A Novel Technology for Smart Domestic Automation System

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Abstract - Technology is a large scale and very fast growing process. We can use current technology to create products that benefit other people's lives. This is a great contribution to the community. The " Internet of Things "is rapidly becoming a disruptive technology business opportunity, most notably the creation of standards   for wireless communication between devices and gadgets, commonly referred to as things, in human everyday life. This paper introduces a new technology for controlling home appliances and building an intelligent wireless home security system using Wi-Fi as the communication protocol. Home automation can be implemented using various types of wireless communication technologies such as ZigBee, Wi-Fi, Bluetooth and GSM. The above existing methods have drawbacks as they work in short range.

To overcome these shortcomings, the developed system is integrated into a single portable unit, enabling wireless control of lighting, fans, air conditioners, televisions, surveillance cameras, electronic doors, computer systems, audio-visual equipment, etc., as well as turning on or off the devices connected to the outlet and obtaining the status of various sensors to make appropriate decisions. The system is portable and designed for easy installation, configuration, operation and maintenance. This document implements RTC-based home automation. Here we can set the load-on and load-off timings here. Loading is timed. This makes it even more convenient for disabled and elderly people.

*Key Words***:** Home automation, Internet of Things (IOT), Wi-Fi, Arduino, Node MCU, RTC

1. INTRODUCTION

Home automation is the handling and control of domestic appliances using microcontroller or computer technology. Automation is very popular today as it ensures comfort, safety and efficiency. The Internet of Things connects the various computing devices that are embedded in our everyday devices to the Internet so that they can communicate with each other. This improves the end user's quality of life and makes their daily activities more efficient and sustainable. In the near future, many intelligent devices will communicate via IoT. Within a few years, over 20 billion devices will be connected to the Internet of Things. How to approach this value[1]. We live in a rapidly evolving world in terms of automation. Automation is the ability to schedule events for   local network or Internet connected devices through time-based or stimulus-triggered programs. From large industrial plants to small offices, automation concepts are introduced to reduce human intervention and improve energy efficiency and productivity. Home automation or home automation is the process of automating various devices in a home and turning it into a smart his home.

This includes not only automation of heating, lighting, ventilation and garden irrigation, but also security systems and various other embedded system devices that can connect to the Internet. Another important feature of today's generation of home automation is remote monitoring and remote access to automated devices. The development of smart phones and tablets, and the development of various communication technologies such as Wi-Fi and Bluetooth. A sensor detects the device status and updates it to the web server. Users can access their devices and change their status even when they are far from home.

A WIFI module, Esp8266, plays an important role in this IOT-based home automation system. The Esp8266 module receives commands wirelessly from your Smartphone over the internet. To encode these commands on your Smartphone and send them to the ESP8266, we need an active application for this work. There are many applications, but I choose the simplest and best application "Blynk". It is also available for both platforms such as iOS and Android. We Create creative projects with the Blynk app. IoT, or Internet of Things, is a new technology that allows hardware devices to be controlled over the Internet. In this paper we proposed to use IOT to control home appliances and automate modern homes over the internet. This system uses four loads to demonstrate home appliance control.

Our user-friendly interface allows users to easily control these home appliances around the world via the internet. This system uses the Node MCU (Node 1 Microcontroller Unit). This microcontroller is connected to a relay modem and receives user commands over the Internet. Relays are used to switch loads. The whole system is powered by a 5V adapter√charger (micro type). After receiving user commands over the Internet, the node MCU processes those commands to properly control the load and display the system status on the Smartphone display. The system enables efficient home automation via the Internet. Controlled home appliances around the world using the Blynk community application. The operation method is swipe the number on the Smartphone or voice operation by Google Assistant. So we used the latest technology, IFTTT platform.

2. Existing methods
2.1 Bluetooth-based home automation system
Regenerative braking systems are designed to recover energy that would normally be lost during braking. When the car brakes, the kinetic energy is converted into heat and released into the environment. A regenerative braking

system captures some of this energy and converts it into electrical energy that can be stored in a battery or used to power the vehicle's electrical system.

2.2 Voice recognition based home automation

A home automation system based on speech recognition proposed and implemented by researchers.Bluetooth technology is used for wireless communication between the Smartphone and the Arduino UNO. This is more convenient for disabled and elderly people who want to control their device by speaking voice commands[2]. The main drawback of this system is that the communication between the user and the speech recognition tool depends on the signal-to-noise ratio (SNR). If the voice signal is noisy, the communication can be greatly affected and the system will not be able to show accuracy.

2.3 ZigBee Based Wireless Home Automation System

ZigBee is similar to Bluetooth technology. It is one of the most widely used low data rate and low power transceiver standards. The physical range is 10-20 meters, but can be extended up to 150 meters using Direct Sequence Spread Spectrum (DSSS). Great for prototyping and research related activities.

2.4 GSM Based Home Automation System

A smart home automation system implemented in a GSM-based home automation system using the Global System for Mobile Communication (GSM). Communication between the main module and the device is via text messages. The main drawback of GSM-based home automation systems is that they are not reliable systems as there is no guarantee that text messages will be sent to the system every time. These are the drawbacks of existing methods.

To overcome these shortcomings, we implement a new technology using RTC.

3. Proposed method

The proposed system realizes home automation using IOT and RTC simultaneously. In home automation using IoT, the load can be controlled from the website[3]. You can use the mode switch to switch between IOT mode and RTC mode. In RTC mode, use the keyboard to set the load ON\/OFF timing. The load is switched on and off based on timings set via the RTC module. The proposed system is an Internet of Things (IOT) and real-time clock (RTC) based smart home automation system. The system aims to make the management and control of various home appliances more efficient and convenient for homeowners. The system consists of various sensors, microcontrollers, RTC modules and Wi-Fi modules interconnected via the internet. With the help of sensors, various environmental conditions such as temperature, humidity and light intensity are recorded and this data is sent to the microcontroller. Microcontrollers are programmed to analyze this data and control various home appliances such as air conditioning,

lighting and irrigation systems based on preset conditions. For example, when the temperature in your home exceeds a certain level, the system turns on your air conditioner to cool your home. The RTC module is used to keep track of the current date and time. This information is used to schedule certain tasks, such as turning on lights at a certain time in the evening or turning off an irrigation system at a certain time in the morning. A Wi-Fi module allows the system to be connected to the Internet, allowing users to remotely control and monitor home appliances using smart phones and computers. This means homeowners can monitor and control their devices even when they are away from home, ensuring their home is always comfortable and safe.Overall, this proposed system is a cheap and efficient solution for managing and controlling various consumer electronics. It offers homeowners superior convenience, comfort and security and can be customized to meet specific needs and preferences.
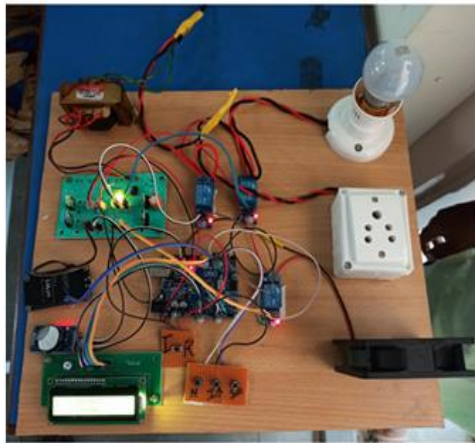
3. Block Diagram & Hardware requirements
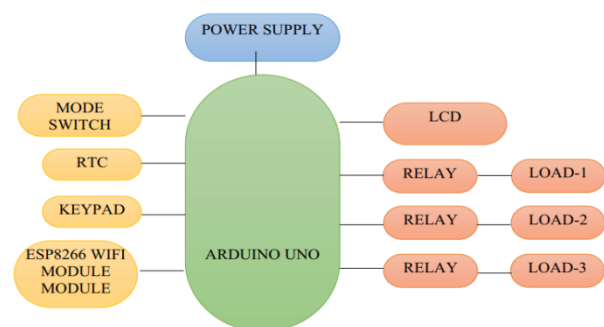
Fig -1: Schematic block diagram of the IOT&RTC based system

The Hardware requirements for the system are as follows

a. Arduino UNO
b. Mode switch
c. RTC module
d. LCD
e. Relay

4. Results

An hardware implementation of IOT AND RTC BASED SMART HOME AUTOMATION SYSTEM is shown in the below fig.2-fig.7
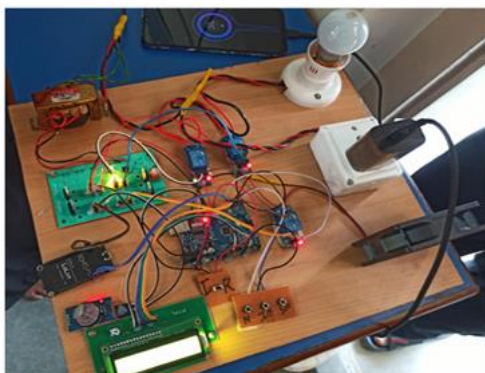
Fig -2: Hardware setup of IOT and RTC based smart home automation system

This system will operate in two modes which are

1. IOT MODE (Internet of things) and

2. RTC MODE (Real Time Clock)

RTC MODE

Fig -3: RTC based smart home automation system

In this RTC mode we set the time manually. Whenever the time reaches the loads will run automatically.
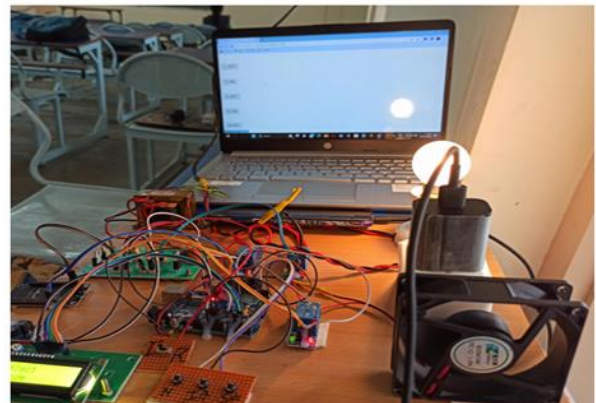

Fig -4: Displaying the Time and Date in LCD for RTC mode of operation

Fig -5: RTC mode time set on different loads OFF/ON time

Here the loads ON time and OFF time are displayed on LCD. After that the loads run manually.

IOT MODE

Fig -6: IOT based smart home automation system

The above fig shows the set up in IOT mode of operation. Here with the help of wifi module ESP8266 we will give the ip address in the website. By using the site we will turn on and off the loads automatically**.**

Fig -7: LCD displays the IOT signal commands

5. CONCLUSION

It is evident from this project work that an individual control home automation system can be cheaply made from low-cost locally available components and can be used to control multifarious home appliances ranging from the security lamps, the television to the air conditioning system and even the entire house lighting system. And better still, the components required are so small and few that they can be packaged into a small inconspicuous container. The designed home automation system was tested a number of times and certified to control different home appliances used in the lighting system, air conditioning system, home entertainment system and many more . Hence, this system is scalable and flexible.

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