Control Home Appliance Using IoT

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Abstract. The control Home Appliance Using IoT is a project that control the electrical appliance at home that used the internet connection. Control home appliance is an innovative concept from technology Internet Of Thing. The electrical appliance of home appliances is light, fan, switch sockets, and universal remote air conditioner. The appliances is using the AC and DC currents. The wire of high voltage connection for electrical appliance is connect using a neutral wire to provide safety to users. The MCB is connect to high voltage wire to provide safety measures for users and electrical appliance. The project must be always connected to the internet at home. The remote control or smartphone of the user also need the internet connection for connect with controller system. The Blynk application in smartphone need an internet to interact with NodeMCU ESP8266 the microcontroller of controller system. Google Assistant application is link with Blynk application to control the light with help IFTTT web application. Voice command only can be used for light. The temperature is above 33° C the sensor will actuate the Arduino to activate the fan, and when the temperature drops below 33° C fan will off. Then that will be automatic fan with temperature sensor. The equipment used for this Control Home Appliance Using IOT component is NodeMCU ESP8266, Arduino UNO, DHT11, Relay Module, MCB which allows to control the appliance. These equipment provides important functions so that the Control Home Appliance Using IOT project can be done smoothly and succeeded. Possible future works recommended is to make the application for remote control and to added the security future at home. The system as a whole provides a cost effective and simple solution for implementation of a the control Home Appliance Using IoT.

Introduction

Smart home technology generally refers to any suite device, appliance or system that connect to a common network that can be independently and remotely controlled. The internet makes it easier because can connect via smartphone or tablet. This level of connectivity between devices is typically referred to as the Internet of Things. This allows better control appliance remotely, which can bring new levels of convenience, efficiency, safety and peace of mind in life.

Each room at home must have unit a basic electrical appliance that use a high voltage. Home appliance refer to many electrical appliance at home which is induction stove cooker, rice cooker, blander, iron, light and many other appliance. However, today people still use manual controls to control their switch appliance. The creation of Control Home Appliance product is to control the basic electrical appliance at home. The connectivity between home appliance and internet make it easier to our daily life because we can control it everywhere. The user only need to using a smartphone to control the light, fan, switch socket and air conditioner.

Methodology

The project is divided into a few stages to ensure smooth progress and success. We have studied to understand the dangers and how to operate AC electrical appliances to be brought into this project. In this block diagram is divided into inputs, processes and outputs. In the input, the section describes the process that takes place on a smartphone or control device. In the process part, it describes the microcontroller which NodeMCU ESP8266 and Arduino Uno will process from the received instructions. The control system as specified in the control from the microcontroller to the relay and that controls the temperature sensor. At the output section, there is a relay connected to the home appliance.
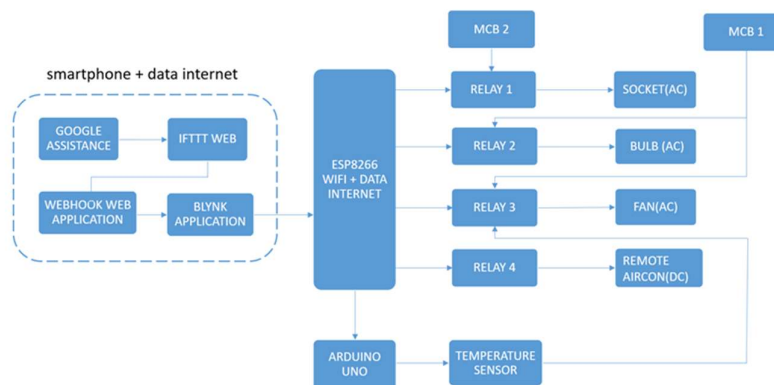
Block Diagram

Figure 1: Block diagram of the project

Base on block diagram 3.1, the smartphone must have Google Assistant for Voice command, Blynk application for button as a control device and internet data. Then from the Blynk application will control the microcontroller which is NodeMCU ESP8266 by using wifi as a connection. Next, another microcontroller Arduino Uno will control the temperature sensor. Then NodeMCU ESP8266 will control four relays. Three relays connected to NodeMCU ESP8266 will control electrical appliance which AC current. While another relay will control the air conditioner remote which is DC current. Two types of MCB are used. The first is connected to the bulb and fan circuit. The second MCB is connected to the socket switch circuit.

System Development

The programming is used to connect Arduino Uno to control the relay circuit of the fan using a temperature sensor. To upload source code into Arduino Uno, Arduino IDE software is used. The temperature sensor will read the ambient temperature and send the data to the Arduino Uno. Then, the Arduino Uno will control the relay connected to the fan. For example, the fan will turn on and off automatically according to the temperature sensor. When the fan switch is off, the temperature sensor will work according to the coding uploaded on the Arduino Uno. The set temperature for the fan to be turned on is 33°C and above. Then the temperature set for the fan is turned off is 33°C below.
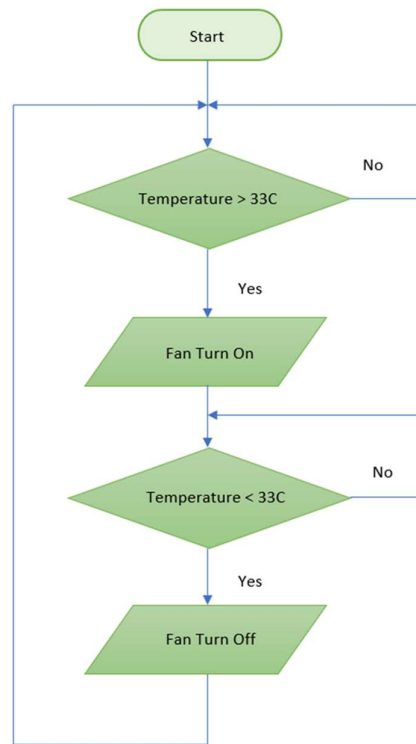
Figure 2: Flowchart of temperature sensor System

Result and Discussion

Arduino Uno is programmed to receive information from the temperature sensor to assess whether the temperature in the room is above 33° Celsius or less than 33° Celsius. Then from that information, Arduino Uno will process the data to control the fan to turn on or off automatically. This will only happen if the fan is in off mode or switch off.

Table 1: Time of Temperature Sensor Function

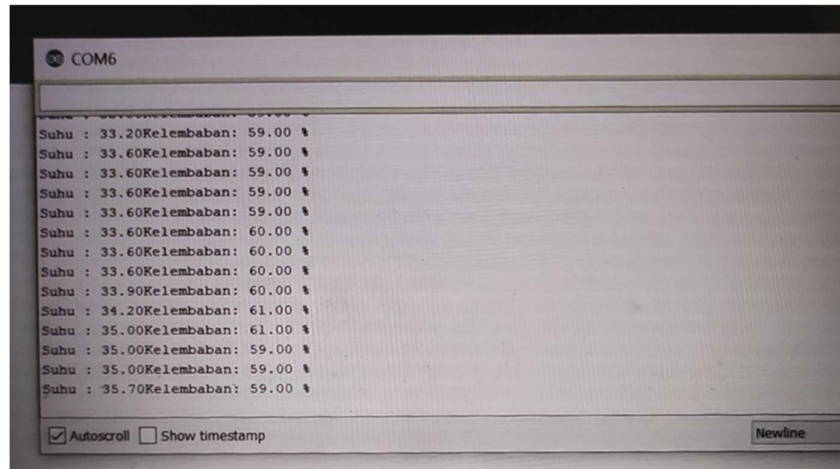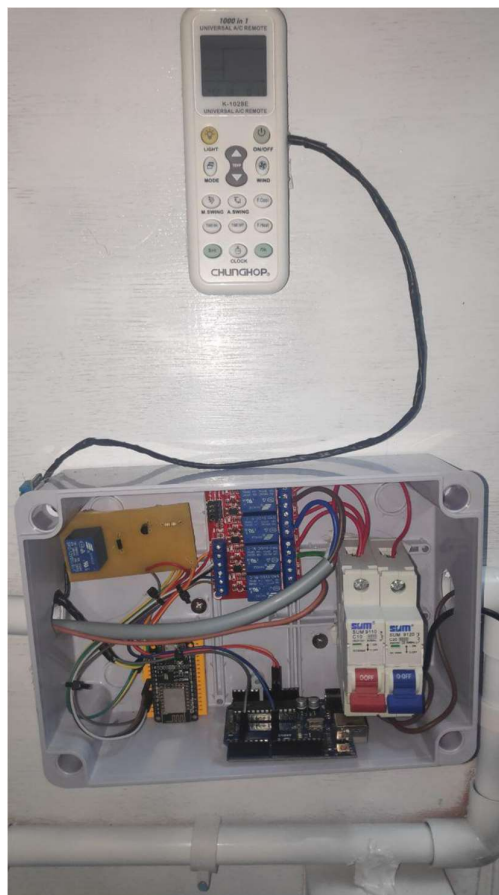| Temperature Sensor Detection (Celsius)	Fan (On/Off)	Time to lower the temperature below 33°C (Minute)
21	Off	-
22	Off	-
23	Off	-
24	Off	-
25	Off	-
26	Off	-
27	Off	-
28	Off	-
29	Off	-
30	Off	-
31	Off	-
32	Off	-
33	On	8 - 12
34	On	10 - 13
35	On	12 - 15

Figure 3: Temperature above 33°C in Serial Monitor

Figure 4: Product of the Project

Conclusion

All the devices are working and functioning as expected and home control appliance can operate well with the designed circuit. When home appliances can be controlled at a long distance, it provides many facilities to users in terms of time and energy. This prototype is developed to remotely monitor the environmental conditions and control the appliances through the existing Wi-Fi infrastructure. Reaping the benefits of sensor technology and advancements in communication technology, it is possible to enhance the old appliances and making them smart through IoT. This kind of automation system can be useful for differently-abled people to control their home appliances remotely.

This project gives the understanding of the internet of thing, high voltage circuit, and the implementation in interface product. The designed system is a low cost, intelligent and flexible. The use of IoT in this project gives something new to the internet-connected controls and home appliances that are usually manually controlled are also connected via the internet. Although the place is far or near if the internet network is there, then it is not impossible for most manual devices can also be connected to the internet.

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