

## A Review: IOT based Smart Home

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Received: December 12, 2018

Accepted: January 21, 2019

**ABSTRACT:** In recent years, there has been a huge development in the world of intelligent objects for home needs. Such gadgets are implemented in order to ease the interaction between people and daily home duties. Although, individually simple to work with, each appliance has its own interface which adds overhead to the general user experience. This paper presents the architecture of the Internet of Things. Smart homes are those where household devices can be monitored and controlled remotely. When these household devices in homes connect with the internet things using proper network, the whole system can be called as Smart Home in Internet of Things environment. This paper proposed an advanced Internet of Thing based Security Alert System for Smart Home in order to detect a motion or any unusual event at home when nobody is available there.

**Key Words:** Internet of Things (IoT), Smart Home, Information and Communication Technologies (ICT).

### Introduction

Nowadays, around two billion individuals across the globe utilize the Internet for education sector, business, entertainment, news, information and so on, while more individuals will access such a worldwide data and identified with the utilization of the internet as a worldwide stage for letting intelligent devices impart, dialog, process and organize. It is unsurprising that, within the following decade, the Internet will exist as a consistent framework of systems and organized things. In such a traditional idea of the Internet as a framework system connecting with end-clients' terminals is fading, leaving space to a thought of interconnected "smart" objects forming pervasive computing environments.

Smart homes constitute an important branch of computing that includes bringing safety into home appliances, wellbeing, and security. Remote monitoring frameworks are segments of intelligent homes, which use telecommunication and web innovations to control home remotely and help the household who are away from their caregivers. The home automation network provides a communication for electronic devices that are connected to sensors and switches via a central hub or a gateway. The earlier concept of homes devices can be seen as automatic garage doors, timers and many other remote control devices. But, technology advancements of the present era have brought sensor networks integrated with many or almost all electronic devices being controlled through some application on a smart phone or through the web.

A home needs three most important to make it intelligent, i.e., an internet network through wired or wireless, an intelligent gateway to manage sensors and system or home automation in general with a link to devices home and external services. Figure 1 shows some of major concerned areas and focuses that motivate to smart homes. Three of the services are household comforts, household healthcare and also patient security. One of the main objectives of smart homes, i.e., household comfort can be achieved mainly by two things. First is the human activity identification and event automation and the second one is remote access and control of different areas of the home. One of the major objective i.e. patient healthcare can be obtained by intelligent indoor local or remote monitoring.

### Related Work

Wei-Chung Teng et al presents survey of a few remote sensors, which are utilized for home checking especially to care for mature individuals. The checking framework is built upon the blend of a few sensors, and it has the capacity of television information by means of remote correspondence. The focal processor gathers information and stores all information for current necessity and for future reason. The framework stores the propensity for way of life of a man.

Gowthami.T1, Dr. Adilinamacriga emphasizes on the controlling and monitoring of smart home remotely and offering security, when the house owner is absent from the place. The personal computer is employed to watch the several parameters in the proposed method. In this method android phone is applied

to control and monitor the numerous parameters. Android phone is a key benefit compared to a personal computer for using any place. To monitor the several parameters using Zigbee, that has sighted by laboratory view and then authorized to use android phone.

Patru et al presents a solution for connecting more devices into a signal entity which can be easily accessed at any time. The implementation integrates the functionalities of different home automation devices into a single application. The author described how to obtain a smart home project which integrates the functionalities of two intelligent appliances, Philips Hue light bulb and Nest Thermostat, and also several types of sensors, buzzers and motors. This system can be controlled from a mobile device with Internet access.

Ravi Kishore Kodali et al [7] defines about the execution and arrangement of a wireless control system and approachability in to a home atmosphere for authenticated persons only. A wireless network method ZigBee based and image processing technique PCA based loyally make the security system awake as per the demand. ZigBee component and electromagnetic gate lock component functions in tandem the door accessibility, has been proposed and evaluated. Face recognition and detection procedures, as well as a wireless interface are employed to identify and detect guests and dispatch an email and an alert communication about the present home situation status via GSM network routinely to the home owner's mobile phone or any communication gadgets.

### **Existing Methodology**

Home automation and security system which can remotely control the home appliances and alert owner on the presence of intruders and occurrence of fire at home. This includes motion detection and intruder detection in sensor circuit and LDR (light dependent resistor) and RF were exchanged. The motion detection sensor does not work properly under all situations. The alert system used in this approach is cost effective. Hence a smart home security system has to design with efficient sensor and also in low cost home Automation and Security System based on Arduino involves that whenever an individual will arrive the home, then the total number of the persons will acquire incremented, the bulb will begin glowing and the alarm will begin ringing. The total the number of household persons existent in the room will be exhibited on the LCD screen. Whenever the room becomes vacant i.e. the total number of the household, members decreases to zero, then the bulb will habitually halt glowing making the system power efficient. Home Security System based on GSM and Android application involves that whenever a person tries to enter into the house, then an SMS will be dispatch to household owner's mobile phone specifying the existence of few member in the house and the household owner can yield some defensive measure in order to guard his house from the intruder. Moreover the persons can manage the home appliances using an android application available in the mobile phone which will diminish the single person hard work

### **Proposed Methodology**

Architecture is presented to provide security for home and some restricted places like army area, government as well as private places etc. Also, the owner/administrator can get an email alert, contains the images of their house, regarding the theft. From the proposed hardware module, any immediate decision can be taken as on when required (during occurrence of theft at home). We have tested the performance of proposed hardware module over other existing approaches. For hardware implementation, we utilize the Raspberry PI3 Model B as an overall system computation device. Complete working hardware module of the proposed approach. PIR sensors and security camera are connected with Raspberry PI, which automatically sends signals to Raspberry PI when intrusion detected. Architecture and its research motivation; followed by a very similar product of the modern world, i.e., intelligent e-meters. This paper is discussed about how researchers are focusing to find out the solutions related to security

### **Advantages**

- a) PIR sensor also works in darkness, so we get more security instead of just using the camera for detection.
- b) It is best, cost effective, secured and suitable option for home automation.
- c) The system which is implemented was a low cost and flexible that can be expanded and scaled up.

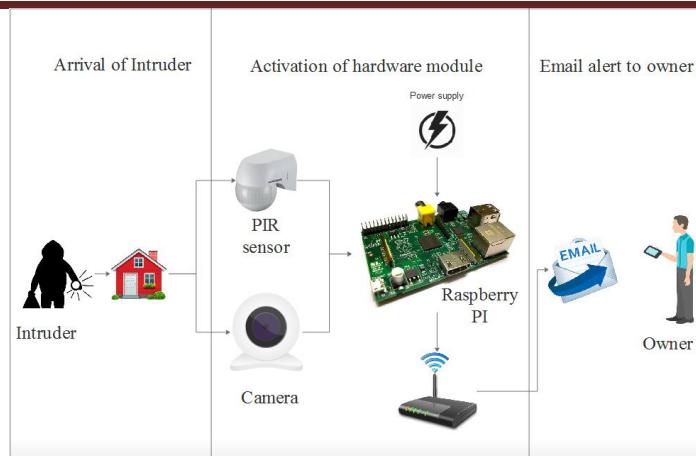


Figure 1. Main architecture of proposed approach

System Implementation uses the structure created during architectural design and the results of system analysis to construct system elements that meet the stakeholder requirements and system requirements developed in the early life cycle phases. These system elements are then integrated to form intermediate aggregates and finally the complete system-of-interest (SoI). Implementation is the process that actually yields the low-level system elements in the system hierarchy (system breakdown structure) Raspberry PI in the proposed approach as main computational device. It performs signal fetching and processing, and email sending processes. It fetches the signal from webcams and PIR sensors and sends captured images to Home owner via email services



Figure 2. Hardware Module of Proposed System

### Component Description

For hardware implementation, we utilize the Raspberry PI 3 Model B as an overall system computation device. A complete working hardware module of the proposed approach is shown in Figure 4. PIR sensors and security camera are connected with Raspberry PI, which automatically send signals to Raspberry PI when intrusion detected.

### Raspberry Pi

The Raspberry Pi is a sequence of minor single-board computers evolved in the United Kingdom by the Raspberry Pi Foundation to encourage the teaching of fundamental computer science in growing countries. The actual model became extremely more widespread than predicted, selling outside of its target for uses such as robotics. Input output devices (including mice, keyboards, and cases) are not comprised with the Raspberry Pi. Some accessories are however having been contained in numerous official and unofficial groups. According to the Raspberry Pi types over five million Raspberry Pi has been vended before February 2015, making it the best-vending British computer. By November 2016 they had vended eleven million units, and also spreading twelve and a half million with in March 2017, making it the third best-vending "personal computer" ever. In July 2017 it was made as are port that the sum of sales has now extended nearly to fifteen million units.

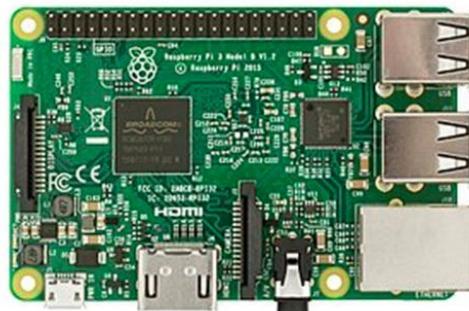


Figure 3. Raspberry Pi 3 Model B

### Webcam

A webcam is a device video camera that streams or pipe lines its image in real time or through a system to a system network. When "captured" by the computer, the video feed may be viewed, stored, or dispatch on to other networks via systems such as the emailed, and the internet as a supplement. On sending to a remote location, the video stream is saved or viewed. Similar to an IP camera (that connects using Ethernet or Wi-Fi), a webcam is normally connected utilizing a USB cable, or a like cable, or constructed into computer hardware. The term "webcam" (is a clipped compound) that is used in its original version of a video camera attached to the Web uninterrupted for an unspecified time, rather than for a specific time, commonly supplying a view for anybody who comes its web page through the Internet. Some as an example, are used as online traffic cameras, which are expensive, rugged professional video cameras.



Figure 4 Webcam

### PIR SENSOR (Passive Infrared Sensor)

PIR sensor is used in proposed approach that frequently utilized as a part of movement detector by measuring infrared lights which is transmitted from the object over sensor range. For home security, PIR is used for motion detection in the home. PIR sensor also works in darkness, so user can get more security instead of just using the camera for detection.



Figure 5 PIR Sensor

### Conclusion

The current research is investigating the concept of smart city and related factors, which have enormous impact on our daily life, with an emphasis on improving its framework's ability to provide customized IoT functionalities. In this survey, we have presented some of the most advanced and trending researches in the fields of smart IoT based products that are ultimately shaping smart cities. The chapter

covered five distinct areas in the development of a smart city. We started with highlighting the improvements in smart grids' architecture and its research motivation; followed by a very similar product of the modern world, i.e., intelligent e-meters. We have discussed about how researchers are focusing to find out the solutions related to security threats in these smart e-meters. At that point, we examined the most intriguing advancements in smart homes and also illustrated research gaps in them more over .We presented some critical features of surveillance cameras and traffic control systems. Finally, we discussed overall challenges, research directions and opportunities in developing smart Home

### **Future Enhancement**

The proposed system presents the basic level of home security and remote monitoring while the required objectives of home security system have been achieved. However every system has some improvement for better result. This low-cost home security system gives minimum delay during the process of email alerts. In future, fog computing has to apply to the proposed system in order to minimize the propagation delay and to enhance the security level of smart home.

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