A Security Framework for IOT based Smart Home Automation System

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Abstract- The Internet of Things (IoT) is a new platform for our technology. Though of IoT, we can control our daily life work such as home application, control, and easy communication systems, improve our digital services, etc. The Internet of Things (IoT) is joining our daily contents information wisely to the internet to make communication between objects and people and among themselves. In this paper, we show improved home automation with the help of IoT. For calculating response time of IoT, we need fog computing platform. Fog computing is also known as fogging or edge computing which is built by Cisco and it is extended the version of cloud computing through a network.

In our proposed system, we use the motion sensor, SBC-PT which is a network access component and daily life component in a home. We can monitor and control that equipment by the approach of IOT based system. The home automation system uses the portable devices as a user interface. They can connect with home automation network through an internet approach. The user will move straightly with the system via control interface whereas home apparatus is remotely controlled through sensor and server.

Keywords: IOT, home automation, smart home, response time, control system.

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Abstract - The Internet of Things (IoT) is a new platform for our technology. Though of IoT, we can control our daily life work such as home application, control, and easy communication systems, improve our digital services, etc. The Internet of Things (IoT) is joining our daily contents information wisely to the internet to make communication between objects and people and among themselves. In this paper, we show improved home automation with the help of IoT. For calculating response time of IoT, we need fog computing platform. Fog computing is also known as fogging or edge computing which is built by Cisco and it is extended the version of cloud computing through a network.

In our proposed system, we use the motion sensor, SBC-PT which is a network access component and daily life component in a home. We can monitor and control that equipment by the approach of IOT based system. The home automation system uses the portable devices as a user interface. They can connect with home automation network through an internet approach. The user will move straightly with the system via control interface whereas home apparatus is remotely controlled through sensor and server. The home automation system has an additional property that enhances the facet of defense from unauthorized accidents. The communication with the server consents the user to pick out the receivable device. This design proposed an efficient control of home automation system.

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I. Introduction

Home automation also known as an intellectual home system. Numerous people often and often shift from one place to another for their business purpose, personal work, traveling, etc. [1]. So that kind of people leaves their home without checking their household component. That’s why they need to exhort and control their things. In this situation, we needed smart home automation. Intellectual home system makes with a network, monitoring instrument and home ingredients [2].

In modern times, we use this system for controlling our home automatically. This system raises the alleviation of our home equipment. Equipment that we use in our system is light, door, fan, window, motion detector, webcam, lawn sprinkler, etc. [3]. If the system built in the home, we will control the home things virtually. For controlling the system, we need not to present physically at home.

To implement a smart home system, we need to control centrally. To save the information centrally, we employ fog computing in exchange for cloud computing. Fog computing minimizes the bandwidth and low latency, because cloud computing is not stable for numerous IOT use [4]. Though this computing system, we can easily connect between sensors and IOT device.

In this paper, we proposed an approach to improve home automation system. At first, we discuss IOT, then our proposed system through Cisco and why we use home automation. Finally, we discuss the goals of our works.

a) Benefits of Home Automation System

- Monitoring and ruling all home devices from one space.
- Improved energy efficiency.
- Save time.
- Save money and utilizes suitability.
- Remote control of home objects.
- Ease to use components of a home.
- Prick detection, CO and smoke detectors.
- Governing house peoples activities.
- After all increasing peace of mind.

II. IOT Based Home Automation

IoT means a world-wide network of interconnected things that are incomparable. An advanced network of IoT is being created, when a public wants to associate with different objects. IOTs terminology is applied for the enhancement of intelligent houses to increase the surviving formats of life [5]. It proposed leading connectivity among services, apparatus, and systems. It uniquely identifies not only attached computing system but also internally handle existing internet architecture [6]. It gives us strong-level facility at the communication and knowledge.

There are three main natures in IoT ecosystems: consumers, governments, and businesses purposes [7]. IoT platforms act as the bridge between the devices, sensors and the data networks. IoT safety and privacy have become the major worry among consumers and businesses [8].
III. Background and Related Work

The smart house was concepts, not real form. Though home materials were not suspect as smart in the early twentieth century (1901-1920). The first engine-power vacuum cleaner invented in 1901, and the electricity-power vacuum invented in 1907. The ECHO 4 was the fundamental smart machine, but it was not vending in the market in the year of 1966-1967. In the year of 1990s, this home automation department reached some new experiment and processing. Smart house become exoteric in the early century 2000s, and various terms began to arise [12]. Suddenly in this century, smart homes ripen affordable choice for people [13]. Now we can control home by a remote server or any wireless component such as a laptop, Wi-Fi, mobile phone, tabs, sensing from any sensor [14].

To implement the automation system of functionality and comfortably, we designed a standalone, liberal, melodious and cheap cost home monitoring and controlling system using sensor service. This work is implemented to retire the troubles of existing methods. It bears much resilience, consolation potentiality and security.

This paper proposes a smart home automation system that services the segregation of objects that connected through the motion sensor, fog computing, server and switch connection among things. This system uses a laptop to monitor the home components. The main object of this paper is to operate household components by sensing the motion sensor. When the sensor detects motion, then those components are automatically turned ON/OFF. We can also turn ON/OFF that objects through server if we want. This system is useful from other systems, because when the motion sensor is sensing objects in that time, they are instinctively changed their state. After a lag time sensing, components go back to their previous state. This process happens back and forth.

IV. Proposed System Framework

a) System Description

Signal Board Computers (SBC-PT) is one kind of network access component. In that component, we will connect motion sensor and others household objects like as door, fan, light, window, etc. Sensors are necessary to gain real-time data from things. These sensors rapidly create a huge volume of data. The main thing is to make a home automation system based on the Internet of Things idea composed of a main controlling instrument and all objects connected to the sensors. In SBC board we will describe the system configuration for detecting the motion sensor. While a man enters in the automated room, a motion creates in this stage, so the sensor is alarmed for obtaining products activation. When it finds out any motion, then automatically all the objects turned ON/OFF. Whereas

b) Future of IoT

- In the next five years almost 6 trillion IoT’s objects connected to the Internet.
- Businesses will be the bearer of IoT solutions cause of IoT’s behavior and those are cheaper operating costs, raising productivity and prolong to current markets or spread new manufacture oblation.
- The complicated infrastructure of the Internet of Things exuded into individual ecosystem.
- The profuse extensive staving to the benefits and drawbacks of fake cellular and internet networks.
- The major role of analytics processes, along edge analytics, cloud analytics, fog analytics will perform in building the most of IoT sending.
- The skate privacy challenges submitted by the IoT and that defeated.
- Upcoming IoT’s infrastructures are connectivity, security, data storage, system integration, device hardware, and application development.
- In-complex analysis the IOT ecosystem will alternative and in several industries.
the sensor will rotate ON it shows high input after finishing its delay (1000ms) time it naturally closed OFF. This process happened continuously until motion object present in the existing home.

**Fig. 1: Proposed System Framework.**

When sensor finds out any motion then automatically all the objects turned ON/OFF. Whereas the sensor will rotate ON it shows high input after finishing its delay (1000ms) time it naturally closed OFF. This process happened continuously until motion object present in the existing home.

**b) Proposed System Functions**

The proposed home automation system has the abilities to observe the following objects in users home and monitor the following activities:

- Light ON/OFF
- Fan ON/OFF
- Door ON/OFF
- Window ON/OFF
- Webcam/CC-Camera ON/OFF
- Fire-Alarm/Sprinkler ON/OFF.

The goal of the proposed work is not to formless costly objects such as high-end own computers. This scheme allows approved hose masters to control and monitor associated instruments at home. The smart home must complete essential condition, processed data and consoling equipment to create a better home automation system.

V. Analysis of Proposed Framework

**a) Software Design**

For implementing the proposed system in virtually here, we will use Cisco Packet Tracer. It is very helpful to design IoT components. Here we use Server-PT, Switch-2960, Laptop-PT, SBC-PT, Motion Sensor and other IoT components. Steps that we will do in the simulation are:

- First, we connect server, laptop, and several IoT objects through Copper Straight cable.
- Setup server IP address for accessing the components.
- For controlling devices through laptop also need to configure laptop’s IP address.
- Then we configure all IoT components uniquely.
- For Signing up to the web browser, we set a username and password. This password is used for login into the server access.
- When we go to the web page for login to the remote server, then put server IP address into the URL box, and next ask to input username and password. If we input correct information, then login to the server.
- Next turn on the Registration server.
- Connect all components to the Registration Server.
- For SBC-PT connection we use IoT Custom Cable.
- Finally, we will join our proposed system with the server simulation.
- For connecting to the Registration Server, we go to the IoT accessories configuration and put Registration Server’s IP address, username, and password. Do that process for all IoT components.
- If we want to control home automation things through remote laptop, then put IP address, username, and password for turn ON/OFF the objects.

**Fig. 2: Software Implementation of Proposed System.**

**b) Security Issues**

When motion detected, it will process its work. But its sometimes create a problem because when any unwanted people such as thief, abductor, robber enter the room then its hamper our actual action. So that we need to, trace out home living people. For that, we
invent a way to discover original living people [15]. In 
this purpose to identify wanted people, we will use Eye 
Retina Scan. It is feasible because no two people have 
the similar retinal pattern. Exceptionally it has low 
negative effect rates for detecting [16].

It recognizes the objects very quickly. While any 
staying people enter the room, the home automation 
system first configure with unique patterns of a person’s 
retina blood vessel. It releases a stealthy beam of low-
energy infrared light into a person’s eye. So when retina 
scan matched successfully to the sensor and gave 
positive output, then the motion sensor start its process 
to serve to the user requirements. This method provides 
a high-security system for our home automation actions. 
Here a flow chart for our proposed design:

![Flow Chart of System Design](image)

### Conclusion

The home automation system is one of the 
most important sectors of the Internet of Things (IoT). In 
this paper, the home automation using the Internet of 
Things (IoT) proved that it has been worked favorably by 
joining simple equipment to it, and the appliances were 
practically monitored remotely through the internet. As 
one of the request state in the Internet of Things, the 
smart house appeals the most effort from the market. 
The process is preferable for real-time home security 
controlled and maintaining from fire accidents with quick 
solution. The system gives us better-secured home and 
controlled theft issues in our house. The proposed 
system consult the sensor data like temperature, 
motion, gas, light sensors, and activates a scheme 
following the necessity [20]. This process will explore 
different situation to control the home anytime anywhere. 
In this process, the sensors can be performed to save 
data that can examine the process. The modern home 
system utilizes that the users controlled the central 
control for all of their materials. In our system, we build a 
new technology to create an excellent automated home 
system which is more useful and more secure in our 
regular advanced life. And the smart house process is 
monitored with our mobile phones and computers, and 
it is to handle our busy lifestyle.

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