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IOT BASED SMART SECURITY AND HOME AUTOMATON SYSTEM

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***Abstract*—This paper represents the home automation with full security and controlling the home appliances using wireless communication as Wi-Fi. We scheme this smart home system with the implementation of related software and hardware. Home automation has become more and more commercial and marketable in recent years. It trains at helping mankind manage the home appliances freely and boosts an autonomous environment in the home. Every day the world of technology evolves amazingly fast. The IOT term, web services, content delivery networks. All of these terms come to aim the same thing, to develop tools that let people, in general, to be more productive and more efficient. The recommended system consists of two main components- the first part is the server (web server), which presents a system core that manages, controls, and monitors users home and outside of the city.**

Keywords—automation, appliances, Wi-Fi, IOT, wireless, web server.

I. INTRODUCTION

Home automation system being a reliable life for mankind. Home automation system using ESP8266 and servo motor SG90 to control the appliances of home. The system is used for controlling and handling home appliances like Lights, Fans, AC, Motor etc. Home automation is one of the major applications of WI-FI technology. The fundamental technical knowledge of home automation is transferring and restraining automatically with each device and sensor in Wi-Fi based on the home network. Home Automation is the most frequently spelled term in the field of electronics. The hunger for automation brought many revolutions in the existing technologies. This automation has exceedingly significance than any other technologies owing to its user-friendly nature. These can be used as a replacement of the existing switches in the home which furnishes sparks and also results in fire accidents in few situations. Base on the huge benefits of Wi-Fi an approached automation system was established to restraining the appliances in the house. The process of controlling various operating equipment, machinery, factory operations, etc., automatically (sometimes remotely) using control systems can be termed as automation. Home Automation is a well organizing method to utilize in every field such that to reduce manpower, energy consumption, manipulation and also for improving the quality and efficiency of any system. Users and the system administrator can locally (LAN) or remotely (internet) manage and control system code. The second part is a hardware interface module, which provides an appropriate interface to sensors and the notion of the home automation system. Inconsistent most of available home automation system in the market the recommended system is ascendible that one server can conduct many hardware interface modules as long as it exists on Wi-Fi network coverage. Prototype reinforces a wide range of home automation devices like power management components and security components. The proposed system is effect full from the extensibility and adjustability point of view than the commercially accessible home automation systems.

II. METHODOLOGY

Numerous attempts and research works have been conducted over the years to enhance performance parameters in home automation. It resulted in the creation of various design methods.

A. Bluetooth based home automation system

The authors of [1] proposed a Bluetooth based home automation system. This system consists of an Arduino BT board and a cell phone is wirelessly using Bluetooth technology. This system is password protected and allows only authorized user. The main limitations of this system are limited to control the home appliances within the Bluetooth range. Similar research was carried out by [2]. A low cost & user-friendly, the smart living system is presented which is also Bluetooth based home automation system.

B. Voice recognition based home automation

The authors of [3] presented hardware architecture of voice recognition based home automation system. This system consists of Arduino UNO and smartphone. Android OS has built-in voice recognizing feature. This is also used to develop a smartphone application, which controls the home appliances. The user voice command is converted to text by this application, then it transmits through the BT-HC05 module which is connected with Arduino UNO. In [4], another voice recognition based home automation system is fabricated by using GPRS technology.

C. ZigBee Based Wireless Home Automation System

The authors of [5], designed a ZigBee based wireless home automation system. This system consists of three main modules, handheld microphone module, a central controller module & appliance controller module. ZigBee protocol is used by handheld microphone module and central controller module are based on PC. RF ZigBee module established the wireless network and Microsoft speech API is used as a

voice recognition application. Same research is implemented in [6]. This is consist of two modes, measurement mode, and current sensor mode. Real-time power is monitored by JAVA platform.

D. GSM Based Home Automation System

The authors of [5], designed a smart home system by using GSM. This system consists of GSM modem, PIC16F887 microcontroller, and smartphone. Electric appliances are controlled by GSM modem through SMS request. PIC16F887 microcontroller interfaced with a GSM modem and it is used to read and decode the received SMS to execute the specific command. Home appliances are connected with PIC16F887 microcontroller via relays. RS232 is used for serial communication between GSM modem and PIC16F887 microcontroller. Similarly, in [6], another GSM based home automation system designed by using the GSM SIM900 module, microcontroller LPC2148, LCD and a smartphone application for the user interface. This system enables the users to control home appliances by sending a message from android application to GSM SIM900 module. Moreover, this system displays the important notification on the LCD and it can be controlled anywhere in the world where mobile network is available.

E. Internet of things (IoT) based home automation system

In [7], designed and implemented by using an embedded micro web server, controlling devices, smartphone, and a software application. This system consists of three parts: home environment, home gateway, and remote environment. Remote environment is controlled by Wi-Fi, 3G or 4G and android application. The function of the home gateway is to provide the data translation service between internet, router, and Arduino Ethernet server. The most important part of the home gateway is a micro web server which is built by using an Arduino Ethernet shield. This system has the ability to control the energy management systems such as power plugs, lightings, security systems such as gate and door locks and heating, ventilation and air conditioning (HVAC). For the monitoring system, home environment supports sensors such as current, humanity and temperature sensors. Similarly, another system focuses on controlling the home appliances through the World Wide Web [8]. This system allows the users to control and monitor the different home appliances using Wi-Fi and raspberry (server system). Home appliances such as fan, TV, and light can be remotely controlled using the website. In addition, this system also provides protection to fire accidents and inform the user about fireplace via an alerting message.

III. PROPOSED SYSTEM

A. Block diagram for IOT based home automation system.

Here it is a complete block diagram for added including the necessary components for controlling home appliance from any remote place. For completing this project we have needed this following component: Arduino, LCD Display, Relay Driver, MAX 232, PIC microcontroller, SERVO MOTOR SG90, ESP8266 NODEMCU,12-2A AC-DC Power Adaptor. The Wi-Fi module gets a signal remotely by means of a cellphone and after that transmits it through its transmitter to the recipient of the microcontroller which thus deciphers the signal and sends a signal to the relating port as needs are which are introduced as outputs. A relay is used through relay interfacing for those devices which draw a larger current.

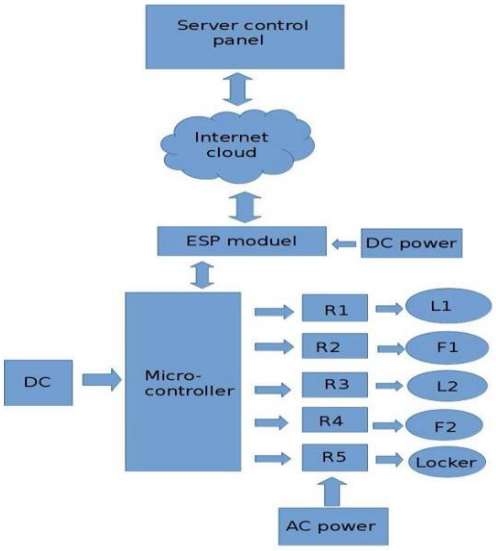

Fig 1: Block diagram for IOT based home automation system.

B. Smart controlling system

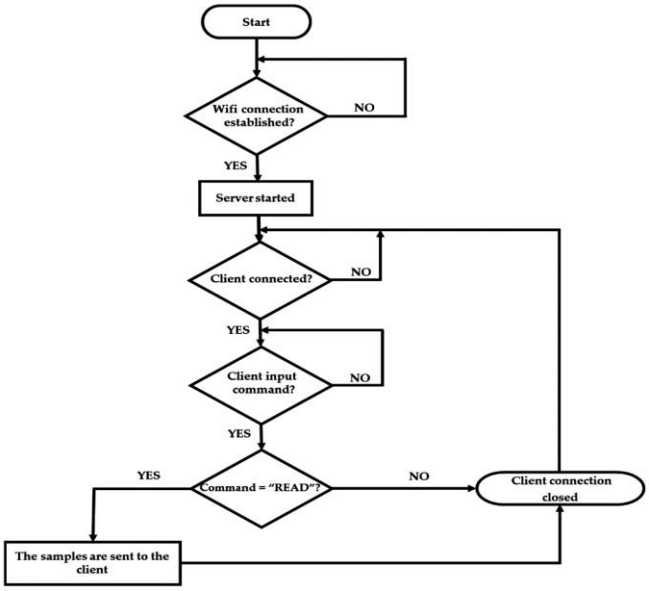

Fig 2: Block diagram of Device activation

The above flowchart showed how a controlling system would work here. The system is connected to the Wi-Fi. Then log in to the web page and send a command to the server. Based on this flowchart coding and simulation had been done.

C. Simulation and output

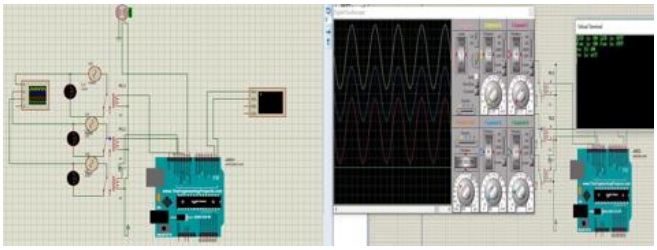

Fig 3: Simulation and results

D. Arduino code for simulation

```
serial_switch | Arduino 1.8.5
File  Edit  Sketch  Tools  Help
New
serial_switch
int LED = 13;
int fan=12;
int tv=11;
void setup() {
  Serial.begin(9600);
  pinMode(LED,OUTPUT);
  pinMode(fan,OUTPUT);
  pinMode(tv,OUTPUT);
}

char rx_byte = 0;

void loop() {
  if (Serial.available() > 0)
  {    // is a character available?
    rx_byte = Serial.read();       // get the character

    // check if a number was received
    if (rx_byte == '1' ) {
      Serial.print("LED is ON \n");
      //Serial.println(rx_byte);
      digitalWrite(LED,HIGH);
    }
     if(rx_byte == '2'){
      Serial.println("LED is OFF ");
      digitalWrite(LED,LOW);
    }

    if (rx byte == '3')
Done compiling.
Detecting libraries used...
"C:\Program Files (x86)\Arduino\hardware\tools\avr/bin/avr-g++" -c -
Generating function prototypes...
```

Fig 4: Programmed code for the working purpose of Arduino Uno.

E. IOT web page

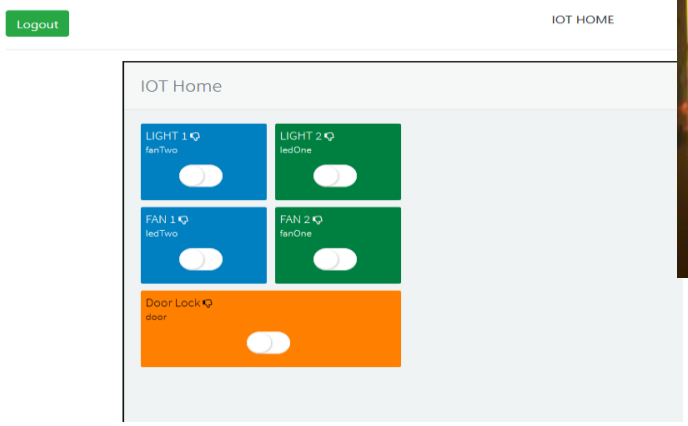

Fig 5: Developed web page for the project.

F. Some Common Mistakes

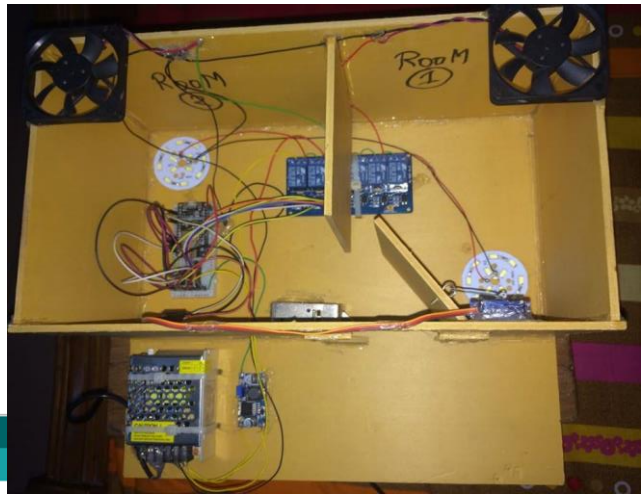

Fig 6: Experimental Setup

IV. WORKING PRINCIPLE

The working procedure of the project can be described from the following figure. In the following figure, the power supply adapter is used in order to step down the voltage from 220v to 12v. This 12v dc is directly connected with the 5 loads (2 fans, 2 light and solenoid door lock). We used an LM2596 dc adjustable buck converter to reduce the voltage from 12v to 2.5 volt. Because our Node MCU module is operated in 3.5. Our Node MCU module is connected with the 6 channel relay module. We use an inverter to invert the voltage from 3.5v to 5v. then we log in to our web page and give a command to turn off an to the corresponding load. By login in the web page we can observe the current status of our load.

V. EXPERIMENTAL RESULT

A. Light 1 & 2 status

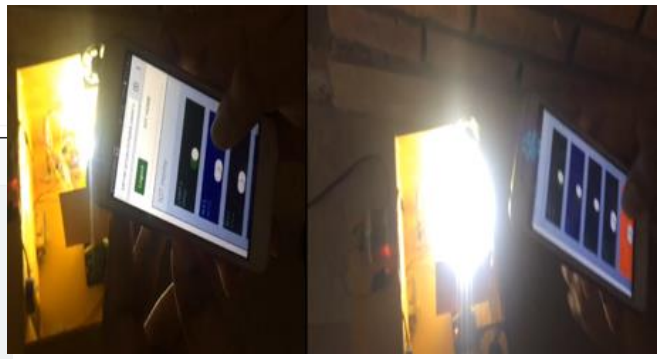

Fig 7: Light 1 &2 status

B. Fan 1 & 2 status

Fig 8: Fan 1&2 ON STATUS

C. Door lock

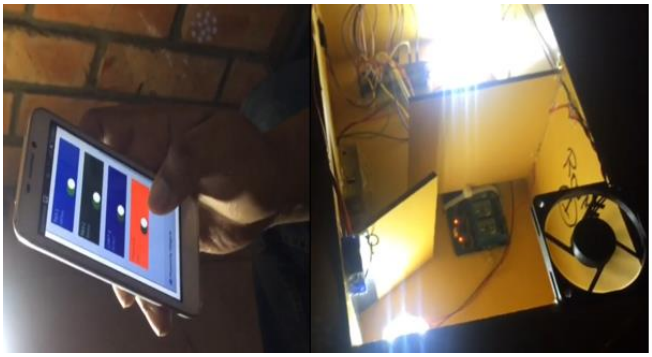

Fig 9: Door lock

VI. LIMITATIONS OF THIS PROJECT

The Wi-Fi-based home automation system isn't all the ongoing idea in present day innovation field. Numerous nations have effectively created a home automation method for them. There is some limitation for this work in our country. A smartphone is mandatory and Wi-Fi is not available now everywhere in Bangladesh. Uneducated people can't use it properly especially in rural area. Wi-Fi connection failure occurs the problem. And if anyone knows Wi-Fi password he/she can control the whole system.

VII. NOVELTY OF THIS WORK

Nowadays the risk of accidents due to current shocked has substantially increased which causes a massive loss of our lives. With a specific end goal to avoid potential risk before this kind of situation happens arrangement of Wi-Fi-based home automation and security system can be utilized. Remote and local control is useful to keep home comfortable and to support the elderly and the disabled people. This system will reduce the losses of electricity. A user can turn off and on electric load and control door from any remote place. Wi-Fi organizes specialized device without wire can diminish the cost of wires. It is completely safe and it will not interfere with any network. The real state organizations can utilize this framework for security purposes. They can join the system to their flats previously they hand it over to their clients.

VIII. CONCLUSION & FUTURE WORK

According to the results from the simulation and hardware implementation and based on the study about this project, finally, a new automation system with an online feature is done for home automation. The IOT based home automation as stated can provide a solution to the difficulties of traditional home automation. With the execution of the IOT network system which is as of now accessible, we are enrooted to eventually get the advantages in remote automation and control of an electrical system. The system has been tried and observed to be solid and dependable. At the point when the observing system will be completely actualized, it will permit automatic judgment and secured the home. Therefore it avoids human intervention, avoids waste of electricity, provides an efficient controlling system and also helps to reduce the maintenance cost. A few proposals for the future improvement of the undertaking are given below: This project is only capable of sending turn on and off command to the mobile device. But it can be modified to send other control parameters as well as voltages and currents etc. For better assessment in the future, an android based application can be presented through which the client can check their day by day use time to time. We can use a timer by which load will automatically turn on and off after a certain period of time n industrial purpose. More intellectual ought to be added to equipment modules to make on them efficient to take the choice as per triggered alarms. Wi-Fi with security camera then detect the area and Wi-Fi Control everything both are connected by the internet.

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