International Journal of Scientific Engineering and Research (IJSER)
ISSN (Online): 2347-3878
Index Copernicus Value (2015): 56.67 | Impact Factor (2017): 5.156

Internet of Things Based Home Automation

Geethu Suresh[1], Revathy Suresh[2]

[1, 2]Department of Computer Science and Engineering, Dr. NGP Institute of Technology, Coimbatore-641048, Tamil Nadu, India

Abstract: ***In today's society automatic machines have higher priority than human power. IoT is the recent arising technology which can be defined as a collection of interconnected devices that are given with distinct identifiers with ability to exchange information over a internet. This home automation system is a device that is used to maintain the home appliance's working automatically by using mobile with internet connection and power also will be saved so it is also called as smart home. Thus this system allows the home owner to maintain the home appliance's working by anywhere around the world by using internet. In this paper, we denotes the home automation system with Intel Galileo which supports in joining the cloud and wireless communication to enable the user with ability to control by using remote for various appliances like lights, fans etc within the house and all the necessary information will be stored in the cloud. The sensors are used to capture the data and are an important component for the working of this system. By using this proposed system, more devices and appliances can be controlled and maintained with less cost.***

Keywords: Home Automation System, Internet of Things, Intel Galileo Microcontroller, Wi-Fi technology, cloud network

1. Introduction

In 21st century, most of the homes will become more self automated and monitored and all the appliances will be controlled by the users who will be in anywhere around the world. There are several popular home automation systems which are based on wired communication but such systems should be installed during the construction of the house itself but for already available buildings it will be very expensive whereas the wireless communication plays an important role in automation systems. With the improvement in wireless technologies such as Wi-Fi, Bluetooth, cloud networks are used everywhere.

The benefits of home automation system are;

- One of the advantages of IoT is providing more information which helps to take better decisions. As we know knowledge is power and more knowledge is better.
- The second most obvious benefit of IoT is monitoring. Monitoring the expiration of products can improve the safety. The exact quantity of supplies in your home can be known through monitoring, thus can further provide more information that could not have been collected easily before.
- A lot of time can be saved because IoT could be very large and another benefit is scalability and extensibility since wireless networks would be used. The installation cost is also low since cabling is not necessary. IoT can be implemented through wireless networks**.**

2. Related Works

[1] Basil Hamed

The aim of this paper was to develop a smart house with automatic controlling and monitoring system. This system is composed of many devices which are controlled by Labview software which is the controlling system in this paper. Remote control system is also supported in this. With the help of labview software, system which is connected to the internet can be used to control and monitor the house devices.

[2] Sirsath N.S, Dhole P.S, Mohire N. P, Naik S. C & Ratnaparkhi N.S

The main objective of this paper is a Home Automation system that involves the connection of multi-touch devices, cloud networks, wireless communication to allow the user with control of different lights and devices with in the home. This system also includes a program to give a means of user interface to the users.

[3] Basma M. Mohammad El-Basioni, Sherine M. Abd El-kader and Mahmoud Abdelmonim Fakhreldin

The main objective of the system is to implement a smart house using biometric technologies along with wireless sensor networks. This system includes biometric technique to provide authentication for home entry which increases the home security.

[4] Deepali Javale, Mohd. Mohsin, Shreerang Nandanwar

The purpose of this paper is to help the physically challenged people or aged people, it provides the method of how to control the appliances and ensures security using android mobile. The implementation of the system includes android mobile with home automation application and arduino ADK. User can send control signals through android mobile to the arduino ADK which will control all other devices and sensors.

3. System Analysis

A. Problem Definition

The major four issues of home automation system are inflexibility, high ownership cost, bad manageability, not secured. The main aim of this system is to implement a home automation system with the help of IoT which has the ability to control and monitor the components via web interface. The Wi-Fi technology is used in this system to interconnect the various sensors to server in order to provide more flexibility, by this deployment cost can be reduced.

B. Proposed System Feature

This system is composed of sensors and servers where server is used for controlling and monitoring the different sensors and configuration can be done easily to control and handle more sensors. This system includes an Intel Galileo development board, which is developed within Wi-Fi card port in which the card is inserted will resemble as a web server. The home automation system could be accessed from the browser of any computer using same LAN or mobile device with internet facilities. In this proposed system, Wi-Fi technology is used to connect the servers and sensors. The Wi-Fi technology is selected mainly to provide more security and also used to increase mobility and scalability.

C. Design And Implementation Of Proposed System

The proposed home automation system model is shown in above figure. This proposed system includes different sensors such as gas, LDR, temperature etc. The Intel Galileo is connected to the internet via Wi-Fi. When all devices are connected, it will begin to read the parameters of sensors like p1, p2, p3 etc and let t1, t2, t3…tn be the threshold levels of the required sensors.

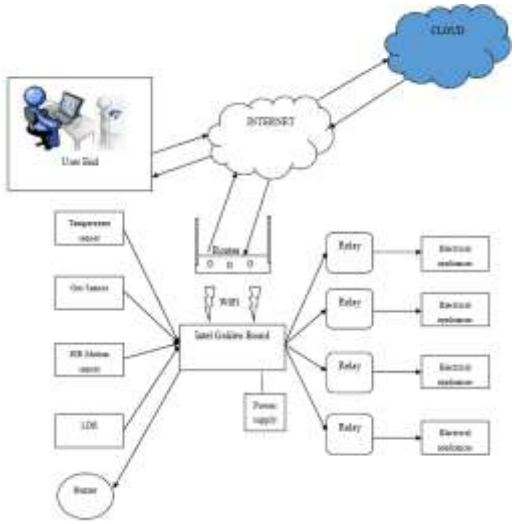

Figure 1: Block Diagram

First of all, the data received from the sensors were sent to the web server and stored in the cloud and the data stored in the cloud can be accessed at anywhere anytime. If the value of the sensor parameters are larger than the threshold level then the alarm a1, a2, a3 etc will be alarmed and necessary step will be taken. All the actions such as room temperature, gas leakage in the house can be detected and monitored and are stored in the cloud for analyzing. If the temperature value is greater than the threshold level then cooler will be turned on by itself and when temperature becomes normal, the cooler gets switched off. If there is any gas leakage then alarm will give an alert sound. The required lights will be turned on/off by detecting the light outside the house. The lights or any other electrical appliances can be switched off remotely by typing the IP address of web server.

D. Proposed Home Automation System Components

Front End Design:

The front end is designed using HTML. The abbreviation of HTML is Hyper Text Markup Language which is used to display web pages to users. The html files should be saved with.html or.htm extension.HTML is composed of full tags which is used by the browser to interpret and display information.

Cloud Storage:

Cloud computing uses remote servers to store, manage and process the data efficiently. Cloud computing is classified into three categories. They are Infrastructure as a service, Software as a service, Platform as a service. There are three types of clouds :public cloud, private cloud and hybrid cloud.

4. Conclusion

The home automation based on iot is very useful and it made our day to day life easier by connecting most of the home appliances to it and these were controlled and monitored using remote and internet respectively. The inclusion of mini camera in the above proposed system provides high security. The proposed system not only records the data obtained from the sensors, such as light, gas, motion, temperature sensors but also performs a process based on the requirement. It also collects and store the recorded sensor parameters in the internet database in a proper order according to time.

5. Future Enhancement

The proposed system can be modified by replacing Wi-Fi technology by Lifi technology. By using Lifi technology in the proposed system it is possible to achieve a very high security, efficiency and availability. Lifi is based on visible light technology. As we all know, the light cannot pass through opaque objects, thus the Lifi internet can be accessed only by the user with in a room and surely cannot be obtained by the users in other rooms or buildings, in this way security can be achieved by using Lifi technology. In the similar manner, with the Lifi technology availability can be achieved because whenever there is a light source, there will be internet. Light bulbs will be there everywhere especially in homes, shops, offices etc which means a high speed data transmission could be possible everywhere. Homes and offices usually have LED bulbs for lightning purposes, the same light source can be used to pass data, and hence it is efficient in terms of cost and energy.

References

[1] Charith Perera, Student Member, IEEE, Arkady Zaslavsky, Member, IEEE, Peter Christen, and Dimitrios Georgakopoulos, Member, IEEE “Context Aware Computing for The Internet of Things: A Survey”. IEEE COMMUNICATIONS SURVEYS & TUTORIAL.

[2] Charith Perera_y, Arkady Zaslavskyy, Peter Christen_ and Dimitrios Georgakopoulosy Research School of Computer Science, The Australian National University, Canberra, ACT 0200, Australia yCSIRO ICT Center, Canberra, ACT 2601, Australia " CA4IOT: Context Awareness for Internet of Things".
[3] Bill N. Schilit, Norman Adams, and Roy Want, "Context-Aware Computing Applications".
[4] Jayavardhana Gubbi, , Rajkumar Buyya, Slaven Marusic, a Marimuthu Palaniswamia, "Internet of Things (IoT): A Vision, Architectural Elements, and Future Directions".
[5] S.P. Pande, Prof. Pravin Sen, "Review On: Home Automation System For Disabled People Using BCI" in IOSR Journal of Computer Science (IOSR-JCE) e-ISSN: 2278-0661, p-ISSN: 2278-8727 PP 76-80.
[6] Basil Hamed, "Design & Implementation of Smart House Control Using LabVIEW" at International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Volume-1, Issue-6, January 2012.
[7] Basma M. Mohammad El-Basioni1, Sherine M. Abd Elkader2 and Mahmoud Abdelmonim Fakhreldin3, "Smart Home Design using Wireless Sensor Network and Biometric Technologies" at Volume 2, Issue 3, March 2013.
[8] Inderpreet Kaur, "Microcontroller Based Home Automation System With Security" at IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 1, No. 6, December 2010.
[9] Rosslin John Robles and Tai-hoon Kim, "Review: Context Aware Tools for Smart Home Development", International Journal of Smart Home, Vol.4, No.1, January, 2010.
[10] Hitendra Rawat, Ashish Kushwah, Khyati Asthana, Akanksha Shivhare, "LPG Gas Leakage Detection & Control System", National Conference on Synergetic Trends in engineering and Technology (STET-2014) International Journal of Engineering and Technical Research ISSN: 2321- 0869, Special Issue.
[11] Nicholas D., Darrell B., Somsak S., "Home Automation using Cloud Network and Mobile Devices", IEEE Southeastcon 2012, Proceedings of IEEE