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DESIGN OF IOT BASED SMART HOME AUTOMATION USING ADAFRUIT IO AND VOICE ASSISTANT

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Abstract: The growth of the technology becomes very vast and faster in this developing world. The usage of the mobiles and its wide range of connectivity has a special impact on the earth. It made me a thing to think over it and motivated me to do this paper which that technology can be accessible everywhere. In this paper, the research is about the home automation using Adafruit IO and voice assistant. In this automation we can operate the things like Fan, TV, Air conditioner, Lights and so on with the commands given to your smartphone through the voice. If you forgot and came to your work without switching off the things in the home, you can operate it on your mobile handy without physical attention requirement at home. You can set the Air conditioner temperature from the place which you have been. An addition thing that here is whenever you are driving a car and wants to operate something in your home, without touching the mobile phone we can operate through the voice commands which can be operated and the requirement is fulfilled.

Index Terms: Adafruit IO, Voice Assistant, Gmail Account, Python, beautifulsoup4, Json

I. INTRODUCTION

In this interconnected world, the concept of savvy homes has picked up noteworthy footing. Shrewd domestic robotization permits clients to control different gadgets and apparatuses remotely, improve vitality productivity, and progress by and large comfort and consolation. One of the key components of shrewd domestic frameworks is the integration of Web of Things (IoT) stages and voice-controlled associates.

Adafruit IO may be a powerful IoT stage that empowers clients to gather, store, and visualize information from associated gadgets. With Adafruit IO, you will construct modern IoT projects and interface sensors, actuators, and other equipment components to the cloud.

Google Collaborator could be a broadly utilized voice-controlled partner created by Google. It permits clients to connected with different administrations and gadgets utilizing common dialect commands. Google Right hand is consistent with a wide extend of keen domestic gadgets and stages, making it a perfect choice for joining voice control into your keen domestic setup.

Shrewd Domestic Mechanization Utilizing Adafruit IO and Google Right hand combines the capabilities of these two stages to make a consistent and natural shrewd domestic involvement. By joining Adafruit IO with Google Partner, clients can control their associated gadgets and screen their domestic environment utilizing voice commands.

Python could be a high-level, translated programming dialect known for its straightforwardness and coherence. It's broadly utilized over different spaces counting web advancement, information science, manufactured insights, computerization, and more.

In this direct, we will investigate the method of setting up smart domestic robotization utilizing Adafruit IO and Google Right hand. We can cover the taking after key topics:

Setting up Adafruit IO:

We are going walk through the method of making an Adafruit IO account, setting up feed, and interfacing gadgets to the stage. You will learn how to send and get data from your associated gadgets utilizing Adafruit IO.

Coordination Adafruit IO with Google Assistant:

We illustrate how to coordinated Adafruit IO with Google Right hand utilizing the Adafruit IO API and Google actions. You may learn how to make custom voice commands to control your gadgets and recover data from Adafruit IO utilizing Google collaborator.

Building Savvy Domestic Applications:

We will investigate different keen domestic applications and utilize cases, such as controlling lights, observing temperature and mugginess, and robotizing errands based on natural conditions. You may learn how to execute these applications utilizing Adafruit IO and Google Collaborator.

By the conclusion of this direct, you may have a comprehensive understanding of how to use the control of Adafruit IO and Google Partner to make you possess keen home automation system. Whether you are a specialist, producer, or devotee, this direct will give you with the knowledge and tools to construct intelligent and interconnected savvy domestic arrangements.

II. LITERATURE REVIEW

[1] Sonali Sen and others [3] This paper presents a micro controller-based voice-controlled home automation system using smartphones. The user needs are an Android smartphone, which is present in almost everybody's hand and a control circuit.

[2] Ritvik Iyer and Antara Sharma [7] This paper proposes a home automations system which can be effectively used to control and monitor home appliances using the internet. The data collected by the various sensors is stored and a pattern analysis is done on the stored data which tells the user at which time the appliances are usually on or off so that they can be automatically controlled without any human intervention by observing the regular usage pattern.

[3] Kishore P and others [2] This paper presents an Internet of Things based real-time home automation and security system using Arduino UNO and ESP8266 Wi-Fi module which makes the system cost-effective and portable.

[4] Devendra Kumar and others [5] In this paper we will demonstrates a flexible and dependable home security system with supplementary security using an Arduino microphone, with the ability to connect via Internet Protocol (IP) through local Wi-Fi for remote access and control by an approved user using the app smartphone.

[5] Ravi Kishore Kodali [4] This IoT project focuses on building a smart wireless home security system which sends alerts to the owner by using Internet in case of any trespass and raises an alarm optionally. The microcontroller used in the current prototype is the TI-CC3200 Launchpad board which comes with an embedded micro-controller and an onboard Wi-Fi shield making use of which all the electrical appliances inside the home can be controlled and managed.

III. BACKGROUND WORK

In this paper, firstly we use the similar Gmail accounts on both the platforms Google Assistant and Adafruit IO. We need to install the Google Assistant application on your smartphone through play store to give the voice commands and have to be signed in on that one. On the other hand, in the Adafruit IO website further developments should be done for the processing stage. In the website we have to use the feed operation to give the instructions on and off signs for the setup.

Python software is used for the real time updates on the dashboard output which interprets the data of the temperature, weather, humidity, feed time, wind speed. It will show the future weather report in the dashboard as well. For this we need to install some of the libraries for the better results.

On giving the instructions to the feed which we have assigned TV or fan switch. By giving the voice commands on your smartphone, it will behave on and off on what command which we have given on Google Assistant.

IV. METHODOLOGY

4.1 PROPOSED MODEL

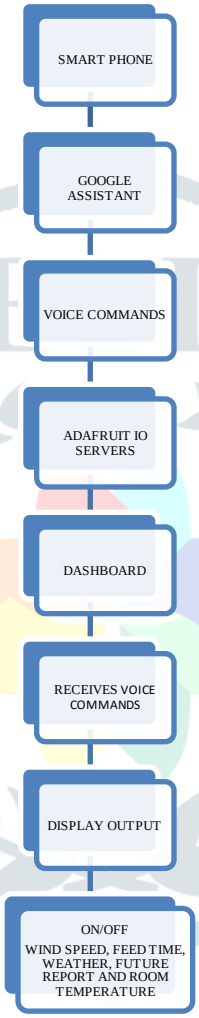

Figure 1: FLOW CHART REPRESENTATION

4.1.1 Online Service Account Creation

1. To begin with, make an account at www.Adafruit.io with the same Gmail account.
2. Presently, make a dashboard. This dashboard is the client interface for farther control.
3. After taking the steps over, donate the title to the dashboard and spare it.
4. Now, make a nourish (utilization location) to control the Turn on and Off light. To form it, basically press the + symbol and select the nourish transformation altered.
5. After selecting the bolster switch, a pop-up window shows up.
6. Enter the name of our bolster (appeared within the red box) and make it. After making, select the created feed (LED) and tap on another step. Within another step get ready the bolster appeared underneath.

7. Here, I have utilized the 0 (OFF) and 1 (ON) button and tap on create. This will make a switch button on your dashboard that can be utilized to remotely control things.

As of now, the dashboard is prepared for IoT applications such as domestic mechanization which means the home automation.

This process is all for the purpose of the controlling the appliances in the home within your smart phone through your voice commands which will send your commands to the Adafruit servers and will react upon what you have given.

On the other hand, I have designed the interface with the things like weather report, wind speed, humidity, feed time and the future weather report as well by using the python code. For this the python software should be installed. Further required steps are mentioned below.

4.1.2 Install Required Libraries

The requests, and beautifulsoup4 library have to be installed before compiling the code and the 'requests' library is to make HTTP request to Adafruit IO's API and the 'beautifulsoup4' library provides the tools for extracting data from HTML and XML files which is required to for real time updates on the output interface. Install these libraries using the command prompt. Open the command prompt and type the command:

- pip install beautifulsoup4
- pip install requests

The libraries have to be installed in the step-by-step manner means one after another.

4.1.3 Adafruit IO Key

To get the AIO key, go to your Adafruit IO account settings to get your AIO key. It will appear on the right-side corner of the screen with key symbol representing, click on it and you can get the key there. This key is necessary for authenticating your requests to the API.

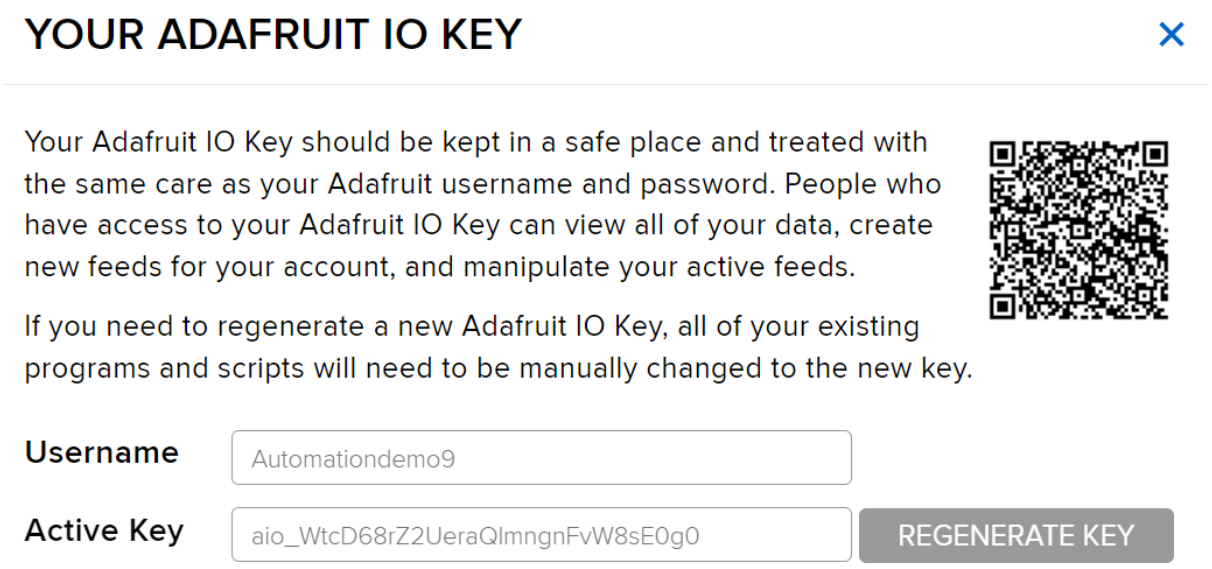

Figure 2: Adafruit IO Key

Visualizing data

Once you have sent data to Adafruit IO, you can log in to your Adafruit IO dashboard to visualize and analyse your data using built-in tools.

IFTTT (If This Then That)

If This Then That, moreover known as IFTTT could be a free web-based benefit for making an arrangement of basic conditional articulations, called applets. The applet is subject to changes that take put on other web administrations such as Gmail, Facebook, Wire, Instagram, or Pinterest. For illustration, an applet might send a mail message when a client in tweets employments a

hashtag or duplicate a picture from Facebook into a client document in case somebody labels a client in a picture. Here, I utilized IFTTT to use Google collaborator benefit and Adafruit benefit within the arrangement. So, on the off chance that I utilize Google right hand to control the brightness of my domestic by saying Alright Google, CRY or turn off the light. IFTTT interprets the message and can send it to the Adafruit dashboard as a justifiable command for the made nourish.

4.2 Programming Procedure

Code: A Python program should be written as of the requirement.

Libraries: Once the libraries are installed, we have to import them into our code using the 'bs4' module and 'Json' module.

- from bs4 import BeautifulSoup as bs
- import requests
- import json
- import time as t

Main data: After the libraries import and installation, we need to set the Adafruit IO key:

- ADAFRUIT_IO_USERNAME = 'Automationdemo9'
- ADAFRUIT_IO_KEY = 'aio_WtcD68rZ2UeraQlmngnFvW8sE0g0'

Create: Create the instances of the Rest client and the def for the weather report.

- aio = Client(ADAFRUIT_IO_USERNAME, ADAFRUIT_IO_KEY)
- def get_weather_data(url):

Run: Run the code using F5 button on the keyboard.

Output: The output of the resultants can be observed on the dashboard of the Adafruit IO website.

V. RESULTS AND DISCUSSIONS

Type-I

Test Case – 1: Turn-On Fan

Figure 3: Command given "Activate Turn on Fan"

In the above test case, we have given the voice command as 'activate turn on fan' and you can see it in the Adafruit dashboard the fan has turned on and the temperature also showing.

Test Case – 2: Turn-On Light

Figure 4: Command given "Activate Turn on Light"

In the above test case, here we have given the voice command as 'activate turn on light' and the light has turned on in the dashboard and the temperature as 84 Fahrenheit.

Type-II

Test Case – 1: Wind Speed, Feed Time and Weather using python code

Figure 5: Adafruit IO dashboard-I

In the above test case, we can clearly see that the Wind Speed is 13 km/h, Weather showing as Fog and the Feed Time is Monday, 10:00 am.

Test Case – 2: Humidity, Temperature Celsius and Future Weather Report

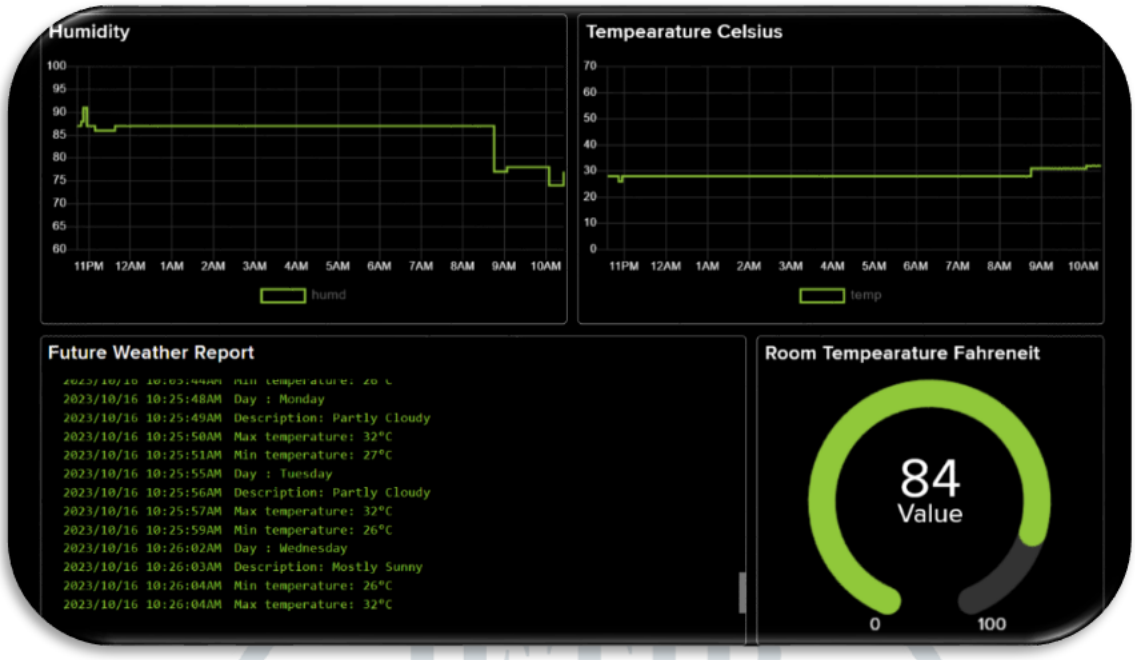

Figure 6: Adafruit IO dashboard-II

In this test case, the Humidity graph and the Temperature Celsius graph we can observe the difference between them. The Future Weather Report accordingly.

VI. CONCLUSION

IOT plays a major role in the new trendy present world and in the future generation. Accordingly, coming to the home appliances people are very much addicted to the technology and its vast usage. Controlling of the switch cases became handy to operate. In this paper, we applied the smart home appliances with the help of the Adafruit IO and python giving the input commands through the smart phone using the Google Assistant application through the internet only it is possible.

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