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Execution of gesture control in automobiles

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ABSTRCT

Margin of the industrial robots are autonomous and are necessary to manage with high accuracy and speed. Several appliances are needed to be semi-autonomous or human operated robots. Human movements comprise a range of motion conveyed by the body which includes facial expressions and hand movements. The objective of the plan is to create a human machine line used for controlling car and to make the device simple as well as cheap so that it can be produced and used for number of functions. In this case study of Gesture control, components required for prototype has been bought and prototype for rough dimensions has been made and finally testing for errors and reworks has been made for several times. This device can perform various tasks because of Arduino Nano which is implanted on the Transmitter section. A main lead of the system is that it offers real time palm gesture recognition, leading to an efficient and natural way of controlling vehicle. The present appliance however seems to be achievable and more user friendly in contrast to the traditional input modes but is somewhat less robust in recognition phase. So in future the work can be done on upgrading each of the technology and new concepts.

Keywords: *Gesture, Automobile, Implementation*

1. INTRODUCTION

In today's world robots have been a big innovation in the technology generated by us. They are the main motivation because of which the work which cannot be done by humans is easily performed by robots. These Robots can be considered in two ways: Autonomous and Semi-autonomous. Autonomous Robots are those which are controlled by themselves and they do not need any outside resource to make up it work. Conversely, semi-autonomous robots are those which need an outside resource for their working. Margin of the industrial robots are autonomous and are needed to manage with high-level precision and speed. However, some submissions are needed to be semi-autonomous or human operated robots. Human gestures represent a range of motion expressed by the body which includes facial manifestations and hand movements. Amongst all the range of gestures, hand gesture is the very communicative and the most often used and shows an exceptional way for the substantially disabled people as well. One such type of semi-autonomous robot is vehicle used by the movement of hand gestures. This robot is operated by the motions and manipulations of the transmitter section which will be placed on the glove on our hand.

Hand gesture status creation use of digital pictures has been an exploration subject for many years now. Precise use of hands as a feedback device is an inventive process for offering natural human computer interaction. Gesture recognition is a very adaptive line among the robots and users. It lets the functions of complicated machines using hand movement thereby reducing physical interaction. The Gesture organized robots offer an prospect to incorporate disabled people into their normal working life alongside to enhance the sovereignty in events of daily living. They can even help to convene tasks caused by military and defence tasks. They can also be used in surgical operations. This system can set up the remote robot in the various environment employing distinct motion orders. A hand gesture is the easiest and the instinctive way to control robots. Hand Gesture regulated robots were established to assist manhood to they are attain places which are out of reach and unsafe to them. These robots have a communicating side and a collecting side. The transmitter is installed on the hand, while the receiver is installed on the robot itself. This is a simple, user-sociable approach to intermingle with robotic system and robots. An accelerometer is executed for spotting the rolling point of your hand, and a microcontroller begins various comparison principles and creates command signals needed to control and move the robot. A component called accelerometer is applied for the work out of this device. This component describes an axis for the progress of our device in the 3D axis. In this case study of Gesture control is primarily divided into two segments namely Transmitting and Receiving portion. Hand Glove with Nano is the Transmitting unit, whereas other section is the car which is the receiving unit. The objective of the plan is to create a human machine line applied for regulating car and to make up the machine simple along with inexpensive so that it can be delivered and applied for number of functions. Further, the purpose of this project is to construct a car that can be operated by gesture all the way through wireless and decisively to make it customer approachable so that user can manage motions of the car by carrying device glove and performing predefined gestures.

2. METHODOLGOY

The case study of Gesture control is accomplished formed on literature analysis for sorts of gestures and distinct hand gestures experiments (1-7). Components needed for the prototype such as Arduino Nano and other encoders and decoders has been chosen. Coding for the prototype i.e., analogous commands like forward, backward, stop, left and right is performed applying Arduino software. Circuit diagrams for Transmitter and Receiver has been performed. 3D CAD Model for prototype made based on rough dimensions and ultimately assessment for mistakes and revises has been made for several times.

2.1. Components Assortment

2.1.1 Accelerometer: Accelerometer sensors are applied to quantify the tilt in x and y planes and transforms it into analog signals and it can effortlessly have interfaced to a microcontroller. The ADXL335 is a small, thin, low power, complete 3-axis accelerometer with signal prepared voltage outputs. It owns 6 pins, first one for power supply (VCC), second pin for ground (GND) and the last one for self-test (ST). Left Over 3 pins are for X, Y, Z axis. X and Y axis pins are connected to A0 and A1 pin of Arduino Uno board, individually and manages on 3.3V from the Arduino Uno board. The ADXL335 is available in a small, low profile, 4mm x 4mm x 1.45 mm, 16-lead, plastic lead frame chip scale package. The small size of 3-axis accelerometer is the two factor that creates it efficient to distinguish the hand gesture. It can determine the constant acceleration of gravity from tilt-sensing functions with energetic acceleration following from motion, shock or vibration and provides subsequent analog ideals over X, Y, Z axis pins.

2.1.2 Arduino Nano: Arduino is an open-source hardware and software company, project and user community that constructs and produces microcontrollers and microcontroller kits for developing digital machines. The boards are outfitted with sets of digital and analog input/output (I/O) pins that may be interfaced to several extension boards or shields and other circuits. Arduino board models employ a range of microprocessors and controllers. The Arduino Nano is a small and breadboard-approachable board established on the ATmega328P; recommends the same connectivity and is programmed using the Arduino Software named Integrated Development Environment (IDE) universal to all our boards and operating both online and offline.

2.1.3 Zigbee: Zigbee is an IEEE 802.15.4-centered design for a complement of high-level interaction procedures applied to establish individual area networks with small, low-power digital radios, for instance for home automation, medical device data collection, and other low-power low-bandwidth needs, intended for small scale schemes which require wireless connection. Consequently, Zigbee is a low-power, low data rate, and close proximity (i.e., individual area) wireless ad hoc network. The technology specified by the Zigbee design is meant to be simpler and less costly than other wireless personal area networks (WPANs), such as Bluetooth or more general wireless networking such as Wi-Fi. Appliances consist of wireless light switches, home energy monitors, traffic management systems, and other consumer and industrial equipment that involves short-range low-rate wireless data transfer. It is usually applied in low data rate applications that involve long battery life and reliable networking.

2.1.4 L293DNE: The L293 and L293D devices are quadruple high-current half-H drivers. The L293D is devised to offer bidirectional drive currents of up to 600-mA at voltages from 4.5 V to 36 V and L293 is intended to offer bidirectional drive currents of up to 1 A at voltages from 4.5 V to 36 V. Both devices are designed to drive inductive loads such as relays, solenoids, DC, and bipolar stepping motors with other high-current/high-voltage loads in positive-supply appliances.

2.1.5 L293 Motor Driver: The best conventional approach to drive DC motors in two routes under control of a computer is with an H-bridge motor driver. H-bridges can be developed from scrape with bi-polar junction transistors (BJT) or with field effect transistors (FET), or can be obtained as an integrated unit in a single integrated circuit package such as the L293. The L293 is an incorporated circuit motor driver that can be utilized for synchronized, bi-directional control of two small motors.

2.1.6 12-Volt Battery: A battery is a device comprising of one or more electrochemical cells with external networks for powering electrical devices such as flashlights, mobile phones, and electric cars. While a battery is distributing electric power (positive terminal- the cathode and negative terminal- the anode), the terminal marked negative is the source of electrons that will flow across an external electric circuit to the positive terminal. When a battery is connected to an external electric load, a redox reaction transforms high-energy reactants to lower-energy products, and the free-energy discrepancy is provided to the external circuit as electrical energy.

2.1.7 Electric Motor: An electric motor is an electrical machine that transforms electrical energy into mechanical energy. Electric motors can be operated by direct current (DC) sources, such as from batteries, motor vehicles or rectifiers, or by varying current (AC) sources, such as a power grid, inverters or electrical generators. Most electric motors work over the communication between the motor's magnetic field and electric current in a wire snaking to create force in the form of rotation of a shaft. The largest electric motors are utilized for ship propulsion, pipeline compression and pumped-storage appliances with grades reaching 100 megawatts. Electric motors are in industrial fans, blowers and pumps, machine tools, household applications, power tools and disk drives and classified by considerations such as power source type, internal construction, application, and type of motion output. Common objective motors with standard dimensions and characteristics offer convenient mechanical power for industrial utilization.

2.2. Coding

a) Hand:

```
#include <SoftwareSerial.h>
SoftwareSerial mySerial(5,4);
int x=A0;
int y=A1;
int z=A2;
```



```
void setup()
{
  Serial.begin(9600);
  mySerial.begin(9600);
  pinMode (x,INPUT);
  pinMode (y,INPUT);
  pinMode (z,INPUT);

}
void loop()
{
int X_value =analogRead(x);
int Y_value =analogRead(y);
int Z_value =analogRead(z);
Serial.print("\n");
delay(200);
if(Y_value>390)
{
  mySerial.write('l');
  }
  if(Y_value<330)
{
  mySerial.write('r');
  }
  if(X_value>360)
{
  mySerial.write('f');
  }
    if(X_value<300)
{
  mySerial.write('b');
  }
}
```

b) Robot:

```
#include <SoftwareSerial.h>
SoftwareSerial mySerial(3,4);
int in1=8;
int in2=7;
int in3=9;
int in4=10;

void setup()
{
  Serial.begin(9600);
  mySerial.begin(9600);
  pinMode(in1,OUTPUT);
 pinMode(in2,OUTPUT);
  pinMode(in3,OUTPUT);
   pinMode(in4,OUTPUT);

}
void loop()
{

while(mySerial.available()>0)
{
  char ch = mySerial.read();
  if(ch == 'l')
  left();
     if(ch == 'r')
   right();
     if(ch == 'f')
   forward();
     if(ch == 'b')
   backward();
  }
```



```
}
void forward()
{
  digitalWrite(in1 , HIGH);
  digitalWrite(in2 , LOW);
  digitalWrite(in3 , HIGH);
  digitalWrite(in4 , LOW);
    delay(200);
   dc_stop();
}
void backward()
{
  digitalWrite(in1 , LOW);
  digitalWrite(in2 , HIGH);
  digitalWrite(in3 , LOW);
  digitalWrite(in4 , HIGH);
  delay(200);
   dc_stop();
}
void right()
{
  digitalWrite(in1 , LOW);
  digitalWrite(in2 , HIGH);
  digitalWrite(in3 , HIGH);
  digitalWrite(in4 , LOW);
  delay(200);
   dc_stop();
}
void left()
{
  digitalWrite(in1 , HIGH);
  digitalWrite(in2 , LOW);
  digitalWrite(in3 , LOW);
  digitalWrite(in4 , HIGH);
  delay(200);
   dc_stop();
}
void dc_stop()
{
  digitalWrite(in1 , HIGH);
  digitalWrite(in2 , HIGH);
  digitalWrite(in3 , HIGH);
  digitalWrite(in4 , HIGH);
}
```

2.3. Circuit Networks

2.3.1 Transmitter Circuit

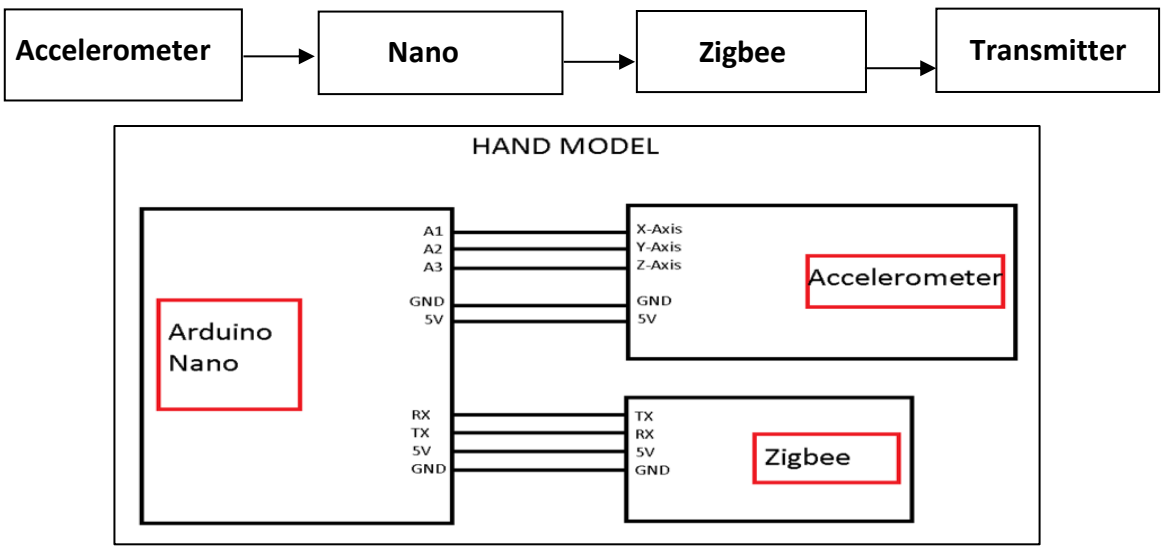


Fig. 1: Transmitter Circuit Diagram

The fundamental block diagram of the transmitter section of vehicle operated by hand gesture is displayed in the above diagram.

2.3.2 Receiver Circuit

At the receiver section we used RF receiver to receive the data and then transfers it to HT12D decoder. Then further the decoder convert the Received serial data to parallel data and then with the data is read by using Arduino software, if data is an predefined process then it instructs the motor driver to proceed further.

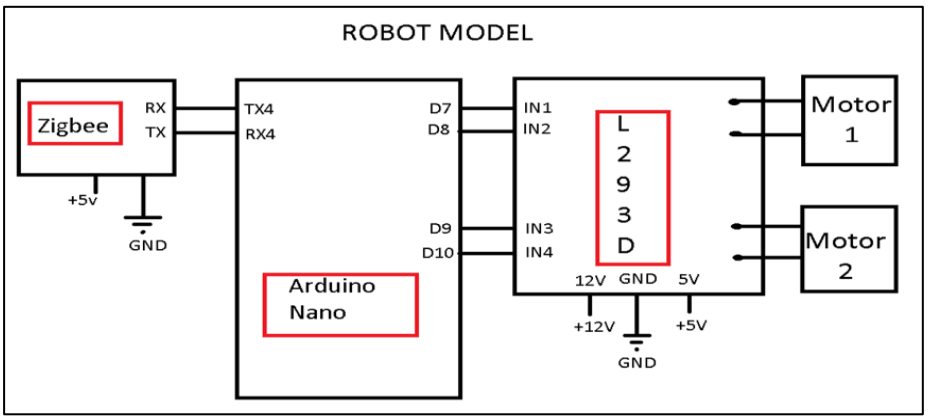
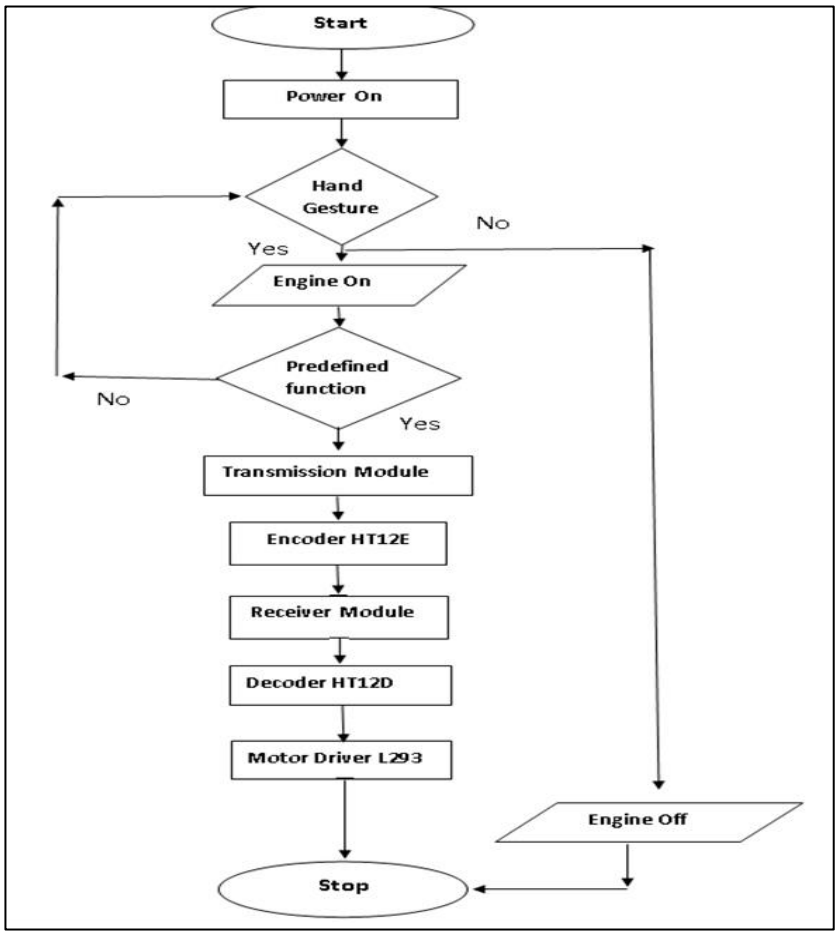


Fig. 2: Receiver Circuit Diagram

2.3.3. Flow Chart



3. RESULTS

Transmission through Zigbee is better than RF (Radio frequency), IR (infrared) as of many justifications. A few of them are: first, signals through Zigbee can move through larger spaces while producing it appropriate for long variety functions, whilst IR mainly use in the line of sight mode. Second, Zigbee and RF signals can move still when there is an impediment among transmitter and receiver. Third, Zigbee transmission is stronger and more reliable than RF and IR transmission. RF interaction applies a specific freq. unlike IR signals which are influenced by other IR emitting sources.

The transmitter and receiver pair manages at a specific freq. A Zigbee collects sequential information that is communicated wirelessly through Zigbee transmitter. Here the experimental setup is done for communication unit and it is independently verified with linking it to the laptop/pc and watching the outputs and the transmitting time of the hand gesture. Later the Receiver Unit is done and tested to know about the response time or the time to decode the data collected from Transmission unit and delivering it to the Motor Drivers.

Prototype

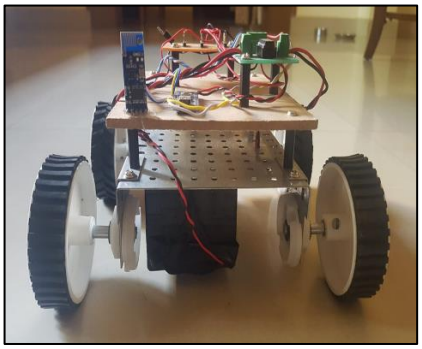


Fig. 3: Front View (Robot Model)

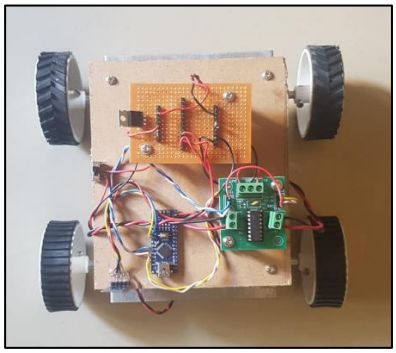


Fig. 4:Top View (Robot Model)

Fig. 5: Hand Model

4. DISCUSSION AND CONCLUSION

This device can execute several assignments as of Arduino Nano which is inserted on the Transmitter portion. A main benefit of the system is that it offers real time palm gesture identification, prominent to an efficient and natural way of managing vehicle. Vehicle can be developed to identify humans covered in earthquake and mudslides by applying the sensor appropriately. GPS system can be enhanced to the vehicle by which its site can be traced. The device can as well be utilized for military reasons to observe those regions of combat zone where human existence cannot be found. All these advancing systems from Glove founded method to the usage of array camera for moving 3D recognition have demonstrated to be of good usage to humans and are getting great functions not only in theories and labs but also commercially.

The current appliance however appears to be achievable and more user approachable in contrast to the conventional input modes but is slightly less robust in distinguishing phase. So, in future the work be able to be done on upgrading each of the expertise and new concepts can be revealed to make the techniques simple. The system can be made faster and precise, various search algorithm methods can be applied and also can design the library software to auto-generate a folder for most utilized hand gesture by the user and removing the least used one. This would make the search procedure faster and safer for the user. Further, future work involves not only enhancement of the intended approach but also considering more tasks such as energetic gestures including both hands and/or multiple cameras. The final objective includes gestures with a high degree of freedom, which may necessitate detection of fingers and enunciated hands. By applying pulse sensor many accidents can be avoided by linking it to the Transmitting unit. Consequently, the transmitting unit will start only if a person has a normal heart beat.

5. REFERENCES

[1] Evolution of Hand Gesture Recognition: Praveen Kumar Sharma, Shreya Sharma. International Journal of Engineering And Computer Science, Volume 4 Issue 1 January 2015.

[2] Robot Control Using Hand Motion Gesture: Aishwarya Mapuskar, Ashish Kharade, Krutika Kedari, Siddhali Shah, Koustubh Gaikwad. International Research Journal of Engineering and Technology (IRJET), Volume: 04 Issue: 04 | Apr -2017.

[3] Vehicle Controlled by Hand Gesture: Prof. Sudhir A. Kadam, Prashant kr. Jha, G.Pavan Vignesh, Akshit Sahai. International Research Journal of Engineering and Technology (IRJET), Volume: 04 Issue: 05 | May -2017.

[4] Robotic Vehicle Movement and Arm Control through Hand Gestures using Arduino: N Meenatchi Sundaram, R Shiva Rama Krishnan, T K Suraj Kamal, J Rajeswari. International Research Journal of Engineering and Technology (IRJET), Volume: 05 Issue: 04 | Apr-2018.

[5] Modeling and Designing of Gesture Control Robot: Argha Samanta, Sangharsh Kumar, Deepak Saraswat, Bharnab Das, Vibhuti Kumar, Harpreet Kaur Channi.

[6] IJSART - Volume 3 Issue 10 – OCTOBER 2017.

[7] Hand Based Gesture Controlled Robot: Viren Sugandh. International Research Journal of Engineering and Technology (IRJET), Volume: 05 Issue: 09 | Sep 2018 .

[8] Design and Implementation of Gesture Controlled Robotic Arm for Industrial Applications: J. PRADEEP, Dr. P. VICTER PAUL. International Journal of Advanced Scientific Research & Development. Vol. 03, Iss. 04, Ver. III, Oct – Dec' 2016.

