

Empowering Homes with Esp-32

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Abstract - Smartboard system utilizing an ESP32 microcontroller integrated with various sensors and electric sockets. The system aims to enhance safety, convenience, and energy efficiency in residential environments. Initially, an electric switch box was fitted with two sockets, and an ESP32 microcontroller was integrated to control them. The system further includes a smoke sensor for gas leakage detection, water level magnetic sensors for automatic water pump control, a DHT sensor for temperature and humidity monitoring, a display for real-time data visualization, and a Miniature Circuit Breaker (MCB) for protection. Through integration with the Blynk app, users can remotely monitor and control the system, including supplying power to sockets and detecting gas leaks. Additionally, Bluetooth connectivity is incorporated for added convenience, particularly for electric scooter users in complex living environments. Experimental results demonstrate the efficacy of the integrated system in providing remote control, safety monitoring, and automation features.

KeyWords: *Smartphone-based, Mobile application, an automated system (ESP32), Wifi Network*

1. INTRODUCTION

microcontroller, to redefine home automation. With a primary focus on enhancing safety, convenience, and energy efficiency, the system begins with the retrofitting of an electric switch box with two sockets, laying the groundwork for advanced functionalities. Central to its operation is the ESP32 microcontroller, serving as the central hub for controlling and coordinating various components. Complementing the core infrastructure are a suite of sensors, including a smoke sensor for gas leakage detection, water level magnetic sensors for automatic water pump control, and a DHT sensor for real-time monitoring of temperature and humidity levels. The integration of a display interface provides users with intuitive access to system status and control capabilities, while a Miniature Circuit Breaker (MCB) reinforces safety measures against electrical faults. Seamless integration with the Blynk app empowers users to remotely monitor and control their home environment, from supplying power to sockets to detecting gas leaks, offering unparalleled flexibility and peace of mind. Recognizing the diverse needs of modern residents, Bluetooth connectivity caters specifically to electric scooter users, ensuring

effortless control and management from any location.

Through rigorous experimentation, this integrated smart board system demonstrates its efficacy in revolutionizing home automation, heralding a new era of enhanced safety, convenience, and energy efficiency.

2. TECHNOLOGY USED

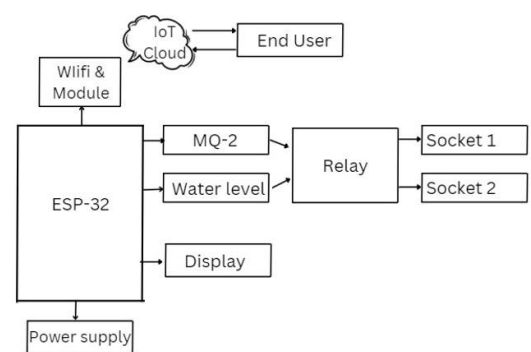
ESP32 Microcontroller: Serving as the central control unit, the ESP32 microcontroller is responsible for managing and coordinating various components of the system. It facilitates communication between sensors, electric sockets, and external devices, enabling remote monitoring and control.

Sensors:

Smoke Sensor: Used for gas leakage detection, enhancing safety by alerting users to potential hazards such as LPG leaks.

Water Level Magnetic Sensors: Employed for automatic water pump control, ensuring efficient water usage and preventing overflow or shortages.

DHT Sensor: Monitors temperature and humidity levels in real-time, contributing to optimal comfort and energy



efficiency within the home environment.

Electric Sockets: Initially fitted into an electric switch box, these sockets serve as power outlets for various devices and appliances, allowing users to remotely control their power supply.

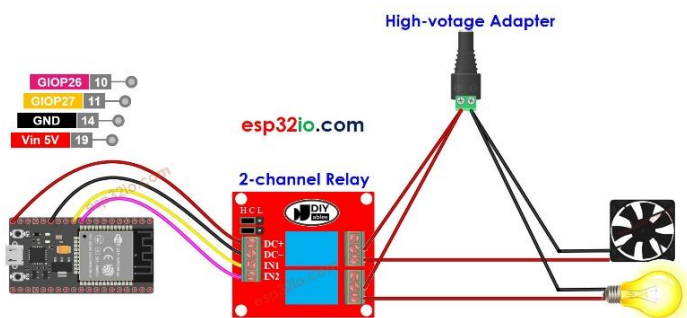
Display: Integrated for real-time data visualization, the display interface provides users with intuitive access to system status and sensor readings, enhancing convenience and usability.

Miniature Circuit Breaker (MCB): Included for protection against electrical faults and overloads, ensuring the safety of the electrical system and preventing potential damage or hazards.

Integration with Blynk App: The system is seamlessly integrated with the Blynk app, enabling users to remotely monitor and control the system from anywhere. This includes functionalities such as supplying power to sockets and detecting gas leaks, enhancing convenience and peace of mind.

Bluetooth Connectivity: Incorporated for added convenience, particularly for electric scooter users in complex living environments, Bluetooth connectivity allows for effortless control and management of the system from any location.

Through the utilization of these technologies, the smart board system achieves its objectives of enhancing safety, convenience, and energy efficiency in residential environments. Experimental results demonstrate the efficacy of the integrated system in providing remote control, safety monitoring, and automation features, showcasing its potential to revolutionize home automation



Module of connected equipments

Step to use Blynk app

Download Blynk App:

Get Blynk from your app store.

Install and open the app.

Create Blynk Account:

Sign up with your email.

Follow the setup instructions.

Start a New Project:

Tap "+" to create.

Name your project and select ESP32.

Get Auth Token:

Blynk will email you a token.

Add Widgets:

Customize buttons, sliders, etc.

Configure them to control sockets, display data, etc.

Connect ESP32:

Use Arduino IDE.

Include Blynk library and paste token.

Upload to ESP32.

Monitor and Control:

Use Blynk to remotely control sockets, monitor sensors, etc.

Optional: Bluetooth Setup:

If applicable, pair Bluetooth with your smartphone.

Configure Blynk app for Bluetooth communication with ESP32. the fuzzy controller tends to learn from the previous experience which reduce overall error and, increase the accuracy and the efficiency of the system from time to time.

Step to add Button

Open Your Project:

Launch the Blynk app and navigate to the project you created.

Enter Edit Mode:

Tap on the project screen to enter edit mode. You'll know you're in edit mode when you see a pencil icon or similar edit option.

Add a Button Widget:

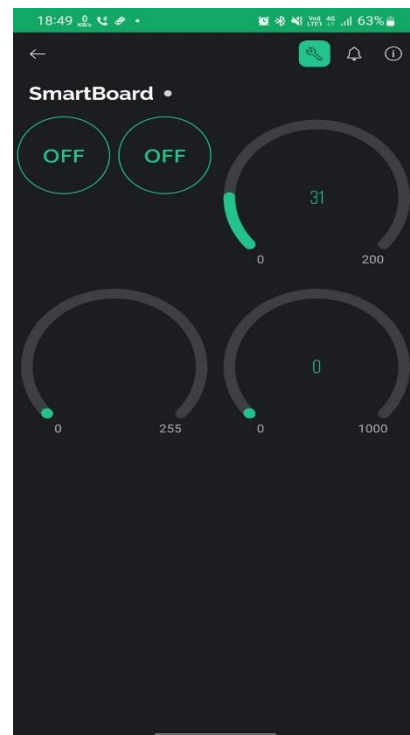
Tap the "+" icon or look for an "Add Widget" option.

Select the "Button" widget from the list of available widgets.

Configure the Button:

Once the button is added to the screen, tap on it to configure its settings.

Give the button a descriptive label or name



Blynk Application

TECHNOLOGY USED

Choose the pin on the ESP32 microcontroller that the button will control. This pin should correspond to the functionality you want the button to trigger (e.g., turning on a socket).

Customize Button Appearance (Optional):

You can customize the appearance of the button by selecting different colors, shapes, and sizes. This step is optional but can help distinguish between different buttons on the screen.

Set Button Functionality:

Determine what action the button will perform when pressed. Options include turning a device on/off, sending a specific value, or triggering a function in your ESP32 code.

Repeat for Additional Buttons (if needed):

If you require multiple buttons for different functionalities, repeat the process for each button you want to add to your project.

If you require multiple buttons for different functionalities, repeat the process for each button you want to add to your project.

Exit Edit Mode:

Once you've added and configured all the buttons you need, exit edit mode by tapping the "Done" or "Save" button.

Your buttons should now be visible and functional on the project screen.

CONCLUSIONS

In summary, the integration of an ESP32 microcontroller with sensors and electric sockets in the smart board system revolutionizes residential automation by enhancing safety, convenience, and energy efficiency. The system, initially comprising an electric switch box fitted with two sockets, incorporates sensors like the smoke sensor, water level magnetic sensors, and DHT sensor, along with a Miniature Circuit Breaker (MCB) for added protection. Through integration with the Blynk app and Bluetooth connectivity, users can remotely monitor and control the system, detect gas leaks, and manage power distribution from anywhere, catering especially to the needs of electric scooter users in complex living environments. Experimental results confirm the system's efficacy in providing remote control, safety monitoring, and automation features, underscoring its practicality and effectiveness in modern residential settings.

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