

Smart Power Supply Switch using IoT

R K Ragavapriya^[1]

Assistant Professor,
Department of Electrical and Electronics Engineering,
Sri Ramakrishna Engineering College,
Coimbatore, Tamil Nadu, India.

R Naveen^[3]

Department of Electrical and Electronics Engineering,
Sri Ramakrishna Engineering College,
Coimbatore, Tamil Nadu, India.

S Naresh Kumar^[2]

Department of Electrical and Electronics Engineering,
Sri Ramakrishna Engineering College,
Coimbatore, Tamil Nadu, India.

S Sanjay^[4]

Department of Electrical and Electronics Engineering,
Sri Ramakrishna Engineering College,
Coimbatore, Tamil Nadu, India.

ABSTRACT

The paper proposes an efficient implementation for IoT (Internet of Things) used for monitoring and controlling the home appliances via World Wide Web. Automation system uses the portable devices as a user interface. They can communicate with the network through an Internet gateway, by means of low power communication protocols like Zigbee, Wi-Fi, GSM etc. This paper aims at controlling appliances using Wi-Fi as a communication protocol and MSP430 controller as server system. The user here will move directly with the system through a web-based interface over the web, whereas appliances are remotely controlled through website. The server will be interfaced with relay hardware circuits that control the appliances running. The communication with server allows the user to select the appropriate device. The server communicates with the corresponding relays. If the web affiliation is down or the server isn't up, the embedded system board still will manage and operate the appliances domestically. By this we provide a climbable and price effective Automation system.

Keywords: *Internet of Things, MSP430 Controller, Wi-Fi Module and Relay.*

I. INTRODUCTION

Today, technology has become an integrated part of people's lives. It has and continues to influence many aspects of daily life and has allowed better social interaction, ease of transportation, the ability to indulge in entertainment and media and has helped in the development in medicine. The creation of many devices such as mobile phones and computers have caused many people to rely on technology to communicate with their friends, store information such as pictures, movies, documents, and music. The internet has become a common interface that many devices use in order to simplify the daily life of many people. Internet helps us to bring in with immediate solution for many problems and also able to connect from any of the remote places which contributes to overall cost reduction and energy consumption.

Automation may be delineated as introduction of technology within the home atmosphere to provide ease and protection to its occupants. By using the technology of the Internet of Things, the examination and execution of home automation have got additional average. Various wireless technologies which is able to support some sort of remote knowledge transfer, sensing and management like Bluetooth, GSM, Wi-Fi and cellular networks are used to enter abundant levels of acumen within the home. Home automation for the older and disabled will offer raised quality of life for persons. It may provide an interface to home appliances or the automation system itself, via telephone line or the internet, to supply management and observance via a smart phone or personal computer.

The Internet might even be utilized in automation that offers several decisions from economical use of energy to additional console, protection and safety. Even over great distances the user can monitor and manage their home gate, various appliances and turn on/off the appliances without any human intervention. Despite these advantages, automation has however received extensive approval and an attention owing to its

high significance and complexness. This project will describe an approach in which we implement a controlling and continuous monitoring system to control various appliances through internet.

II. EXISTING SYSTEM

The Existing System consists of physical appliances in home that are been controlled through switches. These devices can be switched ON & OFF manually whenever needed this system is less secured and prone to electrical hazards. Also, the wastage of electricity tends to be a major factor of concern.

Many existing, well-established home automation systems are based on wired communication. This does not pose a problem until the system is planned well in advance and installed during the physical construction of the building. But for already existing buildings the implementation cost goes very high.

III. PROPOSED SYSTEM

Every user who is experienced in the existing system may think of a system that may add more flexibility and run with some common applications such as android. This work is designed in such a way to avoid the disadvantages of the existing system. The proposed system supports more elasticity, comfort capacity and safety.

The main objectives are to design and to execute a cost effective and open source automation system that's capable of leading most of the home and sustain the automation system. The predictable system contains a great elasticity by using wireless reliable technology to interconnecting various modules to the server of automation system. This in turn reduces the deployment cost; will add to the flexibility of advancement, and system reconfiguration. The projected system can make use of wireless LAN (Local space Network) connections between various hardware modules and server, and various communication protocols between users and server.

IV. BLOCK DIAGRAM

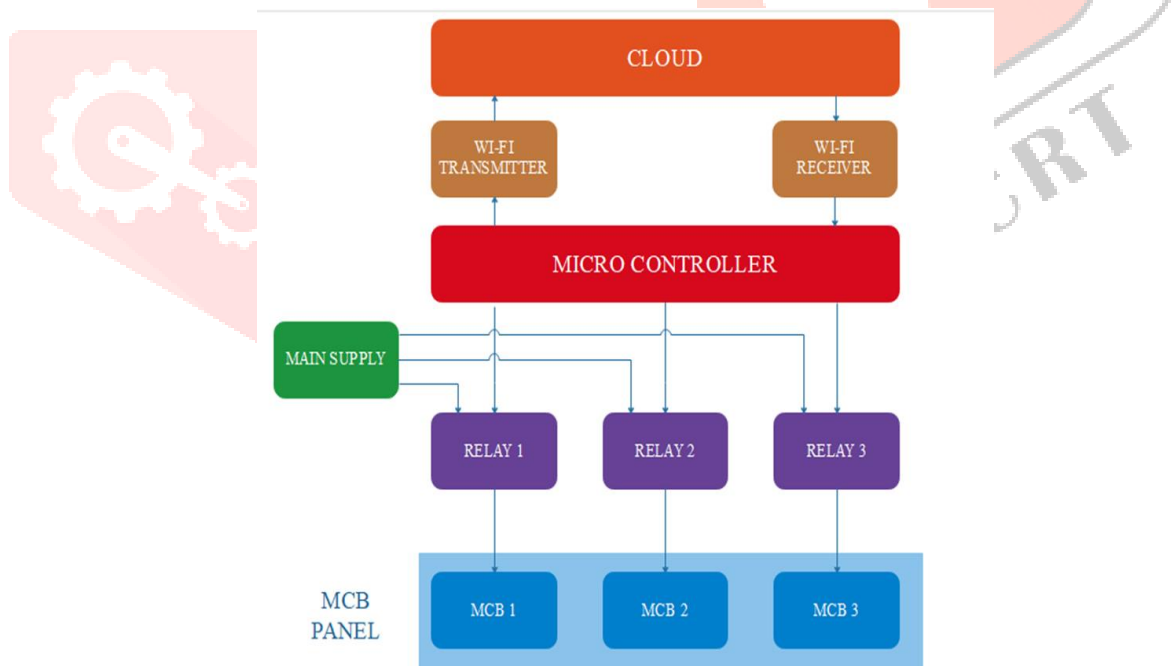


Figure 1. Block diagram of proposed system

Smart Power Supply Switch based on IoT is done using MSP430, Wi-Fi Module and Relay. With the help of IoT the electrical supply of the appliances can be remotely controlled. MSP430 Controller and Wi-Fi Module are connected to main supply board. The Wi-Fi Module transmits and receives data to and from the Cloud Server respectively. Tradition System is to manually control the mechanical switch. The proposed system is to control the supply flowing to the appliances by adding a relay to each individual appliance and all these appliances are connected to a central controller which controls the relay based on the

signals received from the Cloud Server. By this way the wireless technology revolutionizes the standards of living and also, ubiquitously accessible, auto configurable, remotely controlled solution for automation of the appliances has been introduced.

V. METHODOLOGY

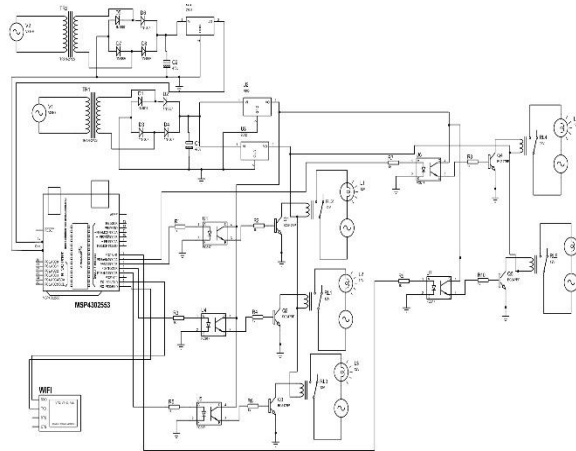


Figure 2. Circuit diagram of proposed system

Internet of Things (IoT) is used in this project to automate the appliances which are connected to it. Traditional method is that the power supply will be connected to the appliances from where the devices are operated. In this project, a small modification has been done. A relay is connected to the appliances and the power supply is given to the relay. By this way the controller used will be able to control the relay according to the signals received from the Wi-Fi. Wi-Fi module will continuously transmit data to the cloud server about the status of the appliances.

A transformer is used to step down the 230V ac to 12V ac, this stepped down voltage is given to a rectifier circuit to convert the alternating current to direct current. The rectifier circuit comprises of diode with which the bridge circuit is formed and a capacitor is used to filter the alternating current to a pure direct current.

Two different regulators are connected to the rectifier circuit they are LM7805 and LM7812 regulators. The output of the LM7805 is 5V which is given as the input to the MSP430 controller parallelly it is also given to the terminal 3 of the Opto-Coupler. Whenever a signal is produced in the MSP430 controller it generates an output of 3.3V and it is given to the terminal 1 of the Opto-Coupler. If the Opto-Coupler receives an input in the input terminal 1, then the 5V connected from the LM7805 in the terminal 3 gets shorted with the terminal 4 and the current will be flowing from the terminal 4 to the base terminal of the transistor. When the base terminal receives a voltage across it, the collector and the emitter terminal will get shorted. The emitter terminal which is been notched with the ground now gets connected to the GND terminal of the relay. Another terminal pin of relay is receiving 12V from LM7812. Whenever emitter-collector terminal gets short circuited the GND terminal of the relay gets connected to the ground and the 12V drives the relay circuit and energies the coil and the switching operation will take place. Through the common terminal of the relay, the main supply will be given and the appliances are connected in the Normally Closed (NC) terminal. By connecting in this way, the appliances will be in the ON state and when the coil from the relay gets switched to Normally Open (NO) terminal the appliances will be disconnected from the circuit.

VI. HARDWARE RESULT

The Hardware Kit comprises of MSP430 controller, Wi-Fi ESP8266 Module, MAX3162, relays, Opto-Coupler, LM7805 and LM7812 regulators. A relay of 30A is used which will be able to control the main power supply of a single room. The power supply of each room will be controlled by an individual relay. The hardware is demonstrated with five relays and floor control for all the five relays are demonstrated in the web page.

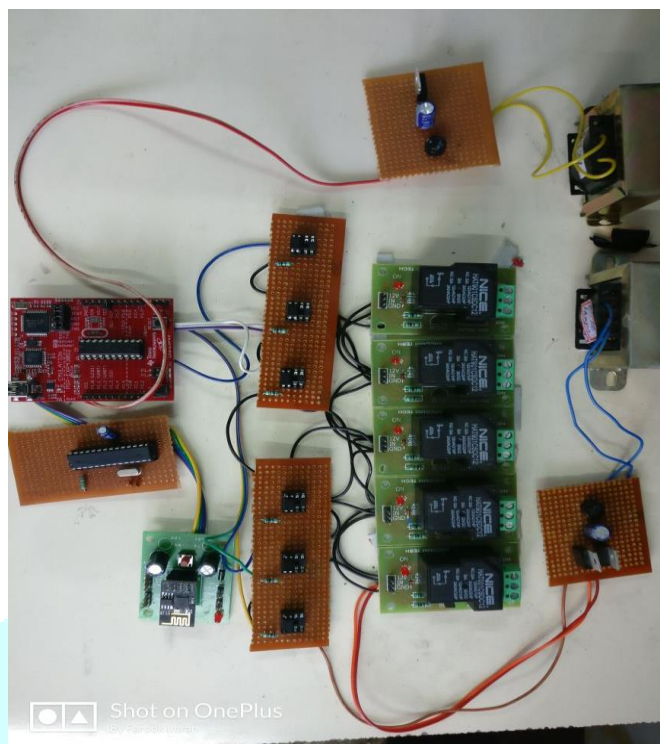


Figure 3. Hardware image of proposed system

VII. WEBPAGE RESULT

Wi-Fi module is interfaced with the MSP430 controller with the help of MAX3162 serial communication IC. This MAX3162 will regulate the voltage difference between the controller and the Wi-Fi module and also for smoother serial communication.

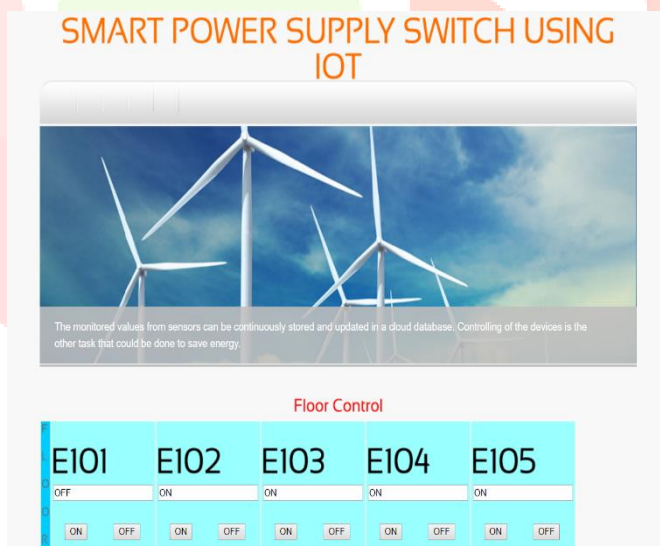


Figure 4. Webpage Result

Wi-Fi module will continuously send and receive data from the cloud. The main purpose of cloud computing is to store the data received via Wi-Fi module. IoT will be used as a controller, it controls the data received from the cloud and resends the updated new data to the cloud. Cloud stores the updated data and sends it back to the Wi-Fi module. If the retrieved data is changed from the original data, then a signal will be generated in the respective pins of the MSP430 controller. This output from the MSP430 controller makes the relay to work accordingly. Hence, this makes the electrical appliances to be remotely controlled.

VIII. CONCLUSION

The event of a commercial management has been exploited using MSP430 and Internet of Things technology. The system is suitable for remotely controlling the appliances. The platform uses the IoT

technology to create a network between the main server and the other electrical and electronic appliances making home a smarter place to live in. This is a smart system which integrates various electrical appliances with each other using informative devices automatically according to the users need. For the web application the HTML part is provided inside the program thus it doesn't require any other application to be developed for different gadgets. The model allows devices to synchronize with the IoT platform so that it can be controlled remotely. The automated mode makes life easier for users by complete automation of necessary appliances without any human effort.

IX. FUTURE SCOPE

The system can be integrated closely with security solutions to allow greater control and safety for home owners. The next step would be to extend this system to automate a large-scale environment, such as offices and factories. Automation offers a global standard for interoperable products. Standardization enables a smart way to control appliances, lighting, environment, energy management and security as well as the expandability to connect with other networks.

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