HOME AUTOMATION WITH SMART SECURITY USING IOT BASED SYSTEM

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Abstract

With the advancement in technology Automation pays a vital role in Home and Industries. Home Automation along with Smart security is an idea of remotely connecting and monitoring real world objects (things) through the Internet and Wi-Fi using PC or mobile devices. By implementing this system it allows accessibility over internet from any place in the world to control multiple devices used at home. By applying this we can minimize the usage of electricity and reduce human efforts,also make the home smarter, safer and automated. The Home Automation system (HAS) includesseveralfeatures of technologies such as wireless networking and wireless communication over cloud etc. The data is stored onto the cloud for security purpose and can be used as per the convenience for analysis

Key Words and Phrases: Home Automation; Internet of things (IoT); Wi-Fi network; cloud; wireless connection.

INTRODUCTION With the advancement in Automation Technology there is an increase in demand for automated system. The rapid increase in the number of users of internet has made Internet a part of life, and Internet of things (IOT) is the latest and emerging internet technology. In 21st century, wireless systems like Wi-Fi networking have become more and more common in home and building automation systems, where the implementation of wireless technologies gives several benefits over wired networks. A home automation system allows the users to control house hold electric appliances such as fan, tube light, refrigerators and many more.Now a days, well- furnished home automation systems are based on wired communication, but to implement wireless system it should have an advance planning to minimise the cost for changing the wired communication to wireless communication. This will be applied due to the advancement of various wireless technology such as Wi-Fi, cloud networking and recently wireless technology as it has several advantages over wired communication. This system can with low cost system can access and control multiple appliances over the internet as per their convenience [1.2].

Advantages of wireless technologies over wired networks is as follows gives several advantages that could not be achieved by using a wired network only.

1) Reduction in installation costs: Since no cabling is required as well as professionals who lay the cables inside the walls are also expensive which can be eliminated.
2) System scalability with easy extension: By using wireless network it's easy to change the layout of devices compared to wire devices where cabling extension is tedious and also the cost of installing wires increases.
3) Aesthetical Looks and benefits: In modern construction where buildings with glass architecture do not allow cable laying for aesthetical look.
4) Integration of mobile devices: With advancement in wireless networks, smart phones can connect to electric appliances such as fan, tube light, refrigerators and many more[3,4]

With the above advantages, wireless technology is an attractive choice in the modern networking of house devices.

For all these reasons, wireless technology is not only an attractive choice in renovation and

refurbishment, but also for new installations. As well as devices connected with internet not only controls but also monitors the electrical consumption.

These devices commonly are connected remotely through different network web browsers present in Smart phones, Laptops or any other smart technique. With rapid change in in wireless technology there are several devices in market which helps to improve the communication with the devices for examples: Bluetooth to Wi-Fi, from ZigBee to Z-wave and NFC (Near Field Communication)[5,6,7]

Following shows the Comparison of Different communication module

Available technology	**Bluetooth**
IEEE Standard	802.15.1
Network Topology	One to Many
Maximum Power Consumption (in mW)	10
Data Rate Maximum	100 1 to 3 Mbps
Range (in meter)	10
Cost	medium

Available technology	**Zigbee**
IEEE Standard	802.14.5
Network Topology	Star, cluster, mesh
Maximum Power Consumption (in mW)	3
Data Rate Maximum	20 to 250kbps
Range (in meter)	100
Cost	High

Available technology	**Esp8266-01**
IEEE Standard	802.11
Network Topology	Star, mesh
Maximum Power Consumption (in mW)	100
Data Rate Maximum	1 to 11Mbps
Range (in meter)	150
Cost	Low

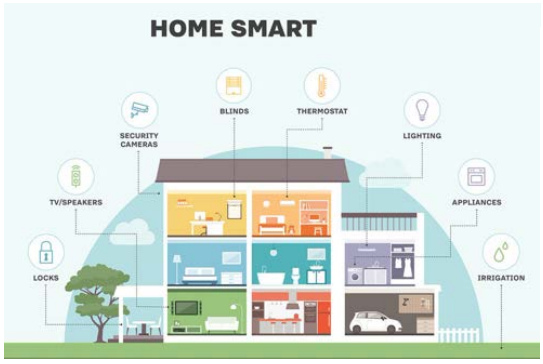

Fig 1. Smart Home Technology

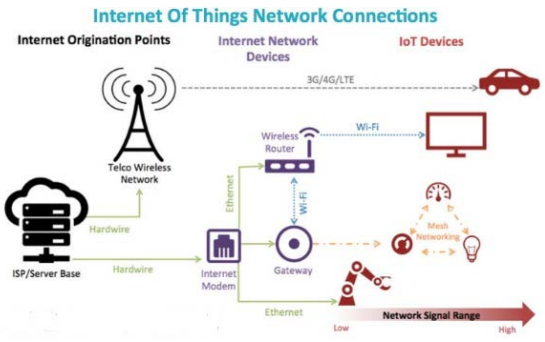

Fig 2. Internet of Things Connectivity

Above figures shows Smart home technology also includes home security, comfort, convenience and energy efficiency by allowing them to control smart devices, which can be executed by a smart home app on their smartphone or other networked device. A part of the internet of things (IoT), smart home systems and devices often operate together, sharing consumer usage data among themselves and automating actions. There are also latest devices such as

- **Smart TVs** which are connected through internet can be switched on and can play on -demand music and videos
- **Smart Lights** and Fans using sensors can be switched On and OFF by

detecting the number of occupants in the room and also saving the energy and avoiding the use of energy in no man room.

- **Smart thermostats** which are connected through Wi-Fi to allow users to monitor and remotely control home appliances
- **Smart Locks** use to detect and allow only residents to enter their home or garage and deny access to intruders.
- **Smart Pet care feeders** which are automated so that the pet's owner can monitor the status and the requirements of the pets.
- **Smart kitchen appliances** such as smart coffee makers for making fresh coffee, smart refrigerators to keep track of items along with their expiry date and many moreare available to make life easy and comfortable.
- **Smart Security cameras** are used by residents to monitor their homes when they are on vacation
- Security control system can be used by the user to each and every smart appliance at home along with the security at doors. This is possible by mounting CCTV in front of the door and can be activated if someone rings the door bell and the live footage of the person can be sent on the owner's mobile. On the other hand when the owner is not at home and his child comes from school and rings the bell. A live footage of his child is send on his mobile and the owner can give instruction to his smart lock to open the door. This is possible due to the comparison of encrypted code stored in the smart lock and the code send by the owner. Along with comparison of data it also compares the security code. The code is double encrypted by the client, so that it cannot tapped by any hacker or intermediate persons. [7,8,9,10,11]

Conclusion:

Home Automation using IoT (Internet of Thing) can be used for connecting all Smart appliances at home. This is achieved by controlling remotely through internet. As the system not only observers the sensor data, like temperature, humidity, gas, light intensity, motion sensors, but also takes corrective action as per the requirement, for example controlling the Air-conditioner temperature setting by sensing room temperature and humidity. All the data are stored in the cloud at time interval. This will help the owner to analyse the condition of the smart devices connected along with its parameters anytime anywhere.

Future Scope With the increasing luxury and Security demand there is vast scope for Home automation. This is possible by capturing live photo inside and outside the house and storing the data in the cloud. This will require less memory storage in DVR(Digital Video Recorder) for the use of CCTV camera to record live data. This kind of system can be helpful for disable and old parents staying at home alone. This can be also useful in industry in hazardous environments.

References

1. Ravi Kishore Kodali, Vishal Jain, Suvadeep Bose and Lakshmi Boppana, "IoT Based Smart Security and Home Automation System",Computing, Communication and Automation (ICCCA), 2016 International Conference on pp. 1286 – 1289, April 2016.

2.VinaySagar K and Kusuma S, "Home Automation Using Internet of Things", International Research Journal of Engineering and Technology, Volume 2, Issue 3 on pp. 1965 – 1970, June 2015.

3. Stefan Matlak, RazvanBogdan, "Reducing Energy Consumption in Home Automation based on STM32F407 Microcontroller", IEEE, November 2016.

4. Su ZinZin Win, Zaw Min MinHtun, HlaMyoTun, "Smart Security System for Home Appliances Control Based On Internet of Things" IJSTR, Volume-5, Issue 6, June 2016.

5Shih-Pang Tseng, Bo-Rong Li, Jun-Long Pan, and Chia-Ju Lin, An Application of Internet of Things with Motion Sensing on Smart House, International Conference on Orange Technologies, Xian, (2014), 65-68.

6. Mandurano, Justin, and Nicholas Haber. House Away: A home management system, IEEE Long Island Systems, Applications and Technology Conference (LISAT), Farmingdale, NY, (2012), 1-4.

7. Zhen Bi, Smart home with ZigBee hardware simulation and performance evaluation, International Conference on Mechatronic Sciences, Electric Engineering and Computer (MEC), Shengyang, (2013), 2139-2142.
8. S. Karaca, A. Şişman and İ. Savruk, A low cost smart security and home automation system employing an embedded server and a wireless sensor network, International Conference on Consumer Electronics - Berlin (ICCE-Berlin), Berlin,(2016), 73-77.
9. T. Thaker, ESP8266 based implementation of wireless sensor network with Linux based web-server, Symposium on Colossal Data Analysis and Networking (CDAN), Indore, (2016), 1-5
10. Y. P. Zhang, T. Liu, Z. X. Yang, Y. Mou, Y. H. Wei and D. Chen, Design of remote control plug, 2015 IEEE International Conference on Applied Superconductivity and Electromagnetic Devices (ASEMD), Shanghai, (2015), 29-30.
11. A. M. D. Celebre, A. Z. D. Dubouzet, I. B. A. Medina, A. N. M. Surposa and R. C. Gustilo, Home automation using raspberry Pi through Siri enabled mobile devices, International Conference on Humanoid, Nanotechnology, Information Technology,Communication and Control, Environment and Management (HNICEM), Cebu City,(2015), 1-6.