International Journal of Innovative Technology and Exploring Engineering (IJITEE)
ISSN: 2278-3075 (Online), Volume-10 Issue-1, November 2020

Home Automation using Thingspeak

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Abstract: ***Nowadays automation of the house is one of the fast growing branches of IoT. Everyone is interested in automating their houses. So this automation is normally made using arduino, relay board, HC-05, and other sensors. So our aim is to demonstrate home automation using thingspeak both auto and manual. In this we are using both automatic and manual mdes. so that users can switch between these modes easily and can run the appliances. to know whether the status of ac or heater is changed after giving the command we are displaying this information in a web page, it keeps updating for every few seconds so that you can easily check whether the appliances are switched on or off.***

Keywords: HC-05, and other sensors.

I. INTRODUCTION

Generally home automation is done using an arduino really board and the sensors so we came up with a new way of doing it. We are implementing home automation using thingspeak an open source IoT platform where we can analyse and visualise any raw data. so here we have a temperature sensor arduino UNO and wifi module which helps us to update the information in thingspeak the open source IoT platform we are using and we can analyse this data and we can set a fixed temperature value, if the recorded temperature is above that temperature value the air conditioner will turn on and heater turns off simultaneously and the recorded temperature is below certain level the ac will turn off and heater will turn on simultaneously. We are also using IFTTT in our project. IFTTT - if this then that is an web application where we can make web requests using google assistant for our need like in our project when we say “turn on AC” to google assistant IFTTT will make a web request to thingSpeak to turn of air conditioner simultaneously for turning off AC and similarly for turning on and off of heater. IFTTT can also be used for switching between the auto and manual mode of working of AC and heater however required.

Revised Manuscript Received on November 30, 2020.
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II. OBJECTIVE

The main objective of the project is to propose an efficient home automation system with less using software as a major component. This is the demonstration of the proposed system. This is mainly to develop a new type of home automation system. To develop a wireless Home Automation system controlled by a smart phone & voice controlled specifically Google Assistant. To design and implement a less cost Home Automation system is still an efficient one.

III. HARDWARE REQUIREMENT:

A .ARDUINO UNO

Fig.1

It is equipped with a set of digital and analog input/output pins. It has 14 digital I/O pins and 6 analog pins. It accepts the voltage between 7V to 20V.

B .WIFI MODULE

Fig.2

ESP2866 module is used. It is used to establish the communication between the Arduino and device. It acts as both client and host.

C .LCD DISPLAY

Fig.3

6*2 LCD displays are used in this project. It displays the analog output of the Arduino digitally. It can display the output at any instant.

D .TEMPERATURE SENSOR(LM-35)

fig.4

Senses the temperature from the source and sends it to the transducer. LM35 temperature sensor is used for detection in this project.

IV. SOFTWARE REQUIREMENTS:

A .THINGSPEAK

Fig.5

Thingspeak is a website which provides cloud services along with data analytics. This thingspeak is used to store data(temperature readings) which can be used from anywhere by just knowing the channel ID and read key

B .IFTTT

Fig.6

IFTTT is a web based software which connects websites and applications which is used to trigger different situations easily. This is used in manual mode of oue automation system.

C .SPYDER

Fig.6

Spyder is a platform which is used to run python codes like anaconda. This spyder is used to run a python code which helps us to print the temperature and the status of the system on a webpage using HTTP.

V. EXISTING SYSTEM

Home automation is one of the developing projects in the sector of IoT. This makes everything automatic and remote control for the convenience of the user. Many companies are developing this for a more user friendly system for home automation. Generally this home automation is done by using an arduino uno connected to ESP8266 or bluetooth module and to relay board to on and off the appliances. For manual use this arduino is connected to a mobile app with the help of wifi module or bluetooth module. Using this app we can control the appliances within a certain area. This is the existing process and is done by using hardware. So we now developed a home automation demonstration using thingspeak and different types of software.

VI. PROPOSED SYSTEM

We want to develop a demonstration of this home automation using software only. In this proposed system there are both auto and manual modes of control.

In other projects they work on fans and lights and only in a manual mode. For a change we developed a project for air conditioners that too auto and manual mode. In auto mode the air conditioner is on or off based on the temperature outside and the conditions predefined by the users.

In manual mode we connect this thingspeak to the smartphone and the air conditioner works according to the command of the user.

We can switch the mode of working through our phone. For simple usage we used google assistant to communicate with the system.

VII. WORKING

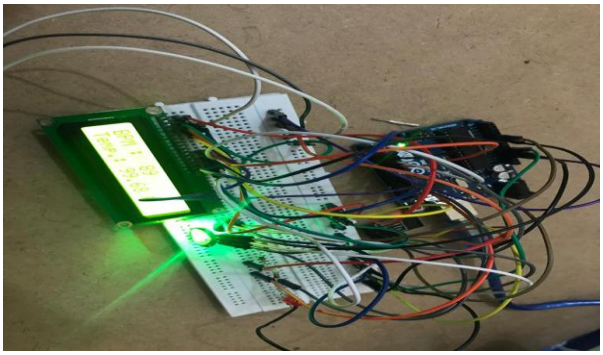

Fig.7

In the hardware unit as shown in Fig 7 we will connect the arduino to ESP8266 which is used to transmit data to thingspeak. The tx pin of esp8266 is connected to rx of arduino uno and rx pin of esp8266 is connected to tx of arduino uno for two way communication. An LCD is also attached to the arduino for the display of temperature. We use arduino IDE application to upload the code to arduino uno. This setup will be planted only at one place in the area and the systems all over the area use the data from the thingspeak. This reduces the cost of implementation. The flow chart of this hardware implementation is shown in Fig.11

This proposed system contains both auto and manual mode In auto mode as shown in Fig.9, a temperature sensor is connected to the arduino which inturn is connected to thingspeak using ESP8266. This is used to measure the temperature of the area and store it in thingspeak. This can be done in an area by one temperature sensor and this data can be collected by every one in that area using the readkey and channel ID of the public channel. This reduces the usage of more temperature sensors in the area. In the same way we collected the data from a public channel in thingspeak which continuously monitors the temperature in a particular area. So this data is analysed by the matlab analyser in thingspeak with the commands predefined by the user. We will set a threshold value of temperature in the matlab analyzer and if the temperature measured is above the threshold temperature, the air conditioner turns on and if the temperature is below the threshold temperature then the air conditioner turns off. In this software demonstration a virtual LED set in thinspeak indicates the status of the air conditioner. In this procedure the auto mode works without the intervention of the user using the predefined conditions. In manual mode as shown in Fig 10, we will be giving commands to the thingspeak using google assistant in our smart phone. We use the IFTTT website which is used to trigger different situations. We connect both google assistant and thingspeak using IFTTT. We create two different commands to turn on and off the air conditioner in IFTTT. So when we give a voice or typed input of one of the two conditions in google assistant, it is sent to the thingspeak using IFTTT which triggers the corresponding situation in thingspeak. But of the drawback in this is this system will not show the status of the air conditioner in our mobile as this triggering is a one way communication.

To overcome this drawback and to know the status of the air conditioner for every where, we developed a python code in spyder platform which is used to print the status of the air conditioner on a webpage and this can be monitored by the user. This python code in spyder is connected to the thingspeak and receives the temperature and the status of the air conditioner in the webpage and using the URL this can be accessed by the user. So this is the complete working of the proposed system.

VIII. CIRCUIT DIAGRAM:

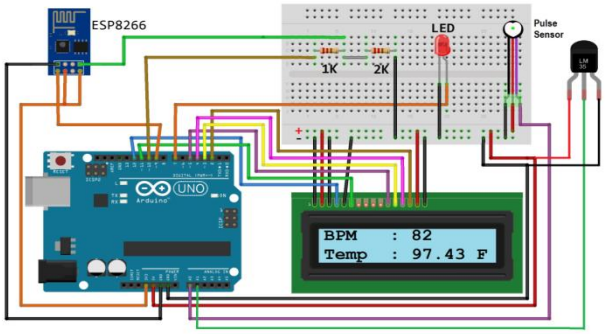

Fig .8

IX. BLOCK DIAGRAM:

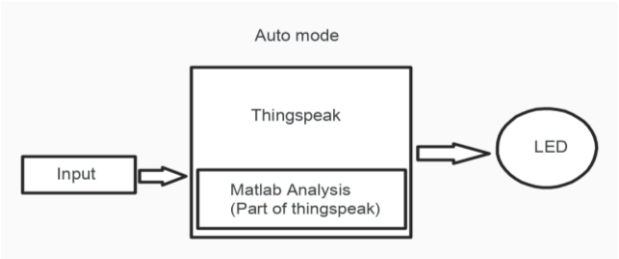

Fig. 9 Auto mode

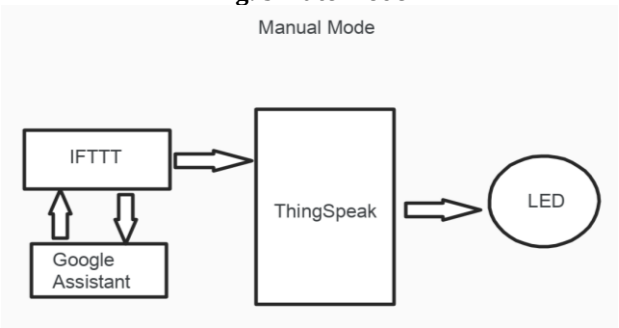

Fig. 10 Manual mode

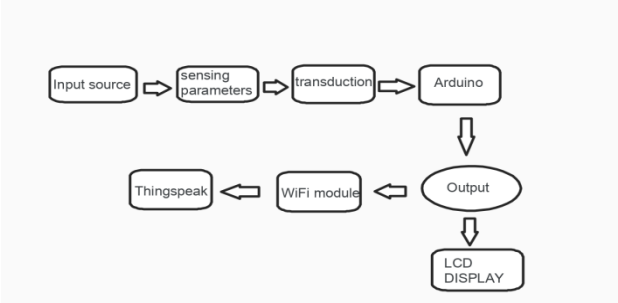

Fig. 11 Temperature measuring unit

X. RESULTS:

Fig. 12 Auto mode

In Fig 12, it shows the automatic mode in which field 1 shows the temperature and field 3 shows the status of the air conditioner in the form of 0's and 1's. The led indicates the status digitally.

Fig. 13 Google assistant commands

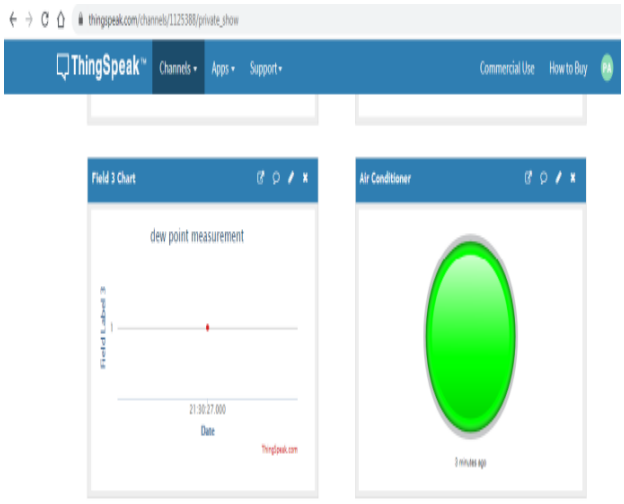

Fig.14 Air conditioner on (manual mode)

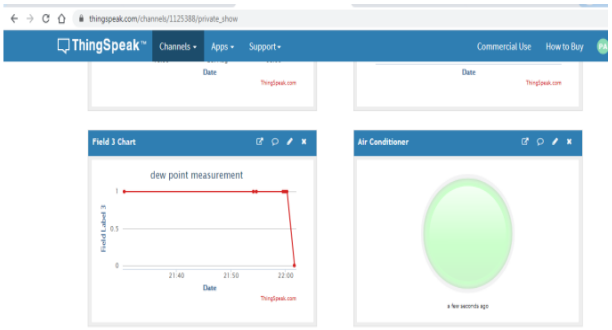

Fig. 15 Air conditioner off (manual mode)

Fig 13 shows the commands given by the user to the system in manual mode. Fig 14,15 shows different situations of the manual mode i.e, on & off respectively

XI. CONCLUSION:

In general home automation is done using arduino, relay board and other sensors. We tried doing it with thingSpeak and IFTTT so that we can run the appliances in both auto and manual mode whenever required. We used lamp indicators in the place of the heater and air conditioner to show the status when the commands are given. We have also used spyder to display the status of the air conditioner and heater on a webpage such that we can get confirmation of the status or air conditioner or heater. In future we can develop this in an efficient way and can be used in offices, colleges, colonies etc as the cost of implementation is much less than using different hardware units in the same area.

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