

APPLICATION OF IOT-WSN IN HOME AUTOMATION SYSTEM: A LITERATURE SURVEY

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Abstract: Life become very simpler and easier in all phases with the improvement of Automation technology. Today, automatic methods are being chosen over manual method. Internet became a part of life, and IoT is the modern and emerging internet skill with the quick increase in the number of users of internet. From industrial appliance to user, IoT is a developing network of everyday object which can share data and complete responsibilities when you are busy with other events. Using IoT with Wireless Home Automation system (WHAS) is a method which control home functions and features automatically through computers or mobile devices. Study of Internet of things (IoT) has become the motivation for years with the enlargement of human-computer interaction skill and development of people's living standards. Smart home system has drawn more and more attention in IoT. This paper is based on wireless sensor network and IoT for home automation which explore the architecture of home automation system with advantages.

Keywords: Wireless Sensor Networks (WSN), Internet of things (IoT), Home Automation.

1. INTRODUCTION

A Wireless Sensor Network (WSN) is a wireless network which consists of distributed and autonomous devices that use sensors to monitor environmental or physical conditions. WSN system is designed by combining nodes or, autonomous devices with a gateway and router. The nodes communicate wirelessly to a central gateway, which provides a connection to the wired world where you can collect, process, analyze, and present your measurement data. You can use routers. To gain a communication link between end nodes we can use routers and for extend distance and reliability in a wireless sensor network we can use gateway. The wireless sensor is networked more scalable and require very little power. It is also smart and also accomplished fast data acquisition, reliable and accurate over the long term, but costs little to purchase and install, and requires nearly zero maintenance.

Fig.1 Shows diagram of sensor node components [3]. The sensor nodes encompasses of sensing unit, processing unit, transmission unit, position finding system, mobilize, power unit. These sensor nodes are scattered in the sensor field. The sensor field is the area where

sensors nodes are deployed. The same diagram shows the communication architecture of WSN. Every scattered sensor node has the capability to collect data and route back to the base station (BS). A BS may be fixed or mobile node and capable of connecting the sensor network to the internet where a user can have access to the reported data.

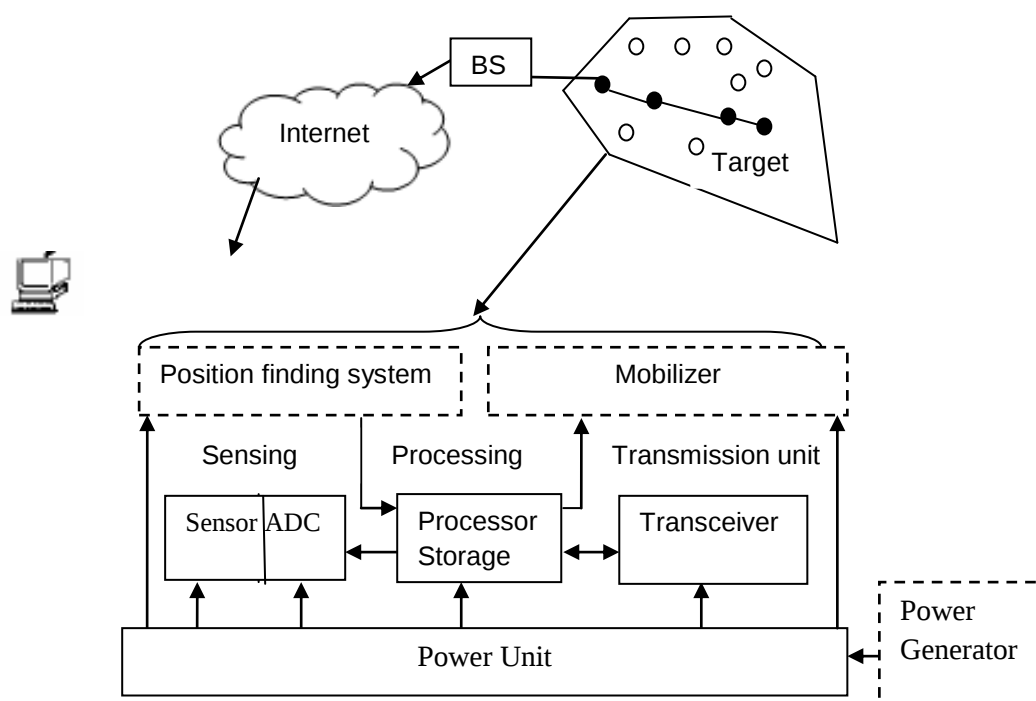


Fig. 1: The component of sensor node

1.1 Sensor nodes

The Sensor nodes sense the data and deliver to the destination. These sensor nodes may do some computation after computation it passes the data to its neighbors nodes or to the Task Manager. In the sensor field, the sensor node can act as a source or destination.

1.2 Gateways

Gateways provide the system managers to interface Motes to personal computers (PCs), existing networks, Internet and protocols. On the internet, gateways act as a proxy for the sensor network. According to [1], gateways can be categorized into active, passive, and hybrid. The sensor nodes actively send the data to the gateway server called as active gateway. Passive gateway controls by sending a request to sensor nodes. Hybrid gateway combines the abilities of active and passive gateways.

1.3 Task Managers

Task Manager connect to the gateways through Internet or satellite link [1]. Task Managers contain the data service and client data browsing and processing. These Task Managers can be imagined as the information recovery and processing platform.

In this paper, we will briefly describe the Application of WSN. In the section 3 concept of IOT are describes. In the section 4 architecture of home automation are discussed and compared. Finally section 5 concludes the survey.

2. APPLICATIONS OF WSN

2.1 Military surveillance and target tracking:

In 1978, WSN originated in military-related research. Sensor networks can be quickly organized for surveillance and used to deliver battlefield intelligence about the location, numbers, movement, and detecting vehicles and troops, and for detection of, biological, chemical and nuclear weapons.

2.2 Environmental Monitoring:

For animal tracking, forest surveillance, flood detection, and weather forecasting environmental monitoring can be used. For applying WSNs, it is a natural applicant because the variables that is considered to be temperature, are distributed over a large region [1][2].

2.3 Health Monitoring:

Wireless sensor network is a foremost application in health monitoring. To track and monitor patients and all medical resources, WSNs embedded into a hospital building. For measuring blood pressure, body temperature and electrocardiograph (ECG) various kinds of sensors are there. When the sensors are worn for healthcare purposes, different kind of sensor network called a body sensor network (BSN) formed.

3. CONCEPT OF INTERNET OF THINGS: IOT

The Internet of Things (IoT) is an atmosphere in which objects, animals or people are make available with distinct identifiers and the capability to transfer data through a network without requiring human-to-human or human-to-computer interaction. 'Internet of Things' defines a number of skills and research disciplines that allow the Internet to reach into the real world of physical objects. Technologies like short-range wireless communications, RFID, ad hoc and wireless sensor networks (WSNs) which is the part of Internet of Things (IoT)[10].. Objects will be well-appointed with some communication abilities, which will be oppressed to manage their action. A common example is books in a library, which having the unique RFID tags, because each book exactly located by a WSN system arranged in the library. This information then served to search engine which is running on a computer sited within the library or even outside. This pattern can be easily prolonged to our houses or offices to acquire the physical location of objects within buildings through a WSN infrastructure connecting the physical world to the Internet domain.

3.1 Advantages of IOT

There are many advantages of incorporating IoT into our lives, which can help individuals, businesses, and society on a daily basis.

- For individuals the concept of IOT can come in many different forms which include health, safety, financially, and daily planning. For an individual and a society, the

combination of IoT into the health care system can be verify to be extremely beneficial. A chip can be applied into each individual which allow for hospitals to display the signs of the patient. By tracking their signs, it can help to indicate whether or not serious valuation is necessary.

- The role of IoT can also be as a tool that can protect people money within their homes. If the home appliances are capable to communicate, they can work in an energy efficient method. So, the IoT can support people with their daily plans.
- From the Internet of Things, businesses can also acquire many benefits. IoT could be valuable in many different types including inventory control and asset tracking, shipping and location, individual tracking, security, and energy conservation.

4. HOME AUTOMATION

Home automation is an extension of building automation. It is automation of the home, household activity, housework. To provide improved convenience, comfort, energy efficiency and security, home automation includes integrated control of lighting, HVAC (heating, ventilation and air conditioning), appliances, safety locks of gates and doors. Home automation provides quality of life for persons who might require care givers or institutional care [10]. In recent year, the reputation of home automation has been increasing greatly because of abundant higher affordability and simplicity through tablet connectivity and smartphone.

In a house, home automation system incorporates electrical devices with each other. The methods integration in home automation include those in building automation and the control of domestic activities, like home entertainment systems, houseplant and yard watering, pet feeding, etc. To allow control by a personal computer, devices may be connected through a home network and allow remote access from the internet.

4.1 Architecture of Home Automation System

Currently the smart home system has turn into inclusive and difficult. Though no matter what is the smart home system, all methods need the network should connect the scattered devices for the operation of centralized control. Thus the main component of the smart home is network configuration. According to the changing behaviors of network, it may be categorized into wired network, wireless network and hybrid network [3].

- **Wired Network:** wired network is the traditional and extensively used smart home network. To established communication network, it uses telephone lines, cable or Ethernet cable and it is capable to guarantee control effects and the signal transmission and through a wired connection agreements. Wired network is not difficult to implement, but only it needs some wiring, that's why the cost of wired network is high. Fig. 2 shows a typical smart home system based on the TCP/IP wired network.

- **Wireless Network:** Infrared connection is the frequently used wireless protocols. Wi-Fi, Bluetooth, and the wireless sensor network signified as Zigbee. The space restrictions of traditional wired networking problems, wireless network may overwhelmed this problem, the device be able to assemble easily in every place of the home for flexible control without negotiating aesthetics.
- **Hybrid Network:** If we apply both wired network and wireless network in the similar system, it creates the system more practical importance by winning advantages of the flexible control of wireless network and the suitability and consistency of wired network for lighting, curtain, door locker and other stationary applications.

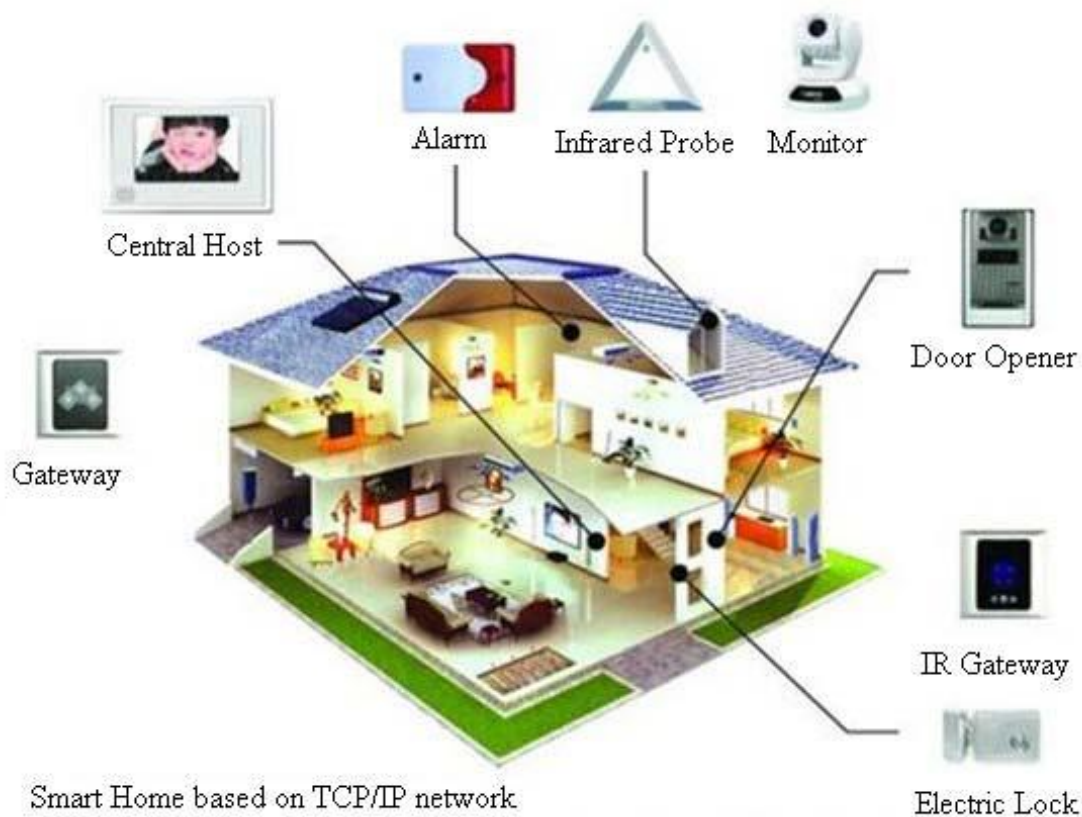


Fig. 2. A smart home system based on TCP/IP wired network

4.2 Advantages of Home Automation System

In home networking, Wi-Fi have become more common in recent years and also in building and home automation systems, the use of wireless network gives numerous advantages that cannot be accomplished using a wired network.

- Minimize installation costs: since no cabling is necessary, installation costs are considerably reduced. Wired network need cabling in which material and the professional laying of cables (e.g. into walls) is costly.

- Structure scalability and informal extension: Because of new or changed necessities, organizing a wireless network is especially beneficial, extension of the network is compulsory. In wired installations cabling extension is monotonous. This makes wireless installations a seminal investment.
- Aesthetical benefits: The attribute supports to full aesthetical requirements, apart from covering a bigger area. Examples include typical buildings with all-glass architecture and historical buildings where designs do not permit placing of cables.

5. CONCLUSION

The Internet of Things (IoT) is an atmosphere in which objects, animals or people are made available with distinct identifiers and the capability to transfer data through a network without requiring human-to-human or human-to-computer interaction. 'Internet of Things' defines a number of skills and research disciplines that allow the Internet to reach into the real world of physical objects. Technologies like short-range wireless communications, RFID, ad hoc and wireless sensor networks (WSNs) which is the part of Internet of Things (IoT)[10]. The home automation using Internet of Things and wireless sensor network works satisfactorily by connecting simple appliances to it and the appliances were successfully controlled remotely through internet. This paper describes the concept of WSN, IoT and architecture of Home Automation.

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