IOT LOAD MONITORING AND ACTIVITY MONITORING SYSTEM

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ABSTRACT

As an essential constituent of many associations security and safety precedence, surveillance has established its importance and benefits numerous times by providing immediate supervising of possessions, people, environment and property. The design approach of an embedded real-time surveillance system based on a ESP32 for intruder detection is the focus of this project. It combines surveillance technology with control and alert functions to provide essential security for our lives. Our novel integration of motion detectors into a web application is the foundation of the proposed security solution. ESP32 controls motion detectors for remote sensing and surveillance. This exploration is centred around fostering an observation framework that identifies outsiders and to reaction quickly by catching them. The concept of monitoring a specific location in a remote area is presented by this Smart Surveillance System that is based on a ESP32. The proposed solution is a cost-effective, efficient, and simple solution for ubiquitous surveillance. Energy Monitors allow you to monitor your consumption and make any necessary adjustments, whether they are used to monitor an entire apartment or just one appliance. We will construct a ESP32 power consumption monitor that can upload energy consumption data to Blynk.

1.INTRODUCTION

The requirements placed on surveillance systems are rapidly increasing in today's world. One of the first questions that most likely will be asked is whether or not they can connect to their surveillance system remotely via the internet. In the past, a guard had to watch the monitors in a locked room all the time to make sure the security system didn't break. As a result, researchers and analysts needed to come up with ways to counter that and advance security as a whole. Thanks to advancements in surveillance technology, you can now view your remote security monitoring from any PC or smartphone with internet access anywhere in the world. Even though this technology is great, the cost of putting it into use has been a barrier, especially for a small home application. Consequently, the core of new innovative technology is affordability of a product in terms of cost and ease of implementation. Because it is a low-

cost, efficient computer that can be connected to other modules to create systems with a lot of functionality, the ESP32 fulfills both requirements. It is possible to add speed control, a security system, automatic lighting, and other features to it. Due to emerging security technology, small homes can now enjoy a comfortable and secure environment. The system's various goals include alerting the facility's owner and locating an intruder. As a result, it allows for the remote monitoring of homes from any location in the world. Despite this, the system that will be developed will make it very easy for homeowners with low incomes to monitor their homes at a very low cost.

Our investigation involves separating the electronic device's current and voltage from the ESP32, which calculates the power value and sends it across the Blynk to the database. From there, the changed over qualities are sent to the ESP32. Blynk is a framework that incorporates electronic gadgets and sensors related with exchange information. Standard meters were utilized before the adroit meter was imagined. But they had issues like being unable to recognize when hardening was taking place and being more likely to make mistakes. Blynk permits energy metering at the lowest possible cost, making it nearly as cost-effective as SMS. Through Blynk, usage reports at the end of each three weeks can be viewed for free. For viewing the current and voltage consumption for more than three weeks, enrolled customers can also make payments online. The customer must sign up on the website first; This is the location in the database where the client's interests are recorded, along with an automatic number that serves as the necessary key. For payment information, he only needs to sign in to his record later. The client can be notified of the payment via SMS or in-person..

2.LITERATURE REVIEW

With hardware that is affordable and simple to implement, researchers and developers have developed a wide range of surveillance systems that can be used for remote monitoring, alerting, and controlling tasks. Some of them have proactively happened, while others are still thoughts. An embedded home surveillance system that evaluates the implementation of a cost-effective alerting system based on small motion detection was presented by Padma Shree A. Shake and Sumedha S. Borde. They worked on implementing energy-efficient and low-cost; their system, which is based on a microcontroller, which is now considered a limited resource and an open-source solution in comparison to SBC, enables real-time monitoring of household activities from anywhere. Their system is also an effective surveillance system that is made up of a variety of sensors.

In previous studies of smart home technology, IoT has been used to remotely control and monitor a variety of appliances, including fans, air conditioners, gas stoves, and water heaters. In an effort to cut down on energy use, some research also focuses on efficiency. Home security systems have been the subject of some research, including the following. Agarwal proposed a home security system that would alleviate laziness's fear. This system has two main functions: "Home Security," which can look at who is outside the door, and "Smart Locking," which lets housemates control the locking system from their phones. A Rasberry Pi 3 that can control hardware like cameras, motion sensors, and electric locks is

required for this system. D. Jeevan and I planned a Raspberry Pi-based organized video catch framework. The proposed system not only records video and distributes it through networked systems, but it also sends an SMS alarm to the administration person when the client needs it. Their structure was planned to work in a persistent situation and considering Raspberry Pi SBC. Their constant application, rather than other inserted frameworks, incorporates an alarming module. R. K. Rathore et al.'s "ESP32 Based Smart Home Automation and Energy Monitoring System" 2021) - An ESP32-based smart home automation and energy monitoring system was suggested by the study. The framework utilized sensors to screen the energy utilization of various gadgets and a microcontroller to control the gadgets in light of client inclinations.

3.PROPOSED SYSTEM:

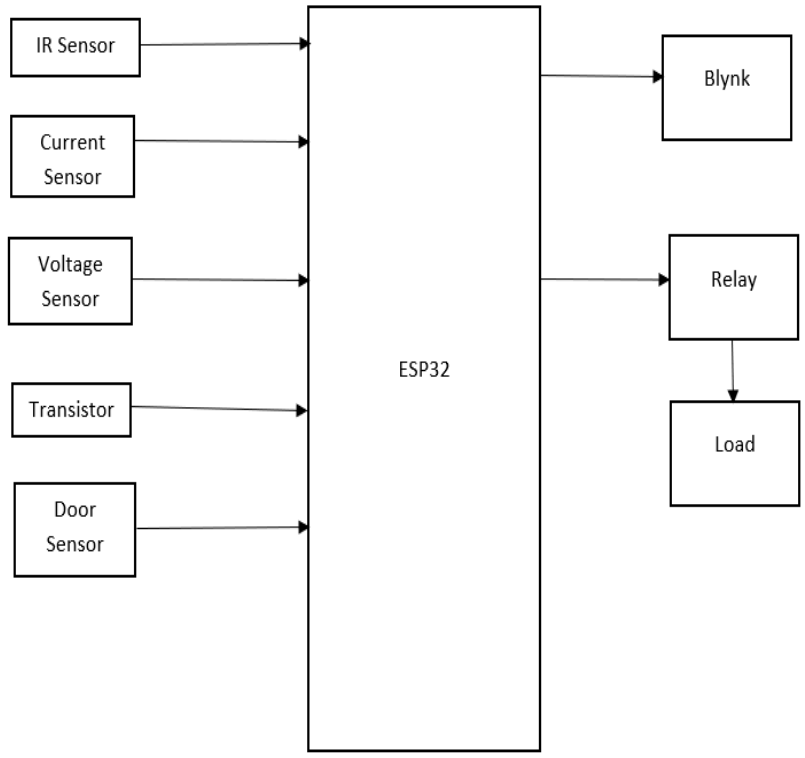

Fig 1: Block Diagram

By providing real-time data on energy consumption and device activity, IOT load monitoring and activity monitoring aim to address these issues, facilitating energy usage optimization and enhanced safety and security. These applications have the capability of eliciting alerts or

notifications when they detect deviations from normal patterns. This makes it possible to take prompt action to stop accidents or other negative events.

We used a door sensor, an IR sensor, a current sensor (ACS712), and a voltage sensor (ZMPT101B). Transfer is an electromechanical switch which is utilized to control the bulb. The primary outputs are primarily notification from motion detection when the IR sensor is detected and consumption of current and voltage when the bulb is turned on. Utilizing BLYNK, we can monitor the load for three weeks at no cost. Using BLYNK, we can determine whether the door is open or not when we receive the notification or alert in our email. The ESP32 is a microcontroller chip made for use in IoT (Internet of Things) applications and embedded systems. The ESP32 is a dual-core chip with built-in Wi-Fi connectivity. It is highly programmable and can be programmed in C++, Python, and the Arduino IDE, among other programming languages. These studies, taken as a whole, demonstrate the energy-saving potential of ESP32-based IoT load and activity monitoring systems for smart homes and buildings. Current sensors and microcontrollers can assist in monitoring and regulating the energy consumption of various devices, which can reduce energy waste and save money.

4. ADVANTAGES AND APPLICATIONS

The advantages and applications behind IoT load monitoring and activity monitoring are as follows:

Energy Efficiency: IoT load monitoring helps to optimize energy usage by identifying the devices that consume the most energy. This can help to reduce energy costs and improve sustainability. We can measure the power consumption by using Blynk.

Safety and Security: IoT activity monitoring helps to improve safety and security by detecting and responding to events in real-time. As in our project IR sensors can detect unauthorized access to a facility and trigger an alert notification.

Operational Efficiency: IoT load monitoring helps to improve operational efficiency by identifying the devices or systems that are not operating at their optimal level. This can help to reduce maintenance costs and downtime.

Overall, IoT load monitoring and activity monitoring are motivated by the need to improve efficiency, safety, security, and sustainability of devices and systems. With the increasing adoption of IoT technology, these applications are becoming more common in various industries and domains.

5.RESULTS

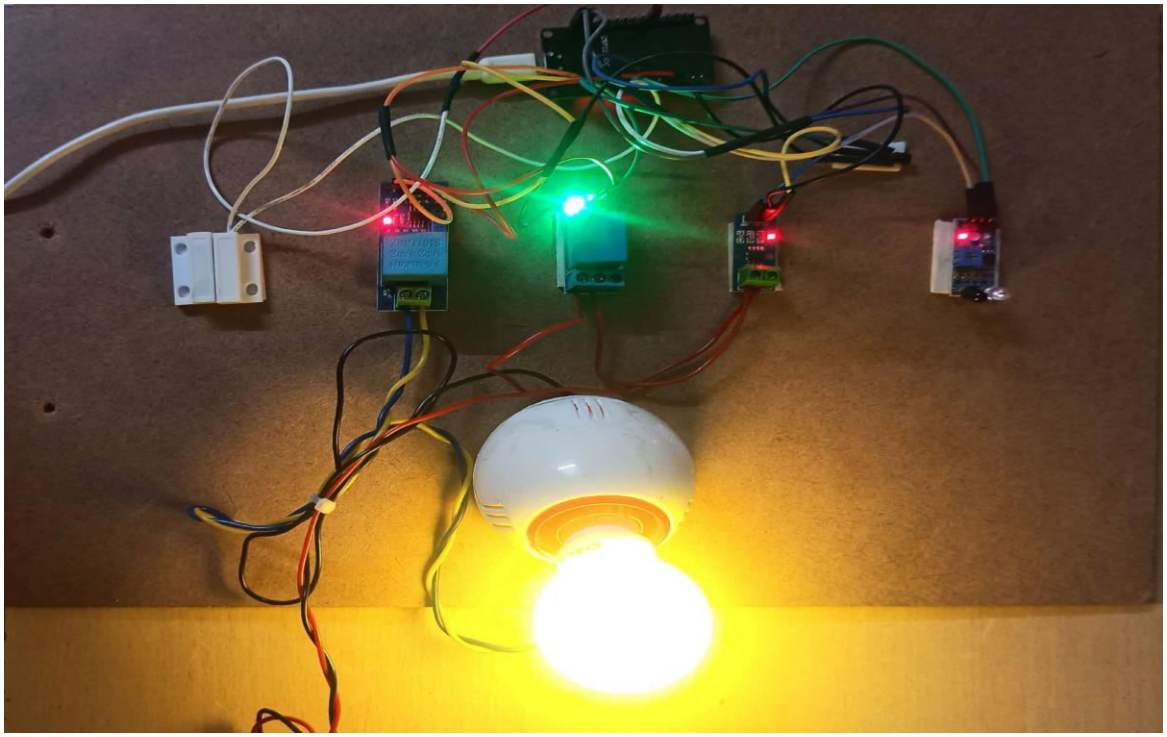

Fig 2 : Results

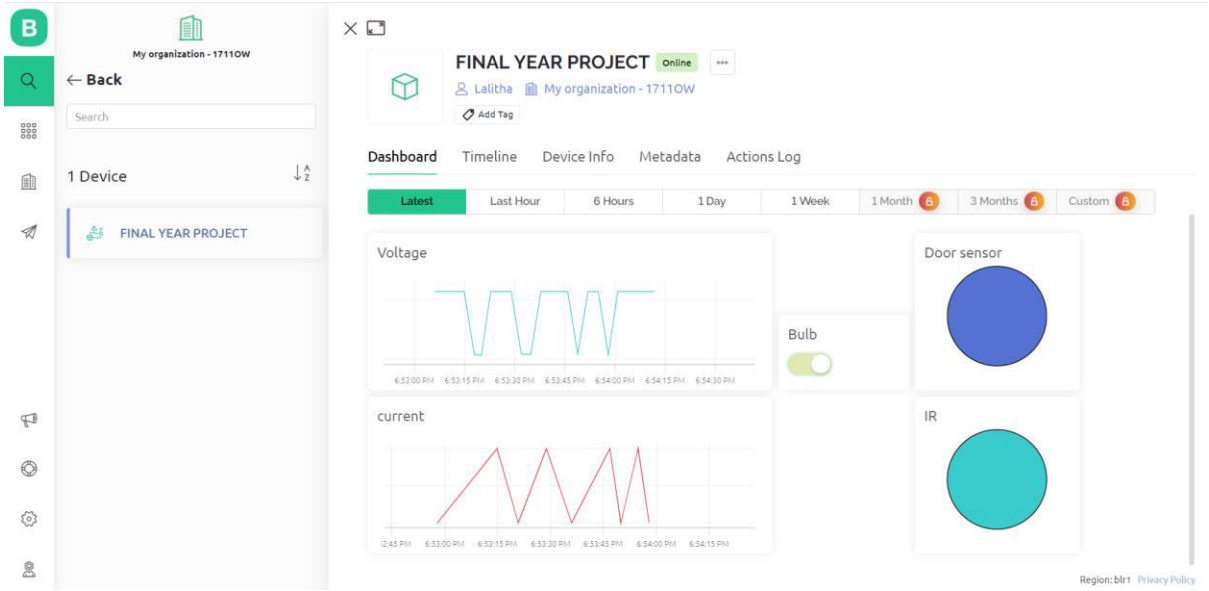

Fig 3 : Blynk Detection

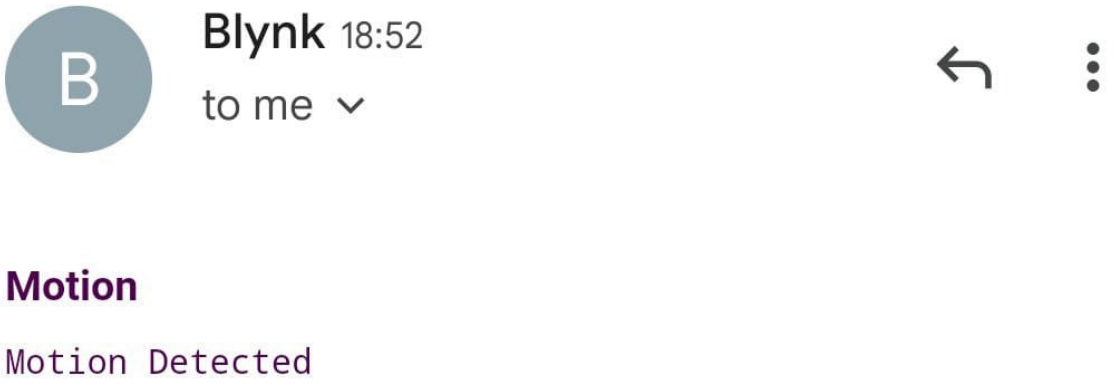

Fig 4 : Mail Notification

6.CONCLUSION

The goal of this project is to reduce the number of people involved in power management. It also prevents data loss. The initial setup will be less expensive than the current mechanism. It improves power management for the utility because the values are sent directly from the metre and stored in their database. This data can be used in the future to analyse power usage and take the necessary steps to optimise power consumption. Furthermore, this mechanism can provide a self-analysis of the user's power consumption so that he or she can reduce it. The sensors used in this project provides motion detection notification and home security by using Blynk to control and monitor loads, among other things.

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