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IoT Smart Vehicle Using Blynk Application

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Abstract

The Internet of Things (IoT) has significantly transformed the field of robotics and automation by enabling remote monitoring and wireless control of devices through the internet. This paper presents the design and implementation of an IoT Smart Vehicle controlled using the Blynk application. The proposed system uses a NodeMCU microcontroller with Wi-Fi capability to receive commands from the Blynk mobile application and control the movement of the robotic vehicle. The vehicle is powered by a 7.4V rechargeable battery and uses an L293D motor driver IC for motor operation. A 7805 voltage regulator IC is used to provide a stable 5V supply to the control circuit. The system provides wireless control for forward, backward, left, and right movement of the robot through a smartphone interface. The proposed vehicle can be used in surveillance, automation, industrial monitoring, and educational applications.

Keywords— IoT, Smart Vehicle, NodeMCU, Blynk, L293D, Wireless Robot, Automation.

I. Introduction

The advancement of IoT technology has enabled smart communication between devices over the internet. IoT-based robotic systems are becoming increasingly popular because they allow remote operation, automation, and real-time monitoring. Smart robotic vehicles are widely used in industries, military applications, surveillance systems, and educational projects.

This project focuses on developing an IoT Smart Vehicle controlled using the Blynk IoT mobile application. The robot uses Wi-Fi communication to receive commands from the user's smartphone and perform directional movements.

The system uses NodeMCU as the main controller due to its built-in Wi-Fi module and low power consumption.

The vehicle is designed using BO motors, wheels, motor driver IC, and a rechargeable battery supply. The simplicity and low cost of the system make it suitable for students and beginner-level IoT applications.

II. Literature Review

Several researchers have worked on IoT-based robotic systems using wireless communication technologies such as Bluetooth, RF, and Wi-Fi. Traditional robotic vehicles were limited by short communication ranges and lack of internet connectivity. Recent developments in IoT platforms such as Blynk have simplified the process of remotely controlling robotic systems using smartphones.

Wi-Fi-controlled vehicles provide better range and flexibility compared to Bluetooth-based robots. NodeMCU and ESP8266-based systems are commonly used in IoT projects because of their compact size, low cost, and internet connectivity features.

III. Proposed System

The proposed system is an IoT-enabled robotic vehicle that can be controlled wirelessly using the Blynk mobile application.

Main Components

1. NodeMCU (ESP8266)
2. L293D Motor Driver IC
3. 7805 Voltage Regulator IC
4. BO Motors and Wheels
5. 7.4V Battery

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6. Robot Chassis
7. Blynk IoT Mobile Application

The NodeMCU receives commands from the Blynk app through Wi-Fi. Based on the received commands, the NodeMCU sends control signals to the L293D motor driver IC, which drives the motors accordingly.

The 7805 IC regulates the voltage and provides a stable 5V power supply to the electronic components.

IV. System Architecture

Working Principle

1. User sends movement commands using the Blynk mobile application.
2. Commands are transmitted through the internet using Wi-Fi.
3. NodeMCU receives the commands.
4. NodeMCU processes the input and sends signals to the L293D motor driver.
5. Motors rotate according to the received signals.
6. The vehicle moves in the desired direction.

V. Hardware Components

A. NodeMCU

NodeMCU is a Wi-Fi-enabled microcontroller based on the ESP8266 module. It acts as the main controller of the robotic vehicle and enables internet connectivity.

B. L293D Motor Driver IC

The L293D IC is used to control the direction and speed of DC motors. It allows the low-power controller to drive high-current motors safely.

C. 7805 Voltage Regulator

The 7805 IC provides a regulated 5V output from the 7.4V battery supply to protect sensitive electronic components.

D. BO Motors and Wheels

BO motors are lightweight geared DC motors commonly used in robotics applications. They provide movement to the robotic vehicle.

E. 7.4V Battery

The rechargeable 7.4V battery powers the motors and control circuit of the vehicle.

VI. Software Requirements

Arduino IDE

The program for NodeMCU is developed using the Arduino IDE software. The Arduino IDE is used to write, compile, and upload the code to the NodeMCU board.

Blynk Application

The Blynk IoT Platform mobile application provides a graphical interface for controlling the robotic vehicle through buttons and control widgets.

VII. Advantages

- Wireless control using smartphone
- Internet-based operation
- Low cost and simple design
- Portable and rechargeable system
- Easy implementation for educational purposes

VIII. Applications

- Smart surveillance systems
- Industrial automation
- Remote-controlled robotic systems
- Educational and research projects
- Home automation systems

IX. Future Scope

The proposed system can be enhanced by adding:

- Camera module for live video streaming
- Obstacle detection sensors
- GPS tracking system
- Voice control features
- AI-based autonomous navigation

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X. Conclusion

This paper presented the design and implementation of an IoT Smart Vehicle using NodeMCU and the Blynk application. The vehicle successfully demonstrates wireless control over the internet using Wi-Fi communication. The system is cost-effective, efficient, and easy to implement for IoT and robotics applications.

The project can be further improved with advanced features such as surveillance cameras and autonomous navigation systems.

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