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Home Automation Using IoT Based

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ABSTRACT

Home automation is becoming increasingly popular due to its many benefits. This project uses an IOT-based system to create a system that gives the user total control over all remotely controllable aspects of their home. It can be controlled by central host PC. It also controlled by internet and remotely from a packet PC using a Windows Mobile application.

Introduction

Home automation is the control of home devices from a central control point. It involves using an underlying wireless data network, such as IEEE 802.11 (Wi-Fi), to estimate the location of a personal digital device. In an intelligent home automation system, there are a variety of options for how and where to control the automation system, and a single device's user interface could be a computer-based system, a mechanical switch, a single light, a loudspeaker with a microphone, or some sort of personal remote controller using a standard PC, laptop, or table PC. internet of things (IOT) is a network of physical things equippe up with electronics, software, sensors, and network connectivity to enable data collection and exchange. Through the use of existing network infrastructure, IOT enables objects to be sensed and controlled remotely, opening up opportunities for a more direct integration between the physical world and computer-based systems and bringing about improvements in accuracy, efficiency, and economic gains.

2. Contents

2.1 Hardware description

The ESP8266 is a system-on-a-chip (Soc) that can perform 2.4Ghz Wi-Fi (802.11b/g/n, supporting WPA/WPA2), generalpurpose input/output (16 GPIO), inter-integrated circuit, analog-to-digital conversion (10bit ADC), serial peripheral interface (SPI), I2S interfaces with DMA (sharing pins with GPIO2), and more. It makes use of an 80MHz, 32-bit Tensilica Xtensa L106 RISC CPU, 64KB of boot RAM, and SPI can be used to access external Flash memory. Numerous vendors have developed modules with the ESP8266 chip at their cores, some with unique identifiers, while others may be incorrectly labeled and only be identified by a general description. ESP8266-based modules have proven to be a reliable, affordable, networkable foundation for advancing end point IOT developments.

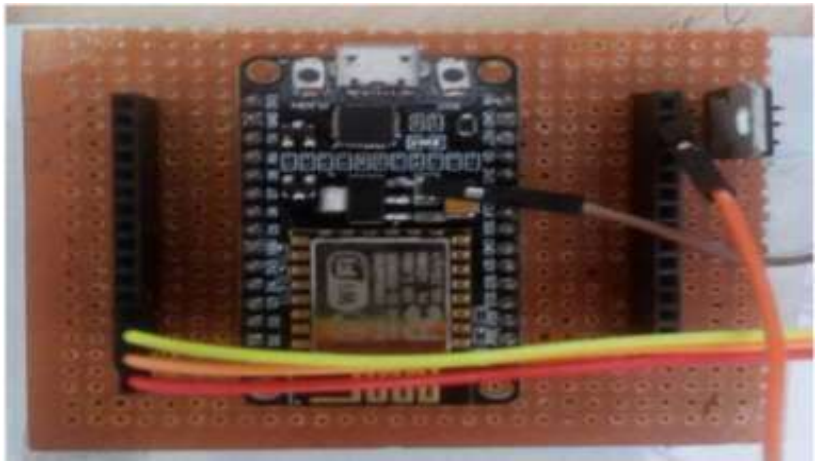

Figure 1. Circuit Connections of ESP module 8266

Relays:

Modules have unique identifiers, such as "Wi07c" and "ESP-01" through "ESP-13". ESP8266-based modules have proven to be a reliable, affordable, networkable foundation .The ESP_wroom-02 is the current official module of ESPressif, while ESP-01 through ESP-13 is a brief designation for the AI thinkers. NODEMCU boards were also used, such as Olimex, ADAfruit, SPArkfun, and WEmo .

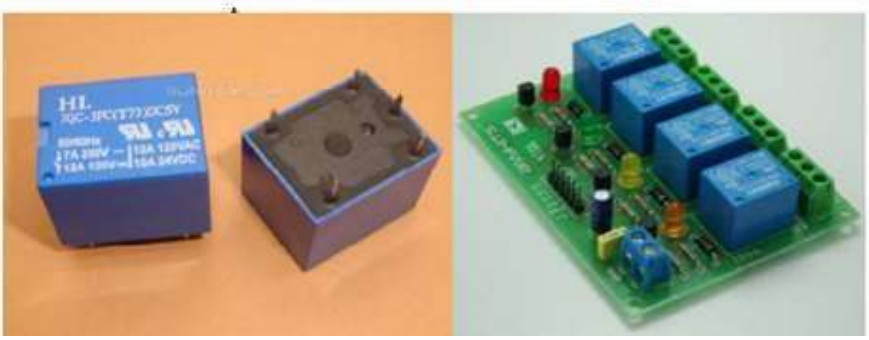

Figure 2. Types of relays

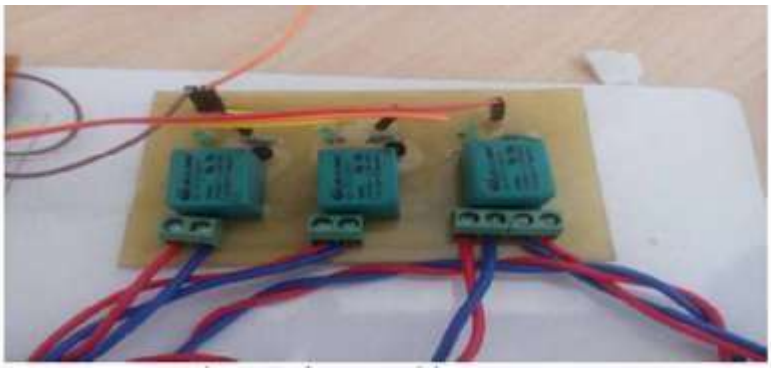

Figure 3. Relays used in prototype

The specification of relays are as follows Input supply 12 VDC @170ma,Output four SPDT relay, Relay specification 5A@ 230VAC,Trigger level 2-5 VDC,PCB dimensions 88mm × 68mm, Four mounting holes of 3.2mm, LED on each channel for relay status. Load of the relays are 7A @ 230-250 VAC,10A @ 120 VAC,10A @ 24 VAC.D2.D4.D6.D8 : relay on/off led indication in figure 4.

Figure 4. Relays pin setup

3. Design & Implementation

The ESP8266 Wi-Fi module and sugar cube relays were incorporated into the project to enable remote or wireless device control. Hotspot configurations were used to create a hotspot channel to connect other devices to the ESP8266. To guard against back EMF damage caused by the coil of the relay's

internal circuitry, diodes were used in the circuitry of these sugar cube relay arrangements. Figure 5 depicts the capacitors used to stabilize the charge so that the coil would remain in the set state.

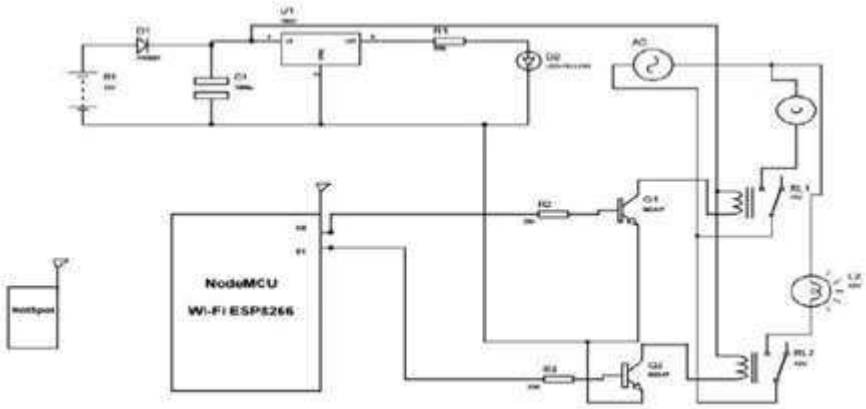

Figure 5. Overall circuit diagram

The Arduino Software (IDE) is an Integrated Development Environment (IDE) that includes menus, a message area, a text console, a toolbar with buttons for common operations, and a text editor for writing code. The Arduino and Genuino hardware must be connected in order to upload programs and communicate with it. Programming code written using the Arduino Software (IDE) is referred to as "sketches". The.ino file extension was used to save these illustrations after being created in a text editor. The message area provides feedback and displays errors while saving and exporting. The console displays text produced by the Arduino Software (IDE), along with other data and complete error messages. The bottom right corner of the window shows the configured board and serial port. The toolbar buttons can be used to create, open, and save sketches.

Figure 6. Software simulation on arduino IDE

Figure 7. Home appliance control using ardunio

4. Results

The sensor data are sent to the web server for system monitoring after a successful connection to the server. Figure 4 depicts the web server page that will let us monitor and manage the system. This web server page can be accessed by typing the assigned IP address into your web browser. The web server provides data on the temperature in various rooms of the house and the level of motion inside. It also displays the status of the various electrical appliances, such as lights, fans, and other things that we can control remotely.

5. Conclusion and future work

The home automation market is entering its next phase due to advancements in automation technology, such as enhancements to wireless automation solutions and a lowering of price points. Big companies like Philips, Siemens, and Siemens will eventually release mass market automation products with attractive user interfaces at a lower price point, while some global players will focus on the premium market and specialize in high automation. This will lead to more people being able to afford the products.

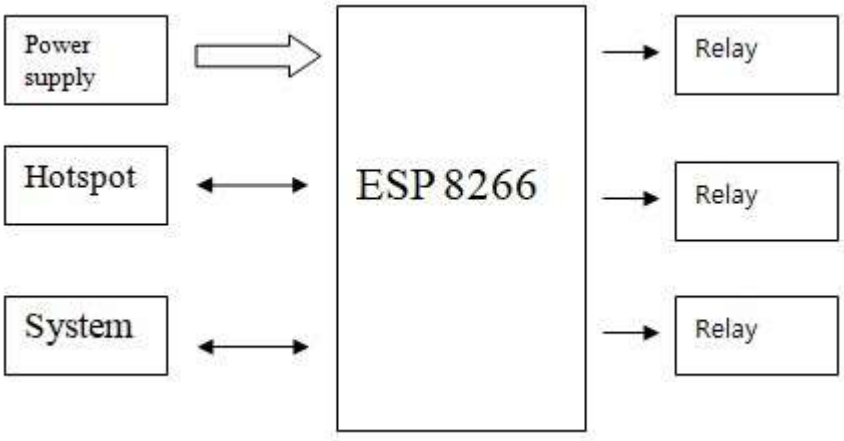

Figure 8. Block diagram of application

Advantages

1. Ease of access, low cost, and power consumption; reduced error probability.
2. Human effort can be minimized.
3. Smarter operations and services.
4. Applications can be automated and applied to any device.
5. Removes the need for PC automation.

6. Aids elderly people in controlling remote controls.
7. Simple user interface..

Disadvantages

- Replacing people is risky and may require time and learning.
- Security worries.
- Most of the time, range is constrained.
- The system is highly dependent on sensor devices, which leaves it open to failure.

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