IoT based AFFORDABLE Home Automation System

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Abstract

   Smart home automation solutions based on the Internet of Things are designed to monitor and control the attributes you want to manage. Wi-Fi devices, for example, use Internet protocols to collect and distribute data. Each item, in turn, contains a sensor that sends a signal to your smartphone. Sensors broadcast and receive commands to one or more hubs, which then relay the results to the cloud network. The architecture shown here allows personal devices to interact with the system remotely.

Keywords

Internet of things, NodeMcu, Home automation, Firebase, Android studio, Xml.

I. INTRODUCTION

The Internet of Things (IoT) is a network of interconnected computing devices, mechanical and digital machinery, items, animals, and people with unique identifiers and the ability to transfer data without requiring human-to-human or human-to-computer interaction.

The Internet of Things (IoT) is the networking of physical items with electronics built in their architecture that allow them to communicate and feel interactions with one another and with the outside world. IoT-based technology will deliver advanced levels of services in the next years, effectively changing how people live their lives. Medicine, power, gene therapies, agriculture, smart cities, and smart homes are just a few of the categories where IoT is well-established.

Currently, over 9 billion 'Things' (physical objects) are connected to the Internet. This figure is anticipated to reach 20 billion in the not-too-distant future.

In IoT, there are four main components:

Embedded systems with low power consumption: The opposite factors that play a vital role during the design of electronic systems are low battery consumption and high performance.

Cloud computing: The amount of data collected by IoT devices is enormous, and it must be kept on a dependable storage server. Cloud computing is useful in this situation. The data is analysed and learned, which gives us more room to figure out where electrical faults/errors exist in the system.

Big data availability: We all know that the Internet of Things relies significantly on sensors, especially in real-time. As these electronic gadgets become more prevalent in many fields, their use will result in a large influx of big data.

Internet access is required for communication, as each physical object is represented by an IP address. According to IP naming, however, there are only a limited number of addresses available. This naming method will become obsolete as the number of devices increases. As a result, scientists are seeking for a new naming system to represent each physical thing.

II. AIM

The current home automation system comprises of tech and iot devices used to control very generalized home appliances like light, fan ,A.C , refrigerator, microwave / oven , etc, but are incapable of recording consumption based on usage of the users.

Our goal is to make home automation centralized , safe, reliable & convenient for all users. despite the fact that there are many devices in the market which provides some functionality is but our additional functionality additional functionality include the cost cutting and other cutting edge technology that do not require high maintenance and expensive iot equipment with fast internet services.

III. MOTIVATION

The already available products in the market are not that user friendly and comparatively expensive for user to install and maintain so our device uses a cheap iot-based easily available device to achieve the same target which is connected to your phone via Internet.

IV. OBJECTIVE

The objective of our home automation project is to make the already available in home automation iot system easily available for people and affordable for average people to use and maintain   .
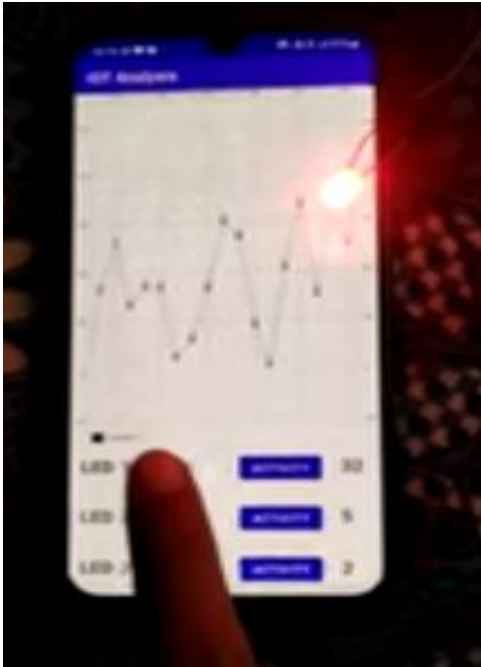
V. SCOPE

future scope of home automation system is making

homes even smarter home can be interfaced with sensor including motion sensor light sensor and temperature sensor that provide automatic automated talking of devices based on conditions and auto and adoption for the devices to the particular condition a domestic home automation system can we place a wired wired home automation system that requires a lot of maintenance and therefore in curing high cost so the replacement for the for the primitive wired based home automation system is iot based automation system that functions on internet.

VI. PROPOSED APPROCH

In this system, the devices like a light bulb, fan or AC are connected to a Wi-Fi module called the Node MCU.

Then, if the user wants to turn on the light bulb then the flag value of light bulb will be set to true and it will be stored in firebase Node MCU will receive the signal and then turn on the fan.

That is how the users can remotely automate their home appliances using any device.

Now, based on the flag values stored in firebase, our system can generate a graph of electricity usage and can even predict the electricity bill at the end of a certain month.

Figure 1.1 :

VII. FIREBASE:

Firebase is **a Backend-as-a-Service (Baas)**. It provides developers with a variety of tools and services to help them develop quality apps, grow their user base, and earn profit. It is built on Google's infrastructure. Firebase is categorized as a NoSQL database program, which stores data in JSON-like documents.
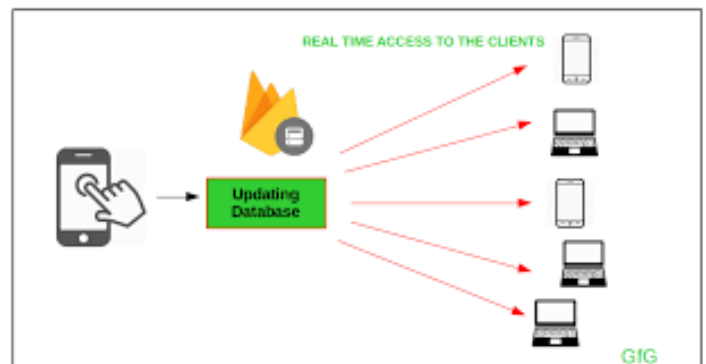
VIII.   NODEMCU

The NodeMCU ESP8266 is an open-source Lua-based firmware and development board designed specifically for Internet of Things (IoT) applications. It includes firmware based on Espressif Systems' ESP8266 Wi-Fi SoC and hardware based on the ESP-12 module, and it, like this, can be programmed using the Arduino IDE and may operate as a WiFi Hotspot or connect to one. It features one analogue input pin, 16 digital I/O pins, and can connect to serial communication protocols such as SPI, UART, and I2C. To store data and programmes, the NodeMCU contains 128 KB of RAM and 4MB of Flash memory. It is perfect for IoT projects due to its high processing power, built-in Wi-Fi / Bluetooth, and Deep Sleep Operating capabilities. Prototyping for IoT devices, low-power battery-operated applications, and projects requiring an I/O interface with Bluetooth and WiFi capabilities are just a few of its uses.

Some Modern Applications:

- Smart Grids and energy saving
- Smart cities
- Smart homes
- Healthcare
- Earthquake detection
- Radiation detection/hazardous gas detection
- Smartphone detection
- Water flow monitoring
- Traffic monitoring
- Wearables

Functionalities of IOT:

- Massively scalable and efficient

- IP-based addressing will no longer be suitable in the upcoming future.
- An abundance of physical objects is present that do not use IP, so IoT is made possible.
- Devices typically consume less power. When not in use, they should be automatically programmed to sleep.
- A device that is connected to another device right now may not be connected in another instant of time.
- Intermittent connectivity – IoT devices aren't always connected. In order to save bandwidth and battery consumption, devices will be powered off periodically when not in use. Otherwise, connections might turn unreliable and thus prove to be inefficient.

IX.   CONCLUSION

The next phase of the home automation industry will be centred on a few major advancements in automation technology, such as advances in wireless automation solutions and lower price points as the market accepts home automation usage in bigger volumes. The following are some of the trends we expect to see in this stage of the industry: Big firms like Philips, Siemens, and Siemens will eventually release pretty mass market automation systems with appealing user interfaces at a lower price point than they are today, allowing more people to afford them. Some international businesses will carve out a position in high-tech automation and will concentrate on the high-end market.

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