Robotic Car with Wireless Hand Motion Control

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Abstract

*Creating better connections between the physical and digital worlds In this work, you will create an Arduino-based vehicle system that allows you to digitally control your car without manually controlling it. The proposed work is accomplished using Arduino. Demonstrate microcontrollers, accelerometers, RF transceivers, and Bluetooth. This work's main contributionbeing able to control and drive the car with hand movements, depending on hand movements and hand positions***.**

Keywords*: Arduino, Bluetooth, hand gesture recognition, open source, sensors, smart cars.*

INTRODUCTION

Gesture-controlled robots are one of the latest implementation technologies in which the robot is controlled by hand gestures. In this work, he uses an ADXL355 and a 3-axis accelerometer to create a robot controlled by a hand gesture system, and the whole system is controlled by an Arduino Lily Pad. Instead of using a joystick or a physical controller with buttons, use hand gestures to control the robot's movements. The focus here is on wireless communication. Here, the receiver receives data from hand gestures and hand positions over a radio frequency link. The transmitter and receiver parts are the two parts of the system. The RF transmitter and accelerometer are combined into one transmitter worn on the hand to detect hand movement. This transmitter sends commands for the robot to move forward, backward, turn right, turn left, and stop. Simple hand gestures control all tasks, and the robot moves according to commands given by hand gestures.

LITERATURE REVIEW

The Basic Historical Background of Gesture-Controlled Robots Human gestures represent many bodily movements expressed through the body, such as facial expressions and hand movements. Compared to all gestures, hand gestures are arguably the most expressive and most used, and they have proven to be better for people with physical disabilities. More natural and easier communication with virtual reality systems It is a proven and excellent means for non-technical users to Premangshu Chanda et al. [1] used his Arduino Atmega in combination with his Bluetooth module to connect to an Android device. I used the built-in sensor on my smartphone. Your smartphone transmits this data via Bluetooth. The data is received by the Arduino, which gives signals to the motor drivers, causing the motors to move the robot in the specified direction. B. & Soubagya Nayak & Jalumuru Nalini et al. [2] They used his Arduino with a Zigbee radio module and his ADXL345 accelerometer. An accelerometer is placed in the hand, and when tilted to either side, the data is transferred to the Arduino, which sends signals to the motor and driver to move the robot in that direction. Prajwal Ashwin Jawalekar et al. [3] used an Arduino UNO, an ADXL 355 accelerometer, and a 433 MHz RF module to achieve hand gesture control of a robot. Archika & Mittal et al. [4] used an ATmega16 microcontroller, an ADXL 335 accelerometer, and 315 Hz RF with a range of 400–500 meters. Argha, Kumar, and others [5] To interface the robot, an AT89C51 microcontroller, MMA7361L accelerometer, and 433 Hz RF module were used, along with an HT-12E and HT-12D.

METHODOLOGY OF THE SYSTEM

The system is composed of the following components:

- Arduino UNO
- Accelerometer ADXL355
- RF433 Module
- HT12E and HT12D
- Motor driver L293DNE

The system consists of the following components: wearable electronics. I am using an ATmega168V,5.5 volts. which -s a lower poweof theversion of ATmega168. It operates with an operating voltage 5.5 volts.7 to 5.5V and requires a voltage of 2.7 to 5.5V. There are 14 digital I/O pins, 6 PWM channels, and 6 analogue input channels. The ADXL355 is a 3-axis accelerometer. It's a small, discreet package. It operates from a single 1.8V to 3.6V power supply and has a shock rating of 10,000 g. excellent thermal stability
The RF433 is a radio module that can only be used in pairs and only a5 volts.llows simplex communication. The operating frequencyMHz, 433 MHz and the operating voltage is +5V. It can have a transmission range of up to 3 metres without an antenna and up to 100 metres with an antenna. Its data transfer rate is 10 kbps. The HT12E is a device used to encode data for RF transmitters. The HT12D is a device used to decode RF receiver data. This is a high-current dual (or quadruple) half driver.It has 16 pins. Input pins 2 and 7 or 10 and 15 can control motor operation. features noise-immune inputs and a separate input logic supply.

ALGORITHIM USED IN PROCESS

Step 1:

Collect various information about the gesture-controlled robot car. I have gathered all the materials needed for crafting.

Step 2:

The chassis is wooden, and the DC motor is installed in the correct orientation.

Step 3:

Create a receiver circuit that attaches to the robot car and a transmitter circuit that uses the Lilypad.

Flowchart :

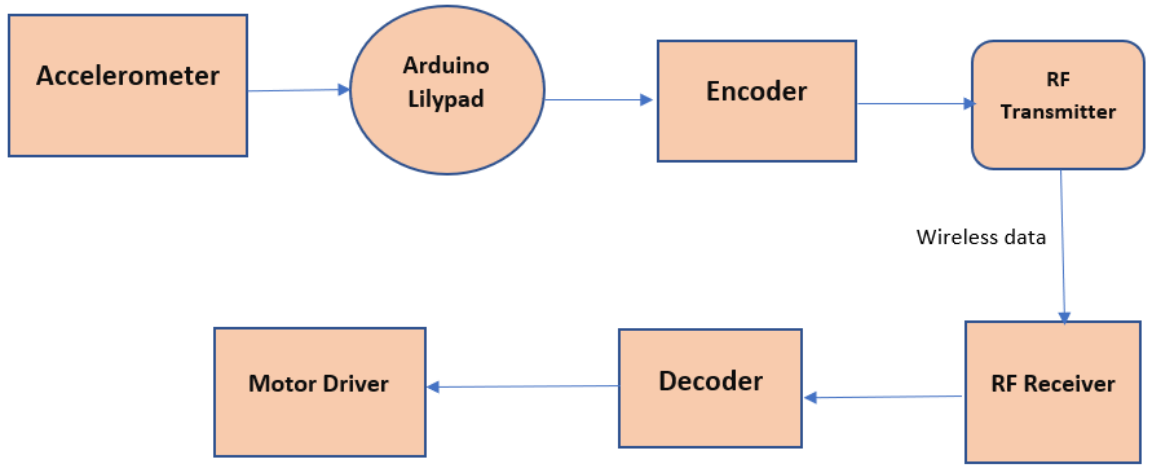

Fig.1

RESULTS AND DISSCUSSION

These gesture-controlled robots not only help people save time but also improve productivity, efficiency, and reliability, reduce resource consumption, and save energy. and aims to reduce operating costs. They will help you in various ways, such as in places where you can't go alone. With the help of this gesture-controlled robot, we can go there and save people's lives from danger. Gesture-controlled robots on the market are still immature. Potential and reliability characteristics are considered. Working models can be used not only for teaching students but also for control techniques for further improvement. Gesture-controlled robots are useful for military and surveillance applications.

Fig.2

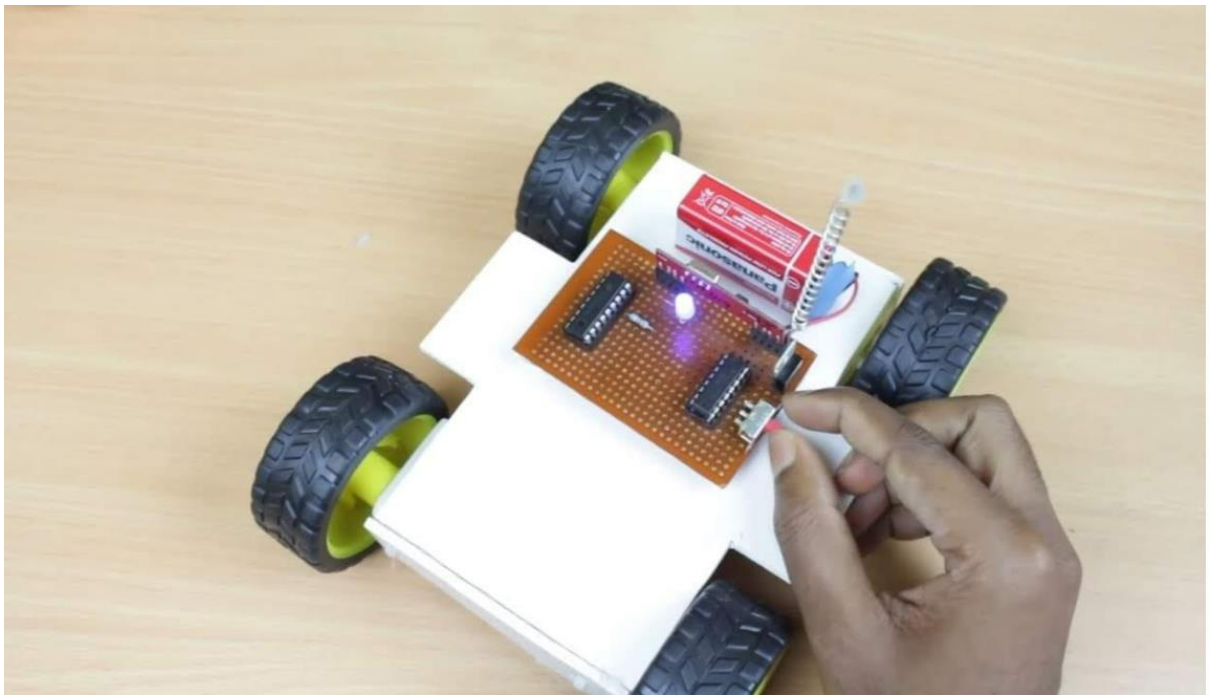

Fig.3

Fig.4

CONCLUSION

Gesture-controlled robots are especially useful for disabled people. Gesture-controlled robots that are on the market are not fully developed. Characteristics such as potential and dependability are considered here.The work model can also be utilised for students' training as well as in control technologies for further improvements. Military and surveillance applications benefit from gesture-control robots.

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