Security Based Home Automation Using IoT Devices

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ABSTRACT

The Internet of things, or IOT, is an arrangement of interrelated figuring gadgets, mechanical and advanced machines, items, creatures or individuals that are given remarkable identifiers and the capacity to move information over an organization without expecting human-to-human or human-to-PC association. One of these applications is home robotization which is utilized to control all electrical home machines naturally of by means of advanced mobile phones. This controls gadgets through a Boolean orders of valid and bogus to control to gadgets. These dampness levels for wet and dry conditions (cases) can be changed relying upon the plant necessities for plant development. This can be utilized to identify soil dampness when the dirt dampness shortage module plant watering gadget, so the plants in our nursery without individuals to make due. This aides in numerous ways like while are getting back to home and you need the AC to be on and be cooled before you happen to assuming that you neglect to turn of light or fan you want not again come to home and turn off them, rather than it you can handle with your advanced mobile phone when any place you are. This undertaking incorporates IFTTT, Blynk and Node MCU(ESP32) .

At first the gadgets are associated with the Node MCU(ESP32) to the regarded ports then the sign from the Blynk application will give signs to the Node MCU(ESP32) then, at that point, the regarded port will give power supply to the gadget through Relay board and the gadget will turn on. The Blynk application is associated with google aide, through IFTTT. In IFTTT the google right hand and web hook is associated together to make this project achievement. Assuming the form in laud is given as a contribution to research aide then the gadget will turn on.

Keywords : Internet of Things, Current Transformer, Wireless Fidelity, General Purpose Input/Output.

I. INTRODUCTION

Every day modern people expect an New device and new technology to simplify their day today life. The developers and researchers a real ways trying to find new things to provide comfort to the people.In the past 1990s, Internet usage increased rapidly in enterprise and consumer markets but was still limited in its use because of the low performance of the network interconnects. But in the 2000s Internet connectivity became a part for many applications to provide access to information. However, these devices require more human interaction and monitoring through apps and interface. The Internet of Things is a new era of intelligence computing and it's providing a privilege to communicate around the world. Figure 1 describes the coupling of C's and A's. That reveals people and things can be connected, ideally by using in Any path/network and anyservice.

1. Resource usage (water conservation and energyconsumption)
2. Security and
3. Comfort.

This paper introduces an IoT agent which is the brain of this architecture and it controls the devices through the internet. At a very short period of time, the IoT agent receives the user data in the form of commands, which will be sent to control the systems through Google commands. This command will be received by Google assistant and control the devices.

Home Automation is controlling and managing the basic operations in a household automatically. It is very inconvenient to have to do every single task manually so to make our lives a bit easier, the concept of home automation has been introduced. Home automation necessitate us to introduce computerized or automatic control to certain electrical and electronic systems either house or factory. These include wiring, lighting, plumber, air conditioner control, smoke indicators, etc. A microprocessor or micro-controller or FPGA based system is used to control the various appliances. These systems control the appliances according to configuration. For example they may be capable to turn on the lights at particular time, or they should quantify the humidity with help of hardware sensor and turn On/Off lights accordingly. Remote control is the most basic example of automation. It lets us control a particular device according to us by sitting within a specific range. The concept of the project is creating an interface that lets us control certain devices and also allows us to monitor several occurrences around the house. The interface created is on XAMP that has SQL and Apache which enables the user to do the programming related to the circuit. XAMP further transfer data to MATLAB which in turn sends the data to the Arduino and the device can be con-trolled according to the conditions. The project revolves around making a website that controls all the basic information related to the sensors and does all the necessary monitoring.

II. SYSTEM DESIGN

In IOT automated systems, the architecture has 2 level of its design, the first level is hardware architecture and the other level is software architecture. Hardware architecture is the most essential part of the system once it is configured correctly then software application can easily integrate with hardware architecture because the purpose of software application is to invoke the request. The main output depends upon the hardware module. Both should be made sync with each other.

a. IOT home automation architecture:

The architecture of IOT consists of software application that interact with hardware board connected with home devices using internet. For

every single home device one input output pin of hardware board is connected with every single relay module which works as a switch for the devices. The static IP is assigned to the hardware board through which we can access the board or execute its stored scripts with the help of software application.

The sensors are used to process or generate the appropriate environmental data on real time needed for the systems and they have the most significant role in providing the energy efficiency in IOT systems [26]. The sensors like motion detection and temperature camera sensor etc. can also connect with the hardware board. They normally have separate input output pin in different hardware board but some board support the same input output pins which are used for smart home devices. Without the sensors used, systems can be implemented by it will not provide full support. The use of sensor technologies provides measurement and evaluation of environmental indicators, as the information shared over a sensor network .

b. Working:

As discuss above the home automation architecture, the working of the system is mainly based upon architecture. Software application is responsible to provide the user interface to the users. Users must need to login to the system and then he/she can control or monitor the status of devices. Software Application receives the request generated from the user and passed it to hardware board. Application by means of IP Address access hardware board remotely and perform its execution with respect to user's input request. The working of software application defines with the help of flow chart in Fig [1].
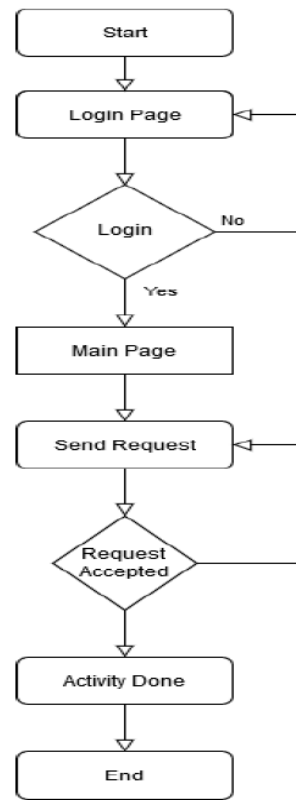
Fig.1. Concept-specific hardware trainers for Digital Fundamentals
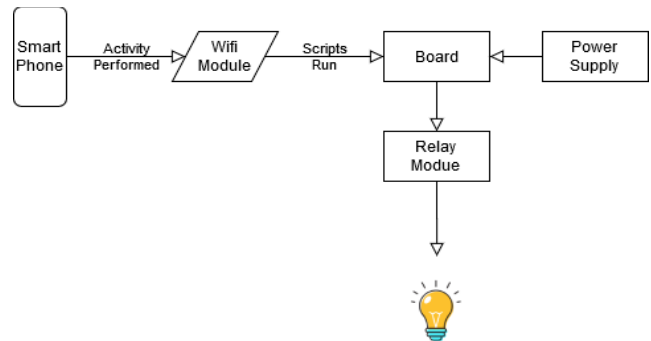
Fig.2. Internal working of the Home Automation System

Scripts are written and stored for every input output pins of hardware board that are connected to every single device like light, fan etc. via single relay module which works as a switch between the device and the hardware board pin. Mostly scripts are written in python language. But the support of JavaScript is also available on many hardware boards depending upon on which Operating system it is

using. Once the user click on the any device button from the software application, the application program invokes and run the respected script of board which execute the command in result the status of device changed with respect to user performed action. This same whole working functionality performs by all other input output pins of hardware board. Fig. 2 shows the whole internal working of smart home automation.

Application users can also control or monitor the smart home devices if he is not available within the specific domain or network. But it is mandatory for hardware board to contain a specific static IP through which hardware board can access remotely anywhere from the World. By this Application can then run any scripts stored in hardware board that correspond to users performed activity. But it requires authorized users to access otherwise it will be a thread for the system that may cause a harmful result. Some level of security support is needed for authentication.

Fig.3. Basic setup for home automation

There are four primary operating standards for home automation technology—Wi-Fi, Z-Wave, Zigbee, and Bluetooth Low Energy (BLE). Wi-Fi is the most commonly used standard where IoT devices are connected to a centralised controller/hub (either wired or wireless), which is connected to the router through an Ethernet link.

The IoT devices can connect to a cloud network on the Internet using the controller/hub and the router. They can be controlled through the cloud network using a FOSS or a mobile app. The mobile app can be used to send and receive data through the cloud network to control and monitor the IoT devices installed in a house.

IoT devices for securing your home:

There are various IoT devices and sensors that can be used for home automation and security. The basic ones are:

1.Wall switches. IoT-based wall switches can be mounted on the wall of a house like regular wall switches, but can be controlled remotely. Such IoT switches can also be wireless and can be connected to an IoT hub or router wirelessly.

2.Voltage sensors. IoT voltage sensors can monitor the supply voltage of the house and one can even monitor the same remotely using the Internet.

3. Energy monitors. IoT energy monitors are digital energy meters that can monitor the power consumption of the house, also helping one monitor the overall power consumption remotely.

4. Thermostats. IoT thermostats can be used to monitor the temperature of the house in real-time. Using such thermostat sensors can help monitor the temperature inside the house from anywhere using the Internet.

5. Smart door locks. Smart door locks are IoT door locks that can be controlled using a home security system and IoT OSS/app over the Internet. One can lock and unlock them remotely via the app.

6. Air-conditioners. Air-conditioning is a very important part of a house and controlling the air-conditioner remotely is a part of home automation.

7. Surveillance cameras. IoT cameras can be used for the surveillance of the house and they can give live video footage of the house remotely. Both indoor and outdoor cameras can be used to monitor the indoor and outdoor environments. Such a surveillance system can have features like motion detection and can alert whenever there is a security breach.

Apart from the above IoT devices, many other devices can be installed in a house to improve the convenience and automation. Many IoT-based home appliances like washing machines, water heaters, refrigerators, dish washers, robot floor cleaners, etc can also be installed additionally to make your house fully automated.

III. CONCULSION

The home automation using the Internet of Things has been proven to work by connecting simple appliances to it and the appliances were successfully controlled through internet. The designed system processes according to the requirement, for example switching on the light when we give the command. This will help the user to get an overview of various parameters in the home anytime anywhere. Low cost and flexible home Automation system using Node MCU microcontroller is proposed and implemented. Overall, Node MCU is easy to understand & its coding is easy. By implementing this type of system, we can ensure that the energy conservation can be done. By help of this system we can increase, the efficiency of the appliances. We can have the complete control over the home appliances from a long distance. This will Increase the comfort ability of human being and it will reduce the Human efforts.

IV. REFERENCES

[1]. T. Sehgal and S. More, "Home Automation using IOT and Mobile App.," International Research Journal of Engineering and Technology (IRJET), vol. 04, no. 02, pp. 2395 - 0072, February 2017.

[2]. V. Yadav and S. Borate, "Smart Home Automation using Virtue of IoT," in International Conference for Convergence in Technology (I2CT), Mumbai, India, 2017.

[3]. K. Moser, J. Harder and S. G. M. Koo , "Internet of Things in Home Automation and Energy Efficient Smart Home Technologies," in 2014 IEEE International Conference on Systems, Man, and Cybernetics (SMC), San Diego, CA, USA, 2014.

[4]. J. Thati, P. V. Kumari and Y. Narayana, "Controlling of home appliances through Internet," in 2017 International Conference on Energy, Communication, Data Analytics and Soft Computing (ICECDS), Chennai, India, 2017.

[5]. X. Hong, C. Yang and C. Rong, "Smart Home Security Monitor System," IEEE, 2016.

[6]. R. K. Kodali, V. Jain, S. Bose and L. Boppana, "IoT based smart security and home automation system," in 2016 International Conference on Computing, Communication and Automation (ICCCA), Noida, India, 1016.

[7]. P. Gupta and J. Chhabra, "IoT based Smart Home design using power and security management," in 2016 International Conference on Innovation and Challenges in Cyber Security (ICICCS-INBUSH), Noida, India, 2016.

[8]. V. Chayapathy, G. S. Anitha and B. Sharath, "IOT BASED HOME AUTOMATION BY USING PERSONAL ASSISTANT," in International Conference On Smart Technologies For Smart Nation (SmartTechCon), Bangalore, India, 2017.