Gesture Control Robot

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***Abstract*— The foremost goal of the project work is to govern robotic with gestures the use of hand. There are foremost additives of the system: The accelerometer relies upon up on the gestures of the hand. Through accelerometer, a passage of statistics sign is acquired and it's far processed with the help of arduino microcontroller. The microcontroller offers command to the robot to transport with inside the preferred course. The simple running precept for the robotic is passage of the statistics alerts of accelerometer readings to the Arduino board fitted at the bot. The application compiled in that arduino runs consistent with that value, which make the bot characteristic accordingly.**

***Index Terms:* Gesture controlled car, Accelerometer Sensor, Hand Gesture, Accelerometer, Transmitting circuit, Motor Drive IC.**

1.INTRODUCTION

1.1 Finalizing the choice of creating a gesture controlled robot a good way to be controlled by a hand-gloved mounted with the transmission circuit assembly. The circuit assembly will include accelerometer and Arduino board alongside an RF transmitter, which collectively characteristic as a enter tool to the bot. The simple goal is to do a basic application of controlling a automobile together along with your hand.

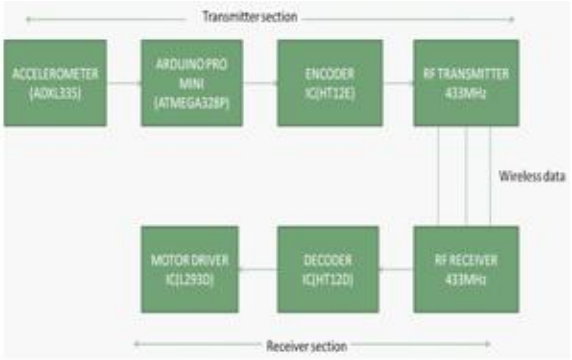
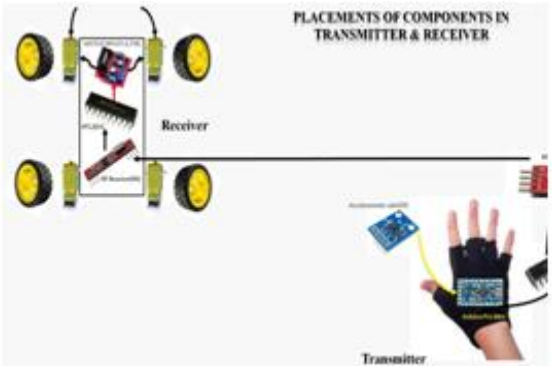


Figure 1.1: Basic block diagram of project

The controls of the robotic are primarily based totally on gesture of hand, which will become easy for any individual to address it. The simple operating precept for the robotic is passage of the data indicators of accelerometer readings to the Arduino board fitted at the robot.

1.2. Gesture recognition is a subject in computer technology and language technology with the purpose of interpreting human gestures through mathematical algorithms. Gestures can originate from any physical movement or country however normally originate from the face or hand. Current focuses with inside the field encompass emotion reputation from the face and hand gesture recognition. Many processes had been made the usage of cameras and pc vision algorithms to interpret signal language. However, the identification and reputation of posture, gait, proxemics, and human behaviors is likewise the difficulty of gesture recognization techniques.

1.3 A Gesture Controlled Robot is a type of robot that can be controlled by hand gestures rather than buttons as in the past. The user just has to wear a tiny transmitting gadget on his hand that contains a sensor, which in our instance is an accelerometer. A command is sent to the robot when the hand moves in a specified direction.



2. LITERATURE REVIEW

Ronny mardiyanto, heri suryoatmojo [1] "Development of hand gesture recognition sensor based on accelerator and gyroscope for controlling arm of underwater remotely operated robots". The accelerometer and gyroscope are used in this paper hand gesture sensor. A gyroscope is a sensor that is mounted to a hand and is used to capture the position of the operator's hand while operating in an underwater controlled vehicle

[2] Using the institute of medical and early modern studies, a basic wearable hand gesture gadget was created. The touch screen, a wired or wireless mouse, and a keyboard are used to interact with systems. This article uses the most intuitive people-machine communication device to interact with the device and other appliances.

Christian manery [3] "hugging a wobot weird? Investigating the influence of robot appearance on user's perception of hugging". Humanoid robots can engage with people through physical interactions such as embracing and shaking hands. Physical interaction must be carefully constructed as a user-friendly system that interacts naturally while minimising rejection.

[4] Robot finger design for myoeletric hand and recognition of finger motion via surface ElectroMyGraphy. The action of finger operation through ground ElectroMyoGraphy and robot hand layout forcing to the software to a ME prosthetic hand are discussed in this work. The robots, which have index or thumb fingers, are designed to do fundamental tasks such as gripping or grabbing in real time.

3. EXPECTED OUTCOME

The results of this proposed device are as followed. The proposed device, in which the user can navigate the wi-fi robotic in the surroundings the usage of various gestures commands. The most important goal is to offer dependable and a more herbal technique for the user to navigate a wi-fi robotic with inside the surroundings the usage of gestures. Object detection was achieved via way of means of color detection and photograph segmentation.

Fig 4.1 Hand Gesture Controlling

PROJECT HARDWARES:

- Accelerometer (ADXL335)
- Arduino Pro Mini
- ATmega328
- Encoder IC (HT12E)
- RF Module (Rx/Tx)
- Decoder IC (HT12D)
- Motor Driver IC(L298N)
- DC Motors

PROJECT SOFTWARE:

Arduino Software

The Arduino incorporated improvement environment (IDE) is across-platform software written in Java, and derives from the IDE for the Processing programming language and the Wiring projects

4. METHODOLOGY

We separated our assignment into two pieces in order to make it straightforward and simple, prevent complexity, and eliminate errors. The first segment is the transmitting section, which has the following elements:

1 Accelerometer
2 Atmega328(MCU)
3 Encoder IC
4 RF Transmitter Module

The second is the receiving end which comprises of following main components:

1 RF Receiver Module
2 Decoder IC
3 Motor Driver IC

4 DC Geared Motors

Only the X and Y directions are recorded by the accelerometer, which generates continuous analogue voltage values. These voltages are passed into the comparator IC, which compares them to the reference voltages we've specified using variable resistors. The encoder IC receives this analogue signal as input. The encoder takes a parallel input and outputs a serially coded waveform appropriate for RF transmission.

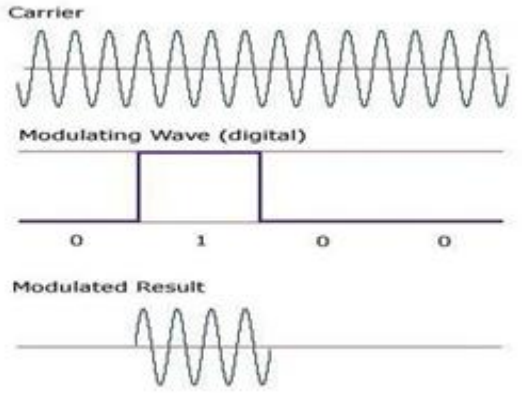


Fig 3.1 ASK Modulation

The 315MHz frequency is used by the RF modules. It signifies that the RF module's carrier frequency is 315MHz. The RF module allows the operator to easily and remotely operate the robot.

The schematic of transmitting end can be seen below:

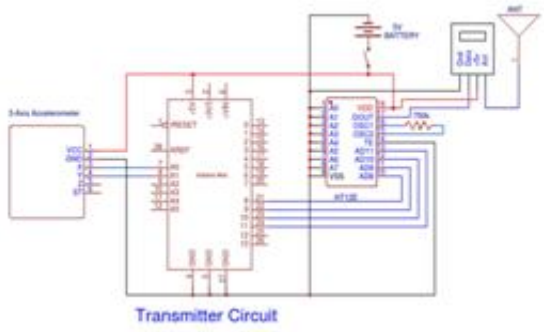


Fig 3.2 Transmitting Circuit

The RF receiver receives the broadcast signal, demodulates it, and then passes it on to the decoder IC. The decoder IC recovers the original data bits after decoding the coded waveform. This pin can be used to attach a light that will indicate the transmission status. The led will blink if the communication was successful.

The encoder's parallel data is supplied into the microcontroller's port lot. Bits make up this information. These bits are read by the microcontroller, which then makes a decision based on them. The microcontroller compares the input bits to the coded bits that are burned into the microcontroller's programme memory and outputs on the basis of these bits. The output port of the microcontroller is port 2. The motor driver IC receives the output bits from this port and operates the motors in a specific configuration based on the hand movements.

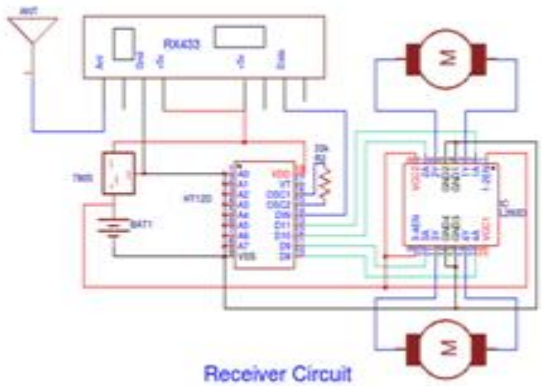


Fig 3.3 Receiving Circuit

SIMULATION:

We used PROTEUS to run a simulation of our project, and the code was created in C using KEIL MICROVISION. Using the H- Bridge IC, we developed code for the microcontroller to operate DC motors (L293D). We transmitted important data to the Microcontroller (AT89C51) through switches in the simulation. The data was processed by the microcontroller, which then passed it to the Actuator IC (L293D). The simulation schematic is as follow:

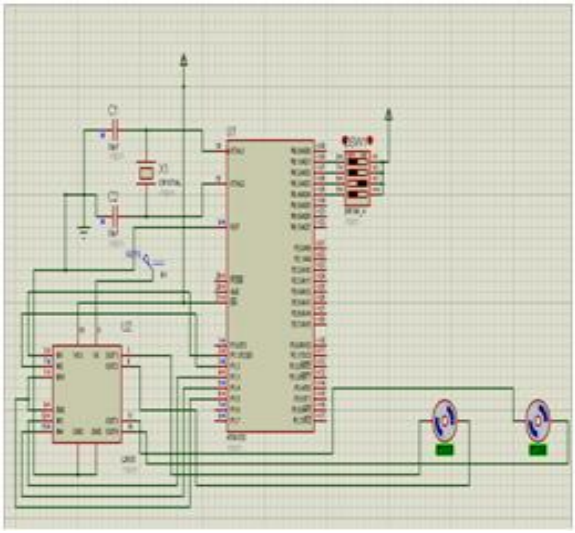


Fig 3.4 FYP-1 Simulation

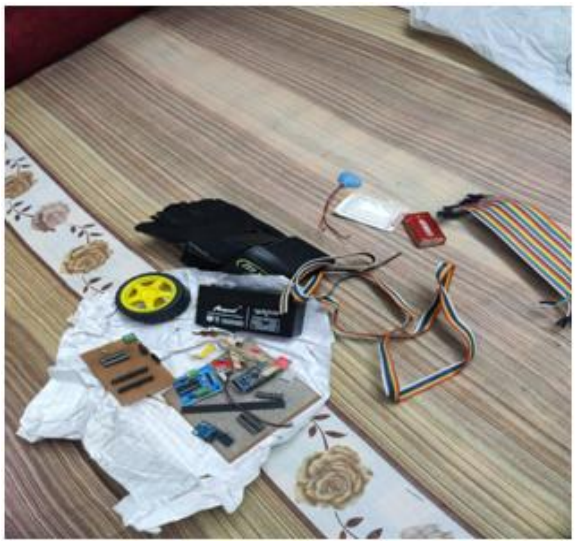
5. BLOCK DIAGRAM

(A) TRANSMITTER

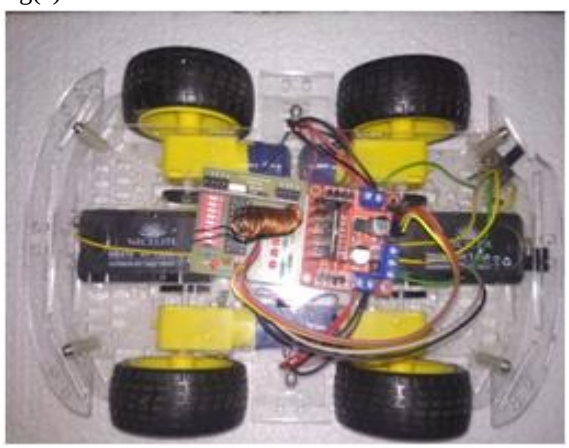
(B) RECEIVER

Fig 1.0 Block Diagram of the wireless gesture controlled robot

5. RESULT



Fig(a) Hardware Modules



Fig(b) Car Module Chassis

Fig(c) Hand Gesture Hardware

Based at the interface, a person with a 3- axis accelerometer module connected to his or her wrist can without delay use hand gestures to navigate a car-robotic. The 3-axis accelerometer module senses the hand trajectories and then wi-fi transmitted to a PC through a RF module.

6. APPLICATION

6.1 Remote control of numerous hands with such a wave of a hand is feasible thanks to gesture recognition.

6.2 Handicapped and physically disabled persons can use gesture control to complete tasks such as driving a car and moving a merchandise.

8. CONCLUSION

The goal of this project is to use accelerometer sensors linked to a hand glove to operate a toy automobile. The sensors are designed to take the place of the remote control that is typically used to operate the vehicle. It will allow us to manage the car's forward and backward motions, as well as left and right movements, all while controlling the throttle using the same accelerometer sensor.

9. FUTURE SCOPE

6.1. The on-board batteries are large and hefty, taking up a lot of room. We may either replace the existing DC Motors with ones that use less power or utilise an other power source for the batteries.

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