Bluetooth-Controlled 6-Wheeled Robotic Car

Overview

This project is a custom-built Bluetooth-controlled 6-wheeled robotic car designed to explore wireless communication, embedded systems, and robotics control. The car is controlled using a smartphone via Bluetooth, enabling smooth directional control through simple commands. It's built on a sturdy 6-wheel chassis, ideal for navigating various terrains with enhanced stability and traction.

This project is a great example of integrating basic robotics and wireless technology, and it's perfect for beginners learning about microcontrollers, motor drivers, and Bluetooth communication in real-time embedded systems.

Features

- 6-Wheel Drive: Provides better balance, stability, and torque across uneven surfaces.
- Bluetooth Control: Operated through an Android device using the HC-05 Bluetooth module.
- Microcontroller: Powered by Arduino UNO, responsible for interpreting Bluetooth commands and driving the motors.
- Motion Capabilities: Forward, Backward, Left Turn, Right Turn, Stop
- Motor Driver: Dual L298N Motor Driver Modules for precise control of all six motors.
- Modular Power System: Separate battery setup for motors and controller to prevent power fluctuation issues.

Hardware Components

- Arduino UNO: 1
- HC-05 Bluetooth Module: 1
- L298N Motor Driver: 2
- DC Motors (Gear Motors): 6

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- Wheels: 6

- Battery (12V/9V): 1

- Chassis Frame: 1

- Connecting Wires: As needed

- Switches & Terminals: As needed

How It Works

1. Bluetooth Communication:

- Connect your smartphone to the HC-05 Bluetooth module using any Bluetooth terminal app or custom controller app.

- Send characters like F (Forward), B (Backward), L (Left), R (Right), and S (Stop) via the app.

2. Command Processing:

- The Arduino receives these commands through its serial interface.

- Based on the input, it activates the appropriate motor channels through the L298N drivers to move the car accordingly.

3. Motion Execution:

- Motors are grouped and controlled in such a way that the car can turn and move smoothly in all directions with decent torque due to the 6-wheel drive.

Future Improvements

- Obstacle Detection using Ultrasonic Sensors

- Speed Control using PWM

- Voice Command Control

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- AI-based Navigation
- GPS Integration
- Solar Power Management
- Camera Streaming via Raspberry Pi
- Real-time Monitoring and IoT Connectivity

Skills Learned

- Arduino Programming
- Wireless Communication via Bluetooth
- Motor Driver Configuration
- Power Management
- Basic Robotics Mechanics
- Real-world Embedded Control Systems