

Smart Energy Efficient Home Automation Using Telegram

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Abstract.Electricity is the heart of modern economies, and it accounts for a growing proportion of energy services. Rising family earnings, electrification of transportation and heat, and increased demand for digital linked gadgets and air conditioning are all expected to drive up power demand. The electrical energy they produce comes primarily from renewable sources, with some non-renewable sources. The energy efficient is also a major part in the modern world. For that many efficient ways are available and one of the method of saving is IoT based home automation. For a few years now, the IoT has sparked interest, with both small scale and largescale companies betting on the industry's growth. It basically involves using the Internet to link and monitor numerous devices and sensors. Smart homes essentially provide home automation for existing gadgets in the home and allow the users to operate their household appliances using internet. The communication between user and the system is done using Telegram Bot.

Keywords:Automation, ESP 32, Telegram Bot, Energy consumption, Alert System.

1 Introduction

IoT can the ability to interchange content based on function control in a predetermined manner. Authority estimate that over 50 billion gadgets will be connected to the internet by 2020. Smart home automation solutions based on the Internet of Things are intended to monitor and control the qualities you wish to manage. Wi-Fi devices, for example, use Internet protocols to gather and distribute data. IoT-based home automation consists of a number of smart devices that may be used for a variety of purposes such as lighting, security, and home entertainment. All of these devices are joined in a mesh network via a common network established by the gateway [1]-[5]. Sensors or detectors on each device then report to a central home automation hub. Also, the IoT has the function of data receiving from the sensors equipped in the smart home and it is necessary to control the energy in a efficient way and stores the data in a secured place in the system. Telegram is an app that is an messaging platform and it is free to use. Telegram app is available for both mobile and desktop platforms. Users may send and receive messages in addition to sending and receiving messages to

integrated system [6]-[10]. It provides the user where can create a new bot using the Telegram app and use it to manage appliances in their home or business by just conversing with the bot. Because of its versatility and ease of installation, it is quite simple to operate the gadgets at home. This program is used to interact amongst people, but we can also use it to control equipment that read sensor status and send it to Twitter and Gmail [11]-[12].

2 Proposed system

Energy consumption is defined as the quantity of power consumed by the load side of an electrical circuit, and it may be quantified in terms of its environmental effect and usage. The total power generated by the source minus the power lost in the transmission line is the maximum power that a load may consume. This becomes a serious issue when the load demands more energy than the supply can give, resulting in load shedding and blackouts. In today's society, energy usage is a serious concern. The major source of power consumption is inefficient power monitoring and control procedures in homes, companies, and institutions. As a result, Telegram is used to construct Smart Energy Efficient Home Automation in order to cut energy usage and improve security. The main system is to turn off the on state of the load using the telegram bot using the integrated commands in it. As the cost of the products is increasing in our routine life due to the development of technology a small idea called smart home project is introduced to reduce the cost and inconvenience. A smart home is able to control the home even though the person is not available in home. The IoT system can be formed by the collaboration of MCU with other components like PIR sensor and ultrasonic sensor which are used to identify the movement of the any person while entering into the room. It gives notifications in mobile app. Data is uploaded into cloud using Thing Speak so that data can be stored and retrieved whenever it is necessary. Various sensors like DHT sensor, PIR sensor, Ultrasonic sensor etc. are connected to microcontroller, these sensors collect the data from surroundings like temperature, humidity, pressure, gas levels and send this collected data to micro controller. Then Micro controller (Node MCU) works on this data, process it and transmit the obtained results to web server. And sensor readings can be stored for future analyzing purposes, users can access this data anytime, anywhere using Telegram app.

2.1 Block diagram

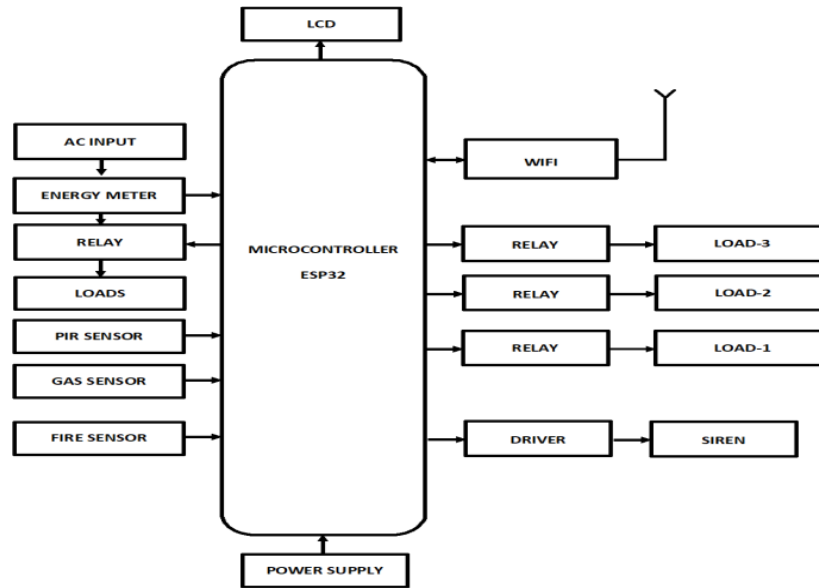


Fig. 1. Block Diagram of the Proposed System

2.2 Hardware components

a. Node MCUESP32

In comparison to the ESP-12e, the ESP32 is far more advanced. The ESP32 includes a CPU core, faster Wi-Fi, additional GPIOs, and Bluetooth 4.2 and Bluetooth low energy capabilities, among other things. Touch-sensitive pins, as well as a built-in Hall Effect and temperature sensors, are included on the board. The ESP32 includes an 802.11b/g/n HT40 Wi-Fi transceiver, allowing it to not only connect to a Wi-Fi network and interact with the Internet, but also to create the network of its own system to connect directly.

b. Relay module

The relay module is an electrically controlled switch that may be switch on or off, allowing or disallowing the flow of current. They're made to run on low voltages like 3.3V (like the ESP32, ESP8266, and others) or 5V (like your Arduino). Controlling a relay with the ESP32 is as straightforward as controlling an LED or any other output. Because we're utilizing a usually open setup in this example, we'll need to send a LOW signal to allow current to flow and a HIGH signal to halt it.

c. PIR sensor

The PIR sensor is a device that identifies the motion by sensing variations in infrared levels

generated by the obstacles nearby to it. Because PIR sensors have a range of up to 10 meters (30 feet), for rooms with only one entry, a single detector positioned at the entrance is usually all that is required. Every day, humans emit heat energy with a wavelength of roughly 9-10 micrometers. The sensor is mainly used to identify the wavelength of several frequencies.

d. Flame sensor

A flame sensor is mainly used to identify the presence of fire nearby to it. In this paper, an IR based sensor and is based on the YG1006 sensor category which is a highly sensitive and speedy transistor. It will identify the IR rays of light at a range of 700nm to 1000nm and it identifies the wavelength at an angle of 60 degrees.

3 Working of the system

The PIR, IR, Gas Sensor, Siren, and Relay Module all use 3.3V DC, while the PIR sensor, IR Flame Sensor, Gas Sensor, and Siren all use 5V DC and the Relay Module requires 12V. The can be charged by plugging it into a USB port or using a 12V adaptor. Because the modules supply and ground pins are connected to the common VCC and the other components are connected on the fixed supply of 5V output. The Load operation is powered by 230V AC. To detect fire presence, the sensor connected to the 26th pin of the ESP. PIR sensor is connected to the 25th pin of the Esp32 in order to provide a pulse as an output signal to intruders around the house. The Gas sensor, which is attached to the 27th detecting pin, then detects a gas leakage in the residence. The AC loads are connected to Esp32's Pins 19th, 18th, 4th, and 33rd, respectively. The Siren also connected to the 5th pin of the controller. In order to read power consumption in units, the output pulse of the energy meter is linked to the 15th pin of the Esp32. Telegram Bot is connected and controls the entire system using a secure id. The integrated system alerts the home by giving alarming in case of fire, gas leakage and also indication of any thefts in the area. Home automation can be done using by the integrated commands in the telegram bot and it controls the all appliances with their telegram.

Firstly, the system is interconnected through the microcontroller and telegram bot. After connection is done between the telegram in the smartphone and Wi-Fi module in the system, the system is ready to work and when the user can operate by giving commands to it. When the commands is given to the system will show all on and off state of all appliances of the house and also give the energy consumption in Kwh in telegram app. By seen them, we can easily know the conditions of the appliances. For example, when the load 1 is on, we can shut down the load 1 by giving off commands in telegram and the load 1 will be turned off immediately or time which we set in the module in the relay system.



Fig. 2. Prototype Model

4Results and discussion

The major goal of this smart house design is to use a smart phone to manage electronic items in the home such as fans, lights, and air conditioning. The Telegram android app allows you to operate your home's smart equipment from afar. The Telegram app can be used by all members of the family to communicate when one person turns on a gadget, such as a fan or a light, so that the rest of the family is informed of how to use the equipment.



Fig. 3. Load on and off commands and fire and gas detection



Fig. 4. Energy consumption details and Intruder Detection

5 Conclusion

It is a customizable home management monitoring system that utilizes a Node MCU Board that is connected to the internet as well as several sensors that can be controlled remotely using an Android OS smart phone. Several sensors, such as temperature sensors and LDRs, can be used to operate wirelessly or to automate home appliances. All of this, combined with IoT technology, creates a comprehensive, versatile smart home control and monitoring solution. Also this system shows the simplest ways to monitor the appliances to the user by using controlling and shut down the loads in their houses.

6 Future Work

Further intelligence can be included to the proposed paper using artificial intelligence and convert our home in a smart home automation incredibly. A camera can also be connected to the microcontroller, allowing a photograph of the suspect to be captured and submitted to authorities if necessary. This system can also contain a voice call capability that allows the user to control their household appliances. Also the system can add many features and integrate to work with general apps like WhatsApp, Facebook and etc., because these days everyone has internet connectivity and they can operate anywhere from the place.

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