***HAND GESTURE CONTROLLED ROBOT***

**OBJECTIVE :**

To Construct a Hand Gesture controlled robot and implement it in daily life uses.

**ABSTRACT :**

1. These robots are manually controlled by the controller as usual, but in a different manner
2. Here we don’t use RC or any mobile keypads, instead we make things simpler here by using our hand movements as the controller.
3. The frame of the robot is a 3D printed plastic material ready to connect with the motors and other components.
4. The design is common as all other robots.
5. This robot can be implemented in the society in many ways.
6. It can be used to carry our luggage without any Hard Work.

**COMPONENTS REQUIRED :**

* 4wd Car kit - 1N
* Arduino UNO - 1N
* Arduino Nano   - 1N
* L298 Motor Driver - 1N
* nRf24L01 Modules - 2N
* Joystick - 1N
* 18650 Li-ion battery - 5N  
  (If possible buy this from local shop)
* Battery Holders - 5N
* Wires - As Req.
* General purpose PCB - 2N
* 20 mm berg strips - 32pins
* Switches - 2N

**TOOLS REQUIRED :**

* Soldering Iron - 1N
* Wire cutter - 1N
* Screw Driver Tool Kit - 1N
* Scotch Tape - 1N
* Arduino UNO R3 Connector cable - 1N
* Arduino Nano Connector cable - 1N

**SOFTWARE REQUIRED :**

* Arduino IDE

**TRANSMITTER CODE :**

//Library needed

#include <SPI.h>

#include <nRF24L01.h>

#include <RF24.h>

#include<Wire.h>

RF24 radio(7,8); // CE, CSN Connection in  Digital Pins

const byte address[6] = "00001";

char xyData[32] = "";

int joystick[2];

int joystick0,joystick1;

const int MPU\_addr=0x68;

int16\_t AcX,AcY,AcZ,Tmp,GyX,GyY,GyZ;

int minVal=265;

int maxVal=402;

int x;

int y;

int z;

void setup(){

  //MPU6050 gyroscope Setup

  Wire.begin();

  Wire.beginTransmission(MPU\_addr);

  Wire.write(0x6B);

  Wire.write(0);

  Wire.endTransmission(true);

  //NRF24l01 Wireless Transmitter Setup

  radio.begin();

  radio.openWritingPipe(address);

   radio.setDataRate(RF24\_250KBPS);

  // radio.setPayloadSize(sizeof(joystick));

  radio.setPALevel(RF24\_PA\_MAX);

  radio.stopListening();

  Serial.begin(9600);

}

//Code for The MPU6050

void loop(){

  Wire.beginTransmission(MPU\_addr);

  Wire.write(0x3B);

  Wire.endTransmission(false);

  Wire.requestFrom(MPU\_addr,14,true);

  AcX=Wire.read()<<8|Wire.read();

  AcY=Wire.read()<<8|Wire.read();

  AcZ=Wire.read()<<8|Wire.read();

  int xAng = map(AcX,minVal,maxVal,-90,90);

  int yAng = map(AcY,minVal,maxVal,-90,90);

  int zAng = map(AcZ,minVal,maxVal,-90,90);

  joystick0 = RAD\_TO\_DEG \* (atan2(-yAng, -zAng)+PI);

  joystick1 = RAD\_TO\_DEG \* (atan2(-xAng, -zAng)+PI);

  if (radio.available())

  {

    Serial.println("Available");

  }

  radio.write( &joystick0, sizeof(joystick0) );

  radio.write( &joystick1, sizeof(joystick1) );

  Serial.print("AngleX= ");

  Serial.println(joystick0);

  Serial.print("AngleY= ");

  Serial.println(joystick1);

  delay(1000);

}

**RECIEVER CODE :**

//Library Needed

#include <SPI.h>

#include <nRF24L01.h>

#include <RF24.h>

//Motor Connection to The Digital pins

int enA = 0;

int Motor1 = 3;

int Motor2 = 4;

int enB = 1;

int Motor3 = 5;

int Motor4 = 6;

RF24 radio(9,10); // CE, CSN Connection in Digital Pins

const byte address[6] = "00001";

char receivedData[32] = "";

int  xAxis, yAxis=0;

int joystick[2];

int joystick0,joystick1=0;

void setup() {

  // put your setup code here, to run once:

  Serial.begin(9600);

  pinMode(enA, OUTPUT);

  pinMode(enB, OUTPUT);

  pinMode(Motor1, OUTPUT);

  pinMode(Motor2, OUTPUT);

  pinMode(Motor3, OUTPUT);

  pinMode(Motor4, OUTPUT);

  //Set NRF24l01 to Receiver Mode

  radio.begin();

  radio.openReadingPipe(1, address);

   radio.setDataRate(RF24\_250KBPS);

   //radio.setPayloadSize(sizeof(joystick));

  radio.setPALevel(RF24\_PA\_MAX);

  radio.startListening();

  //Initial state of the Motors

  digitalWrite(Motor1, 0);

  digitalWrite(Motor2, 0);

  digitalWrite(Motor3, 0);

  digitalWrite(Motor4, 0);

  delay(5000);

}

void loop() {

  // put your main code here, to run repeatedly:

if (radio.available()) {   // If the NRF240L01 module received data

    radio.read( &joystick0, sizeof(joystick0) );

    radio.read( &joystick1, sizeof(joystick1) );

    Serial.println(joystick0);

    Serial.println(joystick1);

    xAxis = joystick0;

    yAxis = joystick1;

  //Turn left

  if ( yAxis > 30 & yAxis < 90) {

  digitalWrite(Motor1, HIGH);

  digitalWrite(Motor2, LOW);

  digitalWrite(Motor3, LOW);

  digitalWrite(Motor4, HIGH);

  }

  //Turn Right

  else if (yAxis > 260 & yAxis < 330) {

  digitalWrite(Motor1, LOW);

  digitalWrite(Motor2, HIGH);

  digitalWrite(Motor3, HIGH);

  digitalWrite(Motor4, LOW);

  }

 //Move Backward

 else if (xAxis > 30 & xAxis < 90) {

  digitalWrite(Motor1, LOW);

  digitalWrite(Motor2, HIGH);

  digitalWrite(Motor3, LOW);

  digitalWrite(Motor4, HIGH);

  }

  //Move Forward

  else if (xAxis > 260 & xAxis < 335) {

  digitalWrite(Motor1, HIGH);

  digitalWrite(Motor2, LOW);

  digitalWrite(Motor3, HIGH);

  digitalWrite(Motor4, LOW);

}

  //Stop Moving

  else {

  digitalWrite(Motor1, LOW);

  digitalWrite(Motor2, LOW);

  digitalWrite(Motor3, LOW);

  digitalWrite(Motor4, LOW);

}

    Serial.print("xAxis:");

    Serial.println(xAxis);

    delay(1000);

    Serial.print("yAxis:");

    Serial.println(yAxis);

    delay(1000);

}

  //If The Receiver Does not Connect to the Transmitter

  else {

  digitalWrite(Motor1,LOW);

  digitalWrite(Motor2, LOW);

  digitalWrite(Motor3, LOW);

  digitalWrite(Motor4, LOW);

  Serial.println("Not Connected!");

  delay(1000);

    }

}

**OUTPUT :**

