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Bluetooth Spy Rover

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ABSTRACT:

The main objective behind developing this rover is to conduct surveillance of human activities in war field or border regions, with the aim of reducing infiltrations from the enemy side. The rover consists of night vision wireless camera which can transmit videos of the war field in order to prevent any damage and loss to human life. Military people have a huge risk on their lives while entering in the unknown territory. The rover will serve as an appropriate machine for the defence sector to reduce the loss of human life and it will also prevent illegal activities. It will help all the military people and armed forces to know the condition of the territory before entering in it,In an era where surveillance technology plays a pivotal role in various fields including security, exploration, and research, the development of efficient, versatile, and discreet surveillance platforms remains paramount. This paper presents the design, development, and implementation of a Bluetooth-controlled Spy Rover, a compact and agile remote surveillance vehicle equipped with advanced features for enhanced mobility, stealth, and real-time data transmission,The Bluetooth-controlled Spy Rover represents a significant advancement in surveillance technology, offering a combination of innovative design, robust construction, and seamless wireless communication. At its core, the Spy Rover features a compact chassis equipped with high-torque motors, rugged wheels, and a suspension system, allowing it to traverse diverse terrains with ease. Integrated with a high-definition camera module and a microcontroller unit, the Spy Rover captures and streams live video footage wirelessly to a remote operator through Bluetooth connectivity.

Keywords: Bluetooth, Control App, Robotics, Mobile, control spy rover, L293D Motor driver, Battery.

INTRODUCTION

The advent of technology has brought a revolutionary change in the field of robotics and automation which ranges in all the sectors from household domestic works to the defence sector. Today in the global market, smart phones also have brought a revolution in changing people's lifestyle and providing numerous applications on different operating systems. Android operating system is one of these systems build on open source which has made a huge impact providing many applications for robotics to help people in their day-to-day life.

The main technology used here for serial communication with the rover is the Bluetooth technology. Bluetooth technology can be used to share data between two devices considering the range between two devices. The Bluetooth module HC-05 will be connected with the rover and the commands to the rover will be given through the android application.

The war field rover consists of Arduino uno board as a controller board. It has L293D motor driver IC's along with a HC-05 Bluetooth module. Four DC motors are also used for the motion of the,Android controlled robot project make use of an Android mobile phone for robotic control with the help of Bluetooth technology. This is a simple robotics projects using microcontroller.

This project is a Bluetooth controlled robot. For this the android mobile user has to install an application on her/his mobile. Then user needs to turn on the Bluetooth in the mobile. The wireless communication techniques used to control the robot is Bluetooth technology. User can use various commands like move forward, reverse, stop move left, and move right. These commands are sent from the Android mobile to the Bluetooth receiver. Android based robot has a Bluetooth receiver unit which receives the commands and give it to the microcontroller circuit to control the motors. The microcontroller then transmits the signal to the motor driver IC's to operate the motors.

SYSTEM DESCIPTION

The working of a Bluetooth-controlled spy rover involves several components working together to enable remote control and surveillance capabilities. Here's a simplified overview of the typical workings of such a system.
Microcontroller or Single Board Computer (SBC): The brain of the rover, responsible for processing commands received via Bluetooth, controlling motors, and interfacing with sensors and other peripherals.
Circuitry or modules that control the movement of motors, allowing the rover to navigate its environment.
Various sensors such as cameras, ultrasonic sensors, infrared sensors, etc., are used for navigation, obstacle avoidance, and surveillance.
Enables wireless communication between the rover and the controlling device (e.g., smartphone, tablet, or computer).
Control Interface:
A user interface (typically a mobile app or computer software) is used to send commands to the rover via Bluetooth.
The control interface allows users to drive the rover, control its cameras, and possibly access sensor data for monitoring the surroundings.
The Procedure for Implementing a Framework

PROPOSED TECHNIQUE

3.1 Circuit Diagram

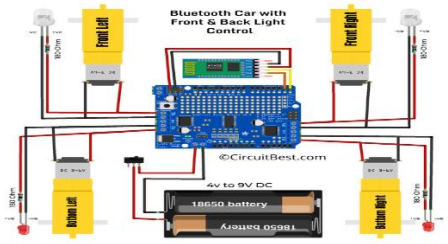

Fig. 3.1 Circuit diagram of Bluetooth Control Spy Rover

3.2 Working

The working of a Bluetooth-controlled spy rover involves several components working together to enable remote control and surveillance capabilities. Here's a simplified overview of the typical workings of such a system:

3.2.1 Hardware Components:

Microcontroller or Single Board Computer (SBC): The brain of the rover, responsible for processing commands received via Bluetooth, controlling motors, and interfacing with sensors and other peripherals.

3.2.2 Motor Drivers: Circuitry or modules that control the movement of motors, allowing the rover to navigate its environment.

3.2.3 Sensors: Various sensors such as cameras, ultrasonic sensors, infrared sensors, etc., are used for navigation, obstacle avoidance, and surveillance.

3.2.4 Bluetooth Module: Enables wireless communication between the rover and the controlling device (e.g., smartphone, tablet, or computer).
Control Interface:
A user interface (typically a mobile app or computer software) is used to send commands to the rover via Bluetooth.
The control interface allows users to drive the rover, control its cameras, and possibly access sensor data for monitoring the surroundings.

3.2.5 Bluetooth Communication:

The controlling device establishes a Bluetooth connection with the rover's Bluetooth module.
Commands from the control interface are transmitted wirelessly to the rover.
These commands may include instructions for movement (forward, backward, turning), camera control (pan, tilt, zoom), and other functions supported by the rover's capabilities.

3.2.6 Motor Control and Navigation:

The microcontroller processes the received commands and translates them into control signals for the motor drivers.
Based on the commands received, the motor drivers adjust the speed and direction of the rover's motors, enabling it to move accordingly.
Sensors such as ultrasonic sensors or cameras may be used for navigation and obstacle avoidance. The rover may autonomously adjust its path based on sensor inputs to avoid obstacles.

3.2.7 Surveillance and Data Collection:

Cameras mounted on the rover capture video or images of the surrounding environment.

These visuals may be transmitted wirelessly to the controlling device for real-time monitoring or recorded for later analysis.
Other sensors may collect additional data depending on the specific application, such as temperature, humidity, or air quality.

3.2.8 Power Supply:

The rover is powered by a battery or a combination of batteries that provide the necessary electrical energy for its operation.

MATERIALS AND METHODS

1. Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online.
2. Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button.
3. Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with youUNO without worrying too much about doing something wrong, worst-case scenario you can replace the chip for a few dollars and start over again.
4. The 74HC595N contains an 8-bit, serial-in, parallel-out shift register that feeds an 8-bit D-type latch with parallel 3-state outputs.
5. Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with youUNO without worrying too much about doing something wrong, worst-case scenario you can replace the chip for a few dollars and start over again.
6. L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC. Dual H-bridge Motor Driver integrated circuit (IC).
7. HC-05 is a Bluetooth module which is designed for wireless communication. This module can be used in a master or slave configuration. Bluetooth serial modules allow all serial enabled devices to communicate with each other using Bluetooth.
8. In a single L293D chip there are two h-Bridge circuit inside the IC which can rotate two dc motor independently. Due its size it is very much used in robotic application for controlling DC motors. Given below is the pin diagram of a L293D motor controller.

RESULT AND ADVANTAGE

The below figure shows the development of Bluetooth Control Spy Rover project which involves various steps such as design of different components, their testing, their implementation and implementation of entire system. These steps can be enumerated into following stages A) Hardware system design for Arduino Hardware system consist of basically 3 components named as Arduino, gear motor, Bluetooth module, led, resistor, battery and L293D motor driver. The gear motor is fix on corner of the board with the wheels. Both the action is controlled by Arduino, When the signal is sent through the mobile application which is received by Bluetooth and then the rover will move.

- System circuit implementation

Figure : Hardware system implementation

CONCLUSION

We have developed a Bluetooth-controlled Spy Rover for use in various surveillance fields, with the primary goal of providing precise and continuous monitoring of hard-to-reach locations, particularly in investigations by intelligence agencies. This mini project provides information on the device's applications for monitoring and securing areas for any potential threats or break-ins through an embedded system and camera that sends data to the observer entity on the other end. The proposed system illustrates how an Android smartphone can be used as a remote controller for robots and various embedded technologies with the aid of Bluetooth technology, allowing for a convenient and easy way to operate the robot. By integrating a Wi-Fi module, the system's functionality can be extended to cover larger areas. Finally, replacing the motor wheel with a chain wheel allows the robot to navigate rough terrain with ease.

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