Design of an IoT-Based Home Electrical Device Monitoring and Control System

Nguyễn Tiến Bộ
Thai Nguyen University of Information and Communication Technology
Thai Nguyen University, Thai Nguyen, Vietnam
dtc16hd4802990401@ictu.edu.vn

***Abstract*—This undergraduate thesis presents the design and implementation of an IoT-based home electrical device monitoring and control system. The system integrates various sensors and control mechanisms to monitor and control household electrical devices, focusing on temperature, humidity, and gas detection. The implementation uses the ESP8266 microcontroller and Blynk for remote monitoring and control via the internet. The author describes the system's components, including DHT11 sensors for temperature and humidity, a buzzer for gas detection alarms, and the Blynk platform for remote control. The author acknowledges that the system was completed with the guidance of a mentor, but there are still areas for improvement. The work includes detailed code for the ESP8266 and Arduino, highlighting the integration of these components. The author suggests potential future developments, such as adding fingerprint recognition and camera systems, and plans to test and improve the system in their own home.**

***Index Terms*—IoT, smart home, ESP8266, Blynk, fingerprint recognition, gas detection**

I. Introduction

The introduction provides an overview of smart homes and the Internet of Things (IoT), emphasizing the integration of IoT technologies into home automation systems. The author discusses the basic characteristics of IoT and its applications in home monitoring and control. The thesis aims to design and implement a system that can monitor and control household electrical devices, such as temperature, humidity, and gas detection, using IoT technologies. The system is intended to be remotely accessible via the internet, allowing users to monitor and control their home devices from anywhere. The author highlights the importance of integrating IoT technologies to enhance the functionality and usability of home automation systems [1]. Published articles on the methods and subject of this project provide context for this English summary [2], [3], [4], [5]. Published articles on the methods and subject of this project provide context for this English summary [6], [7], [8], [9]. Published books on the methods and subject of this project provide context for this English summary [10].

II. Methods

The methods section details the implementation of the system using the ESP8266 microcontroller, DHT11 sensors for temperature and humidity, and a buzzer for gas detection alarms. The system is controlled via Blynk, a cloud-based platform for IoT projects. The author provides the code for the ESP8266 and Arduino, which includes functions for reading sensor data, sending data to Blynk, and controlling the buzzer. The implementation involves setting up the ESP8266 to connect to Wi-Fi, configuring Blynk, and scheduling periodic data transmission. The author acknowledges that the system was completed with the guidance of a mentor, but there are still areas for improvement, such as adding fingerprint recognition and camera systems [1].

III. Results

The results section describes the implementation of the system, including the code for the ESP8266 and Arduino. The author mentions that the system was completed with the guidance of a mentor, but acknowledges that there are still areas for improvement. The system includes DHT11 sensors for temperature and humidity, a buzzer for gas detection alarms, and the Blynk platform for remote control. The author provides the code for the ESP8266 and Arduino, which includes functions for reading sensor data, sending data to Blynk, and controlling the buzzer. The system is designed to monitor and control household electrical devices, such as temperature, humidity, and gas detection, and can be remotely accessed via the internet. However, the author notes that the system has not been tested or deployed in a real-world setting, and there is no evidence of its practical effectiveness or performance metrics [1].

IV. Discussion

The discussion section outlines the potential future developments of the system, including the addition of fingerprint recognition and camera systems. The author suggests that the system could be tested and improved in their own home to enhance its functionality and usability. The author acknowledges that the current implementation is limited and requires further testing and refinement. The author also discusses the challenges of integrating IoT technologies into home automation systems, such as ensuring security and privacy, and the need for continuous improvement and innovation in the field [1].

V. Conclusion

The conclusion reiterates the completion of the project with the help of a mentor and expresses a desire for further feedback

Supervisor: Trần Văn Dũng, Thai Nguyen University of Information and Communication Technology (tvdung@ictu.edu.vn).

and improvements. The author also discusses the future directions of the project, including the installation and testing of the system in their own home. The author acknowledges that the current implementation is limited and requires further testing and refinement. The author also highlights the importance of continuous improvement and innovation in the field of IoT-based home automation systems [1].

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