Smart Home Using Wireless Sensor Network

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Abstract——**In this busy and comfortable lifestyle of peoples, communication technology has evolved in such a way that any information will be accessed from anywhere, at any time, by any one. In today's communication technology, communication is not only constrained between two computers, but it is a complete network called internet. With advance internet technology today not only we can access the information from any place, at any time, by any person, but we can also control and monitor various devices from anyplace, at any time, by any authenticated person, this technology is called Internet of Things (IoT). This report represents the application of wire less sensor network for Smart Home Automation system which includes a microller 8051 as processing unit for data which is extracted from various sub-systems like, Fan, Washing machine, and all load which are use in home.All these systems are controlled remotely by a android application.**

Index Term-**Home Automation, Wifi, Bluetooth, Zigbee**

I.INTRODUCTION

Presently, due to the proliferation of smart devices and the ever increasing dependence on their affluent attributes, it becomes an indispensable necessity to interlink multiple smart devices. The Wireless sensor networks technology like wifi, bluetooth and zigbee provides an excellent medium through which multiple devices can be connected to one network.

Wi-Fi operates over an internationally approved frequency band of 2.4GHz. This paper explores the numerous possibilities of interlinking these smart devices while making juidicios use of wifi technology. Devices that can use Wi-Fi technology include personal computers, video-game consoles, phones and tablets, digital cameras, smart TVs, digital audio players and modern printers. Wi-Fi compatible devices can connect to the Internet via a WLAN and a wireless access point. Such an access point (or hotspot) has a range of about 20 meters (66 feet) indoors and a greater range outdoors. Hotspot coverage can be as small as a single room with walls that block radio waves, or as large as many square kilometres achieved by using multiple overlapping access points.digital audio players and modern printers. Wi-Fi compatible devices can connect to the Internet via a WLAN and a wireless access point. Such an access point has a range of about 20 meters (66 feet) indoors and a greater range outdoors. Hotspot coverage can be as small as a single room with walls that block radio waves, or as large as many square kilometres achieved by using multiple overlapping access points.

hand, idea was Zigbee was conceived in the year 1999, when it was found that for some long running applications, Wi-Fi and Bluetooth were not prepared. It was launched in the year

Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz) from fixed and mobile devices, and building personal area networks (PANs). Invented by telecom vendor Ericsson in 1994, it was originally conceived as a wireless alternative to RS-232 data cables. Bluetooth is managed by the Bluetooth Special Interest Group (SIG), which has more than 30,000 member companies in the areas of telecommunication, computing, networking, and consumer electronics.

Zigbee is an IEEE 802.15.4-based specification for a suite of high-level communication protocols used to create personal area networks with small, low-power digital radios, such as for home automation, medical device data collection, and other low-power low-bandwidth needs, designed for small scale projects which need wireless connection. Hence, Zigbee is a low-power, low data rate, and close proximity. Its low power consumption limits transmission distances to 10– 100 meters line-of-sight, depending on power output and environmental characteristics. Zigbee devices can transmit data over long distances by passing data through a mesh network of intermediate devices to reach more distant ones. Zigbee is typically used in low data rate applications that require long bonattery life and secure networking (Zigbee networks are secured by 128 bit symmetric encryption keys.) Zigbee has a defined rate of 250 kbit/s, best suited for intermittent data transmissions from a sensor or input device.

In section 2 discusses the comparison between different wireless sensor networks.Section 3 consists of the conclusion.

II.COMPARISON

Comparison between wifi and zigbee:

1. IEEE Standard: Wi-Fi has been standardized under IEEE 802.11.x standard. There are several versions of the protocol where x gets replaced by a, b, g, n etc. which are different versions of Wi-Fi. Zigbee comes under 802.15.4 IEEE standard.

2. Caretaker Alliance: Wi-Fi is managed and its certification process is taken by Wi-Fi Alliance, an independent group constituted by several electronics and communication companies. On similar grounds, Zigbee also has a separate alliance that takes of Zigbee based product development and certification processes.

3. Development Timeline: The idea for Wi-Fi came out as an alternative to ease work of cashier machines in the year 1985. A community to standardize was established in the year 1990 which launched the standard in the year 1997. On the other 2004.

4. Operating Frequency: Wi-Fi is known to work at 2.4GHz,

5GHz, though there have been recent developments where Wi-Fi is working at 60GHz frequency. Zigbee works at 900-928 MHz and 2.4GHz. Besides that Zigbee protocol has a specific frequency of 868 MHz for European countries.

5.Channel Bandwidth: Zigbee protocol based communications have a channel bandwidth of 1MHz while Wi-Fi channels have a bandwidth of 0.3, 0.6 or 2MHz.

6. Network Range: Zigbee is restricted to Wireless Personal Area Networks (WPAN), reaching 10- 30meter in usual applications. Recently, there have been some applications which tend to reach 100m in terms of range. Wi-Fi serves up for PAN and WLAN area networks with an average range between 30 to 100 meters.

7. Data transfer speed: Wi-Fi networks, though faster than Zigbee in terms of data transfer, show variation in terms of speed. Wi-Fi networks defined under 802.11b standard have maximum data transfer speed of 11mbps while a and c versions have 54mbps of maximum data transfer speed. Maximum speed in Zigbee networks is only 250kbps, fairly low than the lowest Wi-Fi offers.

8. Bit Time: It can be defined as time taken to transmit one bit at a given data rate of transfer. Bit time in Zigbee is 4micro seconds while in Wi-Fi it is only 0.00185 micro seconds.

9. Power Consumption: Wi-Fi, though now having a low power version over the horizon, has not been known as a power efficient network. Wi-Fi based devices need a good battery back-up if one wants to use them for more than 10hours or so. On the other hand, Zigbee protocol has been designed for "assemble and forget" manner. These are extremely minimal in terms of power consumption and hence can go on for weeks and months. In general, Zigbee based networks consume 1/4th of the power consumed by Wi-Fi networks.

10. Network Size: A single Wi-Fi based network can have a network size of up to 2007 nodes whereas Zigbee based networks can have over 65,000 nodes in one such network.

11.Network Security: Zigbee protocols use Advanced Encryption Security (AES) methods for encryption and CCB-CCM methods for network International Journal of Computer & Organization Trends –Volume 4 Issue 3 May to June 2014 ISSN: 2249-2593 http://www.ijcotjournal.org Page 66 security. On the other hand, Wi-Fi based networks use WEP, WPA and WPA2 protocols for network encryption and security, respectively

Comparison between wifi and Bluetooth

1. Two wireless connection options that are very common in portable devices are WiFi and Bluetooth. WiFi is a wireless networking solution that allows computers to connect to the network via an access point.

2.Since Bluetooth was developed mainly for the mobile phone industry, it has become fairly common in mobile phones. Its ability to connect peripherals like keyboards and headsets is not possible with WiFi and it is a lot easier and faster to send pictures and other small files via Bluetooth than ''WiFi. Though WiFi has already begun to appear in a few mobile phones, you are more likely to find it in laptops, PDAs, and smartphones where it is often used to connect to the internet via a hotspot. Though it is possible to connect two devices via WiFi, it is a lot more technical and tedious since you would need to define one as an access point so that the other can connect.

3.Because WiFi is meant to provide mobility to its users while staying connected, its radios transmit at high power levels to achieve a long range that can extend up to 300ft. Bluetooth does not require this much distance between two devices, that's why it uses a much weaker radio to achieve 30ft of separation. Bandwidth is essential for WiFi since it provides a connection to the internet or intranet and manufacturers are always trying to find ways to improve the bandwidth even further. Most Bluetooth devices do not require a lot of bandwidth and greater bandwidth would usually result to greater cost. That's why Bluetooth still has a very small bandwidth making it unsuitable for transferring larger files.

III.CONCLUSION

In this paper, we have studied that wireless sensor networks can be used to control and monitor the electrical appliances. WIFI, blutooth and zigbee these wireless network are widely used in indoor home applinces. WIFI having large range in home wireless technology with high data transmission in comparison to Bluetooth and zigbee. In section 2 we have discussed the comparison of WIFI with zigbee and WIFI with Bluetooth in details, Hence WIFI is the best technology for home automation.

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