

WIRELESS GESTURE BOT

Project done in Srishti

Abstract

This project mainly aim to control a robot wirelessly using hand gestures. An accelerometer is used to detect the tilting position of your hand, and a microcontroller gets different analogue values and generates command signals to control the robot. The signal from Accelerometer is transferred to motor driver with the help of Bluetooth module. Motor drivers are used to control the movement of robot. Castor wheels provide free movement to the bot

Team Members

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Mentors

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Pre requisite of software

Knowledge of basic electronic concepts and devices - their features, usage, etc. Basic knowledge of assembly/C programming (C is more widely used).

Applications

- It can be sent to the places where human access is not possible .Its Range can be increased by using wifi module instead of Bluetooth module.
- It can be used as fire fighting robot .The robotic vehicle is loaded with water tanker and a pump which is controlled over wireless communication to sprinkle water on fire.
- These robots are used in medical applications for the purpose of surgery.
- These robotics are used in the construction field
- These robotics are used in industries to control trolley and lift.
- Military applications are very closely related to the concept of wireless sensor networks. Regarding military applications ,the area of interest extends from information collection generally, to enemy tracking

Component used

Mechanical

- Ply board
- 2 normal wheels
- 1 castor wheels
- 2 DC geared motors

Electronics

- 2 Arduino UNO and Nano
- Motor driver(L298n)
- Accelerometer(mpu6050)
- Capacitors
- Bluetooth module HC-05

Mechanical Design

The chassis is rectangular in shape attached with two normal wheels. The DC geared motor is fixed using L-channel. The other part of the L-channel is attached with wheels. There is one castor wheel fixed to the board for the free movement of the bot . Arduino, motor driver, Voltage regulator are mounted on the board using DST.

Electronic Design

Arduino

Arduino is an open source electronics prototyping platform based on flexible, easy to use hardware and software. It's intended for artists, designers, hobbyists and anyone interested in creating interactive objects or environment. Motor driver connections are made using arduino. Motor driver works according to the program installed in it.

Motor Driver

Motor driver used in our Bot is L298n. The L298n is a high voltage, high current, dual full-bridge motor driver designed to accept standard TTL logic levels and drive inductive loads such as relays, solenoids, DC and stepping motors.

Use in Bot

A motor driver is an electronic device that acts as an intermediate device between a microcontroller (here Arduino), a power Supply or batteries, and the motors. The main purpose of the Motor driver in our bot is to provide the sufficient power to the two dc geared Motors which Arduino cannot do.

Bluetooth module

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication.

Use in Bot

Bluetooth module is used to transfer signal from Accelerometer to motor Driver. Default baud rate of new Bluetooth module is 9600 bps. You just need to connect rx and tx to controller or serial converter and give 5 volt dc regulated power supply to module.

Accelerometer

Accelerometer is a 3 axis acceleration measurement device with $\pm 3g$ range. This device is made by using polysilicon surface sensor and signal

conditioning circuit to measure acceleration. The output of this device is Analog in nature and proportional to the acceleration. This device measures the static acceleration of gravity when we tilt it. And gives an result in form of motion or vibration

Use in bot

The accelerometer will detect the accelerations along its axes and this will be transmitted to the transmitter through a microcontroller. In this way, bot will move forward, backward , left , right, strike a target etc.

Designing and Control

There will be a glove worn on the hand containing components of accelerometer, microcontroller, and a wireless transmitter module. The accelerometer will detect the accelerations along its axes and this will be transmitted to the transmitter through a microcontroller. The other wireless module, on the bot, that is, the transceiver will receive these signals and send it to the microcontroller, which will be coded to control motion of the bot . There will be an on-board battery on the bot.

The hand gestures could also instruct the bot to push object using metal rod. The pushing mechanism is controlled by a servo motor.

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Future Scope

Wireless gesture bot basically works on principle that reading of accelerometer should be transferred to motor driver to control its action. We can increase the range of transmitter and receiver module to increase the efficiency of bot sothat it can be control over a large distance . we can also attach web camera to visulaize the place where t.he bot currently is present