IOT BASED SMART LIGHTNING SYSTEM FOR UNIVERSITY CLASSROOM

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Abstract
The internet of things (IoT) is connecting the devices and tools to the internet network to be controlled by websites and smart phone applications remotely, also, to control tools and instruments by codes and algorithms structures for artificial intelligence issues. In case we want to create advanced systems, Wi-Fi or Ethernet connection is connected to our tools, equipment, and devices controlling them by smartphoneapplicationsorinternetwebsites.That'sactuallythesimplifieddefinition of IoT. Farther than just using the IoT as a smart Class to operate lamps or other Class-use devices, it can be used as a security system or an industrial-use system, for example, to open or close the main building gate, to operate full automatic industrial machine, or even to control internet and communication ports. And more ideas can be done by using IoT technology. A huge industrial facilities or governmental institutions have much of lamps. Employees sometimes forget to turn them off in the end of the day. This research suggests a solution that can save energy by letting the security to control lighting of the building with this smart Class by Blynk application. The lamps can be controlled by switches distributed in the building and Blynk application at the same time with a certain electrical installation. This research presents a simple prototype of smart Class, or the easy way and low cost to control loads by Wi-Fi connection generally. Automatic Room Light Controller Using ESP32 and PIR Sensor can be used to turn ON and OFF the illumination system of home / office routinely by sensing the existence of human. Such Automatic Room Lights systems can be implemented in your Classrooms, faculty cabins, garages, staircases, bathrooms, etc. where we do not need constant light but only when individuals are existing. Also, with the assistance of this system, we can save the energy bill as power will be consumed only when human is present i.e. when required lights will be spontaneously turned ON or OFF. This paper proposed system of Automatic room light controller using ESP32 and PIR sensor and relay module. PIR sensor will spot the human activity and based on response of PIR sensor unit will control the switching action. Proposed method can help us to reduce the consumption of electricity.

Keywords: Blynk, Ethernet, IoT, Wi-FI

Introduction
A load controlled by computer systems has many advantages compared with manual controlled loads. Nowadays there are many programs and applications help to control things better using codes or python algorithms in artificial intelligence projects. In order to save energy and make loads monitored easily, this research suggests smart Class project based on IoT technology. This smart Class is an Internet of Things (IoT) project that controls loads with internet connection via Wireless Fidelity WIFI connection. A smart phone connected to internet with Blynk application as a control panel, and ESP32 microcontroller kit in other side as a controller that receives control commandsviaWIFIsignal.ESP32 kit is built with ESP32 WIFI receiver that able to process and analyze WIFI signal to input the microcontroller. The WIFI receiver and microcontroller are built in one kit to be used as IoTproject.It'scalledESP32. To connect the system to the Internet, needs aWiFireceiver.InmycaseIusedESP32that is connected as built-in in the ESP32 board that contains a firmware runs with theESP32.Thefirmwareis a low-level control computer software. Scientific discoveries delivered us luxury and comforts. Technology has become vital and essential part of our lives. Tremendous advancement in technology is succeeded in last few years. Electrical energy has become an crucial part of human life. In recent years the people are looking forward for the

automation in their day to day life, and even now the people are excited to save energy consumed to reduce the expenditures. People are becoming lazy to switch off the lights while leaving the room, so the large amount of energy is wasted if the light is remain ON in the absence of human being. Generally, in public and private sector companies, offices, school and colleges most of the people are not interested to switch OFF the electronic machines like fan, light, etc., while going out of the room [1]. As more and more consumer electronic and home appliances are used, the size of them is becoming large; power consumption in home area tends to grow. Moreover, unusable power consumption occurs in the absence of human being in public and private sectors. Using the automation in switching the home or office lighting system, the consumption of electricity can be comprehensively reduce which will in turn save the money of the owner. Now the people are looking forward for automation in their daily life. The people are trying to reduce human efforts. By using suggested system wastage of electricity can be reduced as electrical appliance will be automatically turned ON or OFF based on the presence of the human being with the help of PIR sensor [2], while departure no need to turn off the appliances or while arriving in your cabin no need to turn on the electrical appliances. This is the main enhancement of the projected system. The main parts of the proposed system are ESP32, PIR Sensor and the Relay Module. This system can be considered as a major application of PIR sensors. The ESP32 is coded via Arduino Integrated Development Environment (IDE) with the Universal Serial Bus port (USB) to tell the ESP32 what to do, I want to make theESP32 controls four-channel relay kit by Blynk hand phone application.

Parts used to create the project:

1) ESP32board.Opensourceinternetofthingsplatform.
2) AC-DC step down converter. Switch mode power supply to provide the project with power. This project needs 5volts.
3) DC-DC step down converter as a regulator to convert the 12 V output of the power supply into regulated 5V.
4) Four-channel relay kit. To drive loads from digital ESP32outputpins.
5) Computer with Arduino (IDE) program installed tocodetheESP32once.
6) Android smart phone with Blynk application installed to be used as control panel.

Scope of the method

This research is conducted based on the important steps that are done by orienting on the success indicators in connecting the ESP32 module and other devices so that it can be used to solve multi-objective problems. To achieve these indicators, the stages of this research areas follows:

1) Analysis of the problem. Analyze the problems to be studied regarding smart Class.
2) Analysis of needs. In this case all needs in researching both from journals, literature books, tools and materials.
3) System design. Designing tools to be built using the ESP32 module, and the sensors used.
4) System programming. Make a program using the Arduino IDE and the Blynk android application.
5) Testing tools. Testing tools with program codes created and internet connections.

The Flow of the System

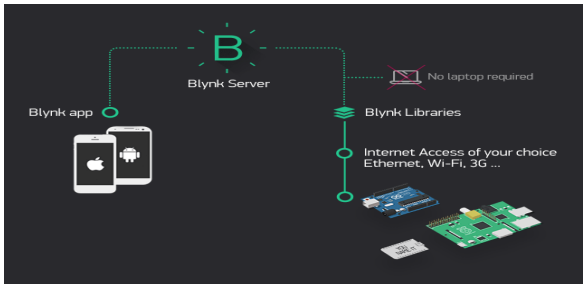

Figure1. Blynk System Principle

The system is based on ESP32 board as an internet of things system. The ESP32 is connected to the internet from the hotspot of the smart phone via WIFI connection as theESP32 has ESP32 circuit to connect with the internet. ESP32 to be connected to the hotspot of the smart phone, needs to be identified to the name of hotspot, the password and token code letting the server of Blynk connects them together. You may need the computer once to transfer code from ArduinoIDE to the ESP32 kit to prepare the software part of the project. Figure 1 shows that the server of Blynk application will process the smart phone-ESP32 connection. Blynk libraries are ZIP files can be downloaded from Github website to be imported to the Arduino IDE library. Blynk server will check for internet connection, ESP32 with android hotspot, the ESP32 code includes the token code, the name of hot spot and it's password. The information included to the code must be match with the hot spot information to allow ESP32 connect with the WIFI to be as a channel to exchange commands between smart phone and ESP32.Remaining processes are just commands sent from Blynk application to ESP32 to control loads those are connected to the relay kit as shown in Figure 2. And sensor output value is sent reverse to the Blynk application fromESP32 kit.

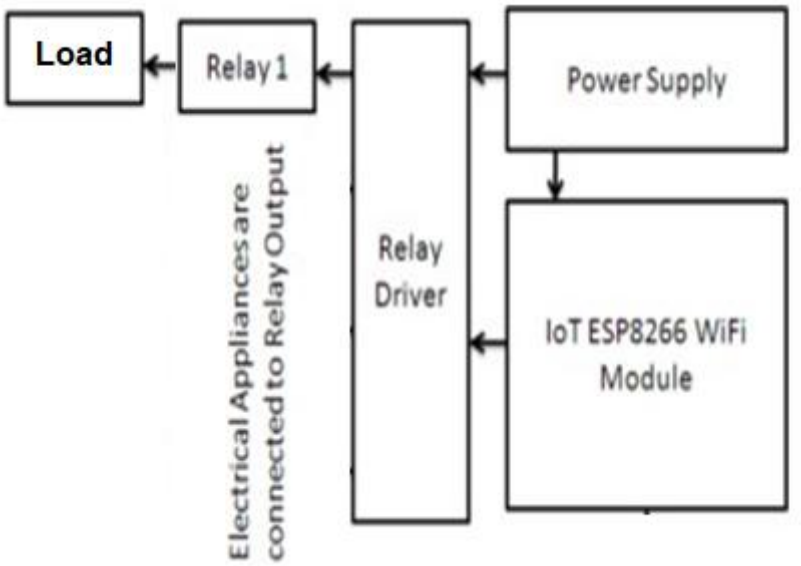

Figure.2. System Block Diagram

Figure.2 shows the system block diagram. The Power Supply will provide energy to the system through the relay and ESP32 modules, so that all equipment can work and function properly.ESP32 microcontroller will read the temperature by the Temperature sensor LM35, and then send the data to the Blynk server in TCP / IP format for display on the smart phone. ESP32 microcontroller will also read commands that have been sent by the Blynk Server in TCP / IP format which will then be changed by giving the logic "HIGH" or "LOW" on certain pins by relay to regulate the on/off of the Class lights. Cloud (internet) by utilizing Wi-Fi becomes the central connection between Blynk application and ESP32 project.

Conclusion

Based on the results of analysis of all data obtained by testing the smart Class with the Internet of Things based ESP32module,the following conclusions can be drawn:

1) Smart Class with Internet of Things (IoT) based ESP32 Module can bedesignedwithvariouscomponentshardwareandsoftwaresupportsothatitcanbearrangedinto a smart Class system that is controlled with Blynk android application according to what is intended.
2) The Smart Class with this Internet of Things (IoT) based ESP32 Module can be implemented to control some of the Class electronics performance including lighting controls, fan control, Early warning systems and etc.

Future Scope

In the design and manufacture of this final project there are still deficiencies that need to be corrected in order to perfect this final project, including:

1) Optimizing the power control consumption of the ESP32 module to be further developed in wireless-based technology application, considering the current technology prioritizes low cost but efficient.
2) The development of an internet-based smart Class system of things needs to be tested on other electronic devices in everyday life.

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