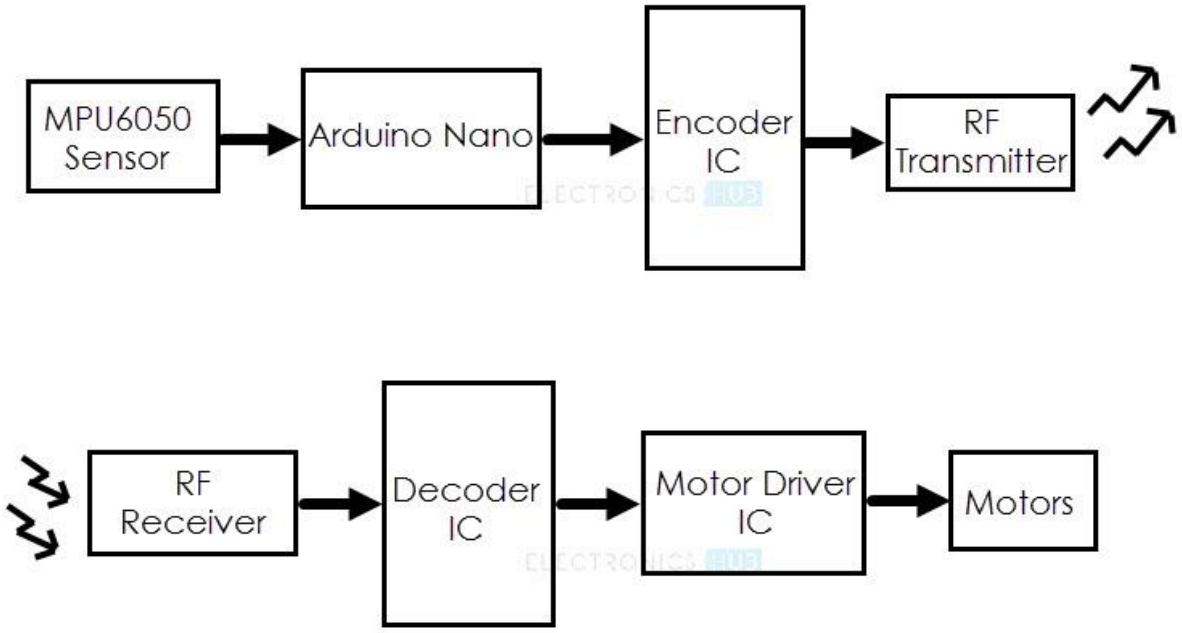
RF Receiver

Decoder

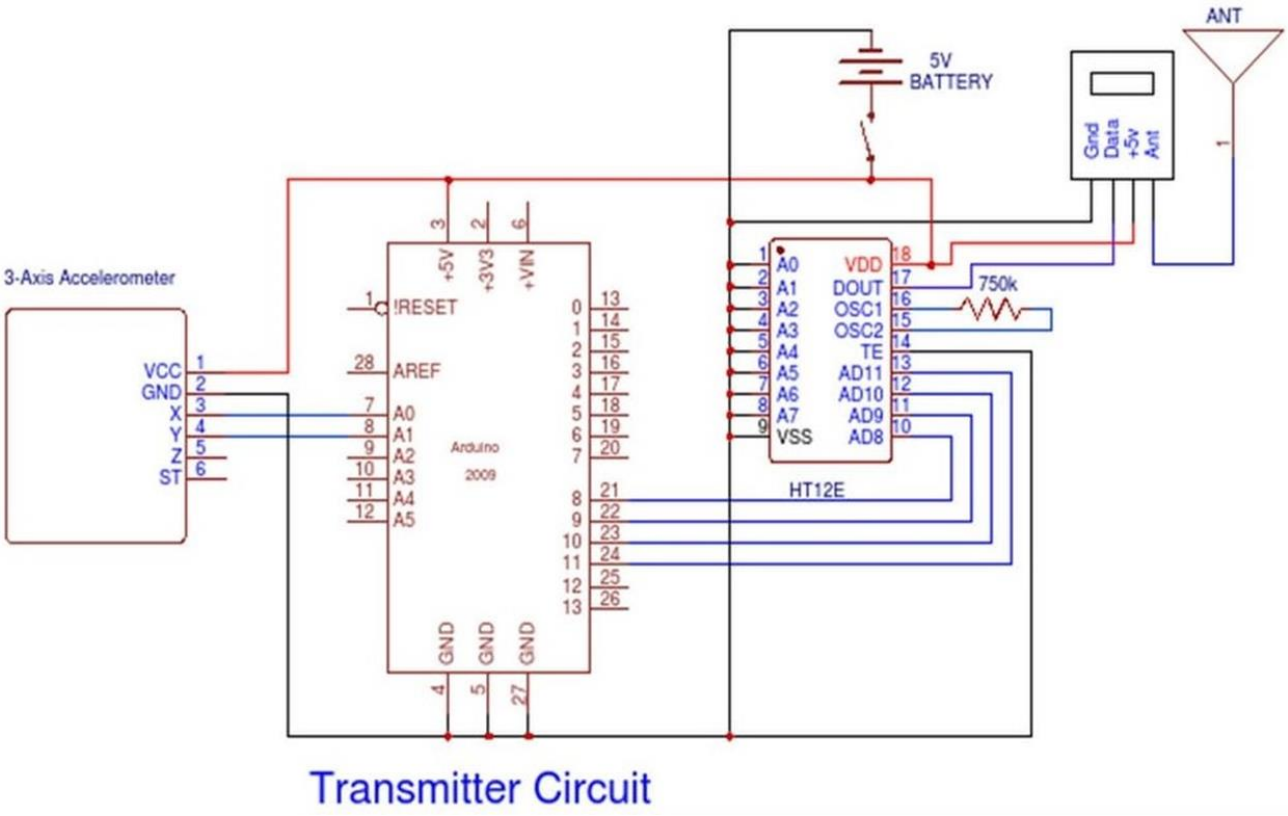
Motor driver

Motor

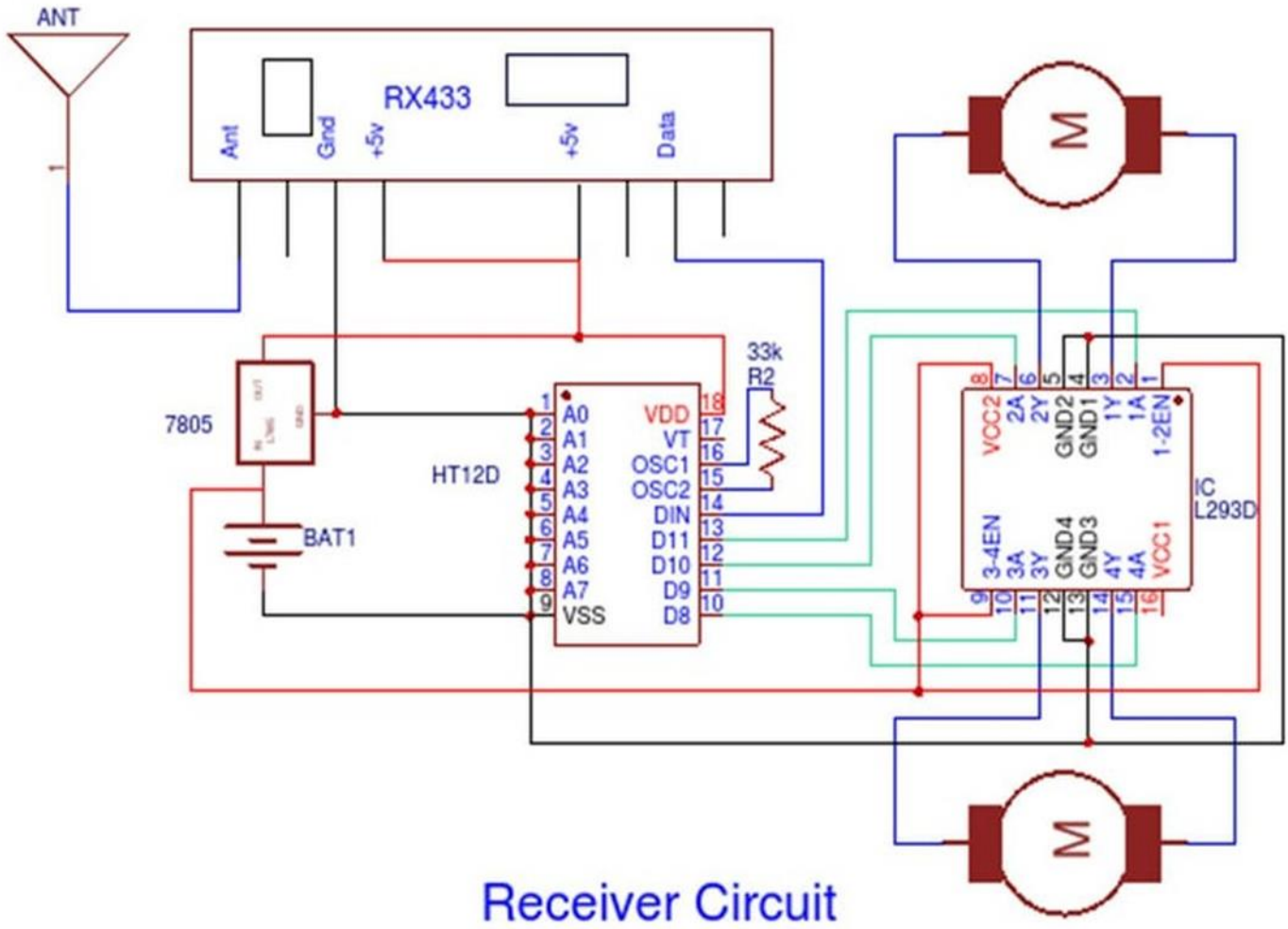
At the receiver end we have used RF receiver to receive data and then applied to HT12D decoder. This decoder IC converts received serial data to parallel and then read by using Arduino. According to received data we drive robot by using two DC motor in forward, reverse, left, right and stop direction.



BLOCK DIAGRAM



Transmitter Circuit



Receiver Circuit

Arduino Code:

```
#define forward 410 // Change this value to change senstivity for forward direction /-Default 340-/ X
#define backward 320 // Change this value to change senstivity for backward direction /-Default 400-/ X
#define left 320 // Change this value to change senstivity for left direction /-Default 340-/ Y
#define right 400 // Change this value to change senstivity for right direction /-Default 400-/ Y

int GNDPin=A4; //Set Analog pin 4 as GND
int VccPin=A5; //Set Analog pin 5 as VCC
int xPin=A0; //X axis input
int yPin=A1; //Y axis input
int zPin=A2; //Z axis input(not used)
int Q1=8,Q2=9,Q3=10,Q4=11; //Output pins to be connected to 10, 11, 12, 13 of Decoder IC

long x; //Variable for storing X coordinates
long y; //Variable for storing Y coordinates
long z; //Variable for storing Z coordinates

void setup()
{
 Serial.begin(9600);
 pinMode(Q1,OUTPUT);
 pinMode(Q2,OUTPUT);
 pinMode(Q3,OUTPUT);
 pinMode(Q4,OUTPUT);
 pinMode(GNDPin, OUTPUT);
 pinMode(VccPin, OUTPUT);
 digitalWrite(GNDPin, LOW); //Set A4 pin LOW
 digitalWrite(VccPin, HIGH); //Set A5 pin HIGH
```

```
}

void loop()
{
 x = analogRead(xPin);
 Serial.print(x);
 Serial.println("x - value" );//Reads X coordinates
 y = analogRead(yPin);
 Serial.print(y);
 Serial.println("y - value" );//Reads Y coordinates
 z = analogRead(zPin);
 Serial.print(z);
 Serial.println("z - value" );//Reads Z coordinates (Not Used)
 delay(100);

  if(y<350   ) // Change the value for adjusting sensitivity
  Forward();
  else if(y<490 && y>410 ) // Change the value for adjusting sensitivity
  Backward();
  else if(x< 360 && x>290 ) // Change the value for adjusting sensitivity
  Right();
  else if(x<470 && x>400 ) // Change the value for adjusting sensitivity
  Left();
  else
  stop_();
}

void stop_()
{
 Serial.println("");
 Serial.println("STOP");
```

```
 digitalWrite(Q1,LOW);
 digitalWrite(Q2,LOW);
 digitalWrite(Q3,LOW);
 digitalWrite(Q4,LOW);
 delay(100);
}

void Forward()
{
 Serial.println("");
 Serial.println("Forward");
 digitalWrite(Q1,HIGH);
 digitalWrite(Q2,LOW);
 digitalWrite(Q3,HIGH);
 digitalWrite(Q4,LOW);
 delay(100);
}

void Backward()
{
 Serial.println("");
 Serial.println("Backward");
 digitalWrite(Q1,LOW);
 digitalWrite(Q2,HIGH);
 digitalWrite(Q3,LOW);
 digitalWrite(Q4,HIGH);
 delay(100);
}

void Left()
{
```

```
 Serial.println("");
  Serial.println("Left");
  digitalWrite(Q1,LOW);
  digitalWrite(Q2,HIGH);
  digitalWrite(Q3,HIGH);
  digitalWrite(Q4,LOW);
  delay(100);
}

void Right()
{
  Serial.println("");
  Serial.println("Right");
  digitalWrite(Q1,HIGH);
  digitalWrite(Q2,LOW);
  digitalWrite(Q3,LOW);
  digitalWrite(Q4,HIGH);
  delay(100);
}
```

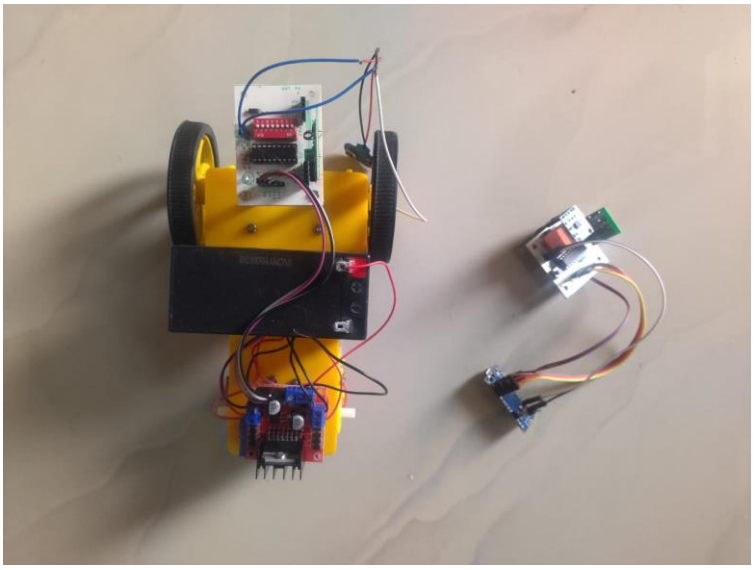
CHAPTER 5

ADVANTAGES AND APPLICATIONS

1. Wireless controlled robots are very useful in many applications like remote surveillance, military etc.
2. Hand gesture controlled robot can be used by physically challenged in wheelchairs.
3. Through the use of gesture recognition, remote control with the wave of a hand of various devices is possible.
4. Developing system will save the electricity and it benefit the Indian economy.
5. It will save the life of human beings in the dangerous zones.
6. Far objects can be easily identified through webcam.
7. It is cheap so it can be produced and used for number of purposes.
8. The applications of robotics mainly involve in automobiles, medical, construction, defense and also used as a fire fighting robot to help the people from the fire accident.
9. But, controlling the robot with a remote or a switch is quite complicated. So, a new project is developed that is, an accelerometer based gesture control robot.
10. The main goal of this project is to control the movement of the robot with hand gesture using accelerometer. The robot is usually an electro-mechanical machine that can perform tasks automatically. Some robots require some degree of guidance, which may be done using a remote control or with a computer interface. Robots can be autonomous, semi-autonomous or remotely controlled.
11. Human hand motions are received by the wire connected to the accelerometer. The robots travel by motion made by the user hand tilting.

CHAPTER 6

RESULTS AND DISCUSSIONS



Nowadays, robotics are becoming one of the most advanced in the field of technology. A Robot is an electro-mechanical system that is operated by a computer program. Robots can be autonomous or semi-autonomous. An autonomous robot is not controlled by human and acts on its own decision by sensing its environment.

Majority of the industrial robots are autonomous as they are required to operate at high speed and with great accuracy. But some applications require semi-autonomous or human controlled robots. There are different ways to control robotic arm like Voice Controlled, Keypad Control, Gesture Control, etc…

A Gesture Controlled robot is a kind of robot which can be controlled by your hand gestures not by old buttons . You just need to wear a small transmitting device in your hand which included an acceleration meter . This will transmit an appropriate command to the robot so that it can do whatever we want. As our project is already divided into two different part transmitter and receiver.

CHAPTER 7

FUTURE SCOPE

1. An on-board camera can be installed for monitoring the robot from faraway places.

2. All we need is a wireless camera which will broadcast and a receiver module which will provide live streaming.

3. This robots can be upgraded to detect human life styles earthquake and landslide by ways of enforcing the sensor therefore it can also be upgraded to bomb detecting robot because it has robotic arm it may additionally elevate the bomb which is Positioned at distant location.

4. And these type of methodology can be used in rescue operation to view the sight without any complexity.

5. Further controls can be added as it is programmable.

6. Bluetooth module can be upgraded to RF module for better range.

7. Tyre grips can be changed for off-roading capabilities.

8. If we could provide IOT capabilities this can be controlled remotely from anywhere in the world.

9. Motors can be upgraded for better speed capabilities.

10. Wireless charging capabilities can also be added if we upgrade battery circuit.

CHAPTER 8

CONCLUSION

In this project, a programmed component has been built up that works in accordance with your hand signal. The system moves remotely in accordance with palm signal. The Bluetooth module is operating on the frequency of 2.4 gigahertz and consists of a circulate of 40-70 meters. Overall ,there are total two Bluetooth modules in the project one at the glove and one at the receiving end.

The one on the hand glove does only transmitting and on the receiving end only receiving they are programmed for one way communication. The battery in the circuit lasts for 30 minutes if used continuously . This circuit runs on eight AA batteries. The motor driver is rated for 5v and one driver can support up to 2 motors. Thank You.