

Hand Gesture Controlled Vehicle

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Abstract: Hand gesture controlled vehicle is a robot that can be controlled by simple human gestures. The user just needs to wear a gesture device with a sensor. The sensor will record the movement of the hand in a specific direction which will result in the motion of the robot in the respective directions. The robot and the Gesture instrument are connected wirelessly through radio waves. Users can interact with the robot more easily due to the wireless communication. We can control the car using accelerometer sensors connected to a hand glove. The sensors are intended to replace the remote control that is generally used to run the robot. It will allow the user to control the forward, backward, leftward, and rightward movements while using the same accelerometer sensor to control the throttle of the car. The movement of the car is controlled by the differential mechanism.

Keywords: hand gesture, vehicle.

1. Literature Survey

Gesture recognition can be done with many systems like image processing, motion, and angle detection. A system having a low-cost Microcontroller Based Gesture Recognition system without image processing is cheaper than image processing-based gesture recognition systems. The Accelerometer sensor is used for measuring the gesture of a human hand. Then the collected data will be sent to the robot via Radio Frequency communication and the robot will move forward, backward, left, and right direction by following the hand gesture.

2. Methodology

Transmitter Section: The major components of the Transmitter Section are the Sensor (ADXL335), MCU (Arduino Nano Board), Encoder (HT12E), and Transmitter Module (433MHz). In the transmitter circuit, two analog outputs from ADXL335 pins (x, y) are connected with input pins (A0, A3) of the microcontroller. Analog signals are converted to digital signals through the microcontroller. Digital outputs from pins D09, D10, D11, and D12 of the microcontroller are directly sent to the encoder IC (HT12E). This data is encoded and transmitted via the RF Transmitter module.

Receiver Section: The receiver part consists of a 433MHz RF Receiver module, HT12D decoder, and L298N motor driver to run the motors. Here, the receiver module receives the transmitted signal, which is decoded by the decoder IC to get the same digital outputs. Four outputs of L298N IC drive two

6V motors. The robot moves as per digital signals generated by the tilt direction of the accelerometer in the transmitter section. The direction of the robot movement is as per the logic.

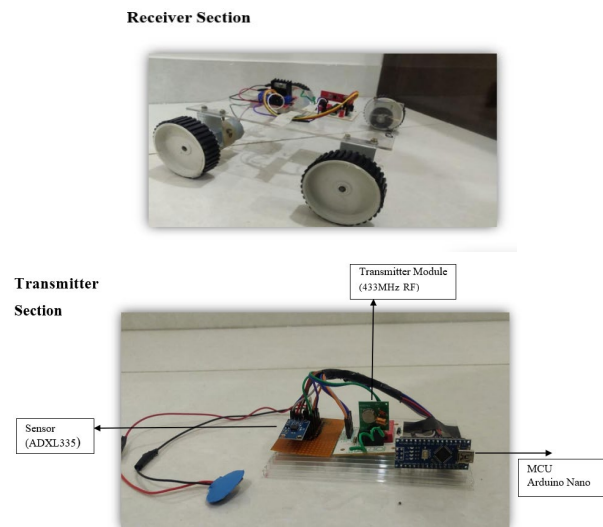


Fig. 1.

3. Conclusion

A study on the Hand Gesture based systems and wireless communications were conducted through various research papers. The working model of a Hand Gesture Controlled Vehicle was developed with all the information and data collected from the research papers and the internet. The model successfully operates in four directions – forward, backward, left, and right. In case of no gesture, the vehicle stops.

References

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