

Study of Wireless Sensor Network

Author Name- Alpna Devi,
College- World Institute of Technology (Gurugram University) Gururgram
Co-Author-C.B Prasad

Abstract

Wireless Sensor Networks (WSNs) is useful technology in the world of sensing technology. WSNs has many applications like as communication system, military, area monitoring, air pollution monitoring, water quality monitoring, landslide detection, forest fire detection. Now a days wireless sensor network technology become basic need of human. Sensor networks operate with minimum power. If power consumption is low then it will survive for longer duration. Wireless sensor network is one type of wireless network. It has number of circulating, self-directed, and low powered device. This device is called the node. Sensor node are fitted with on board. Sensor subsystem, processing system, communication system is part of sensor node. It is also used in confidential purpose like battle field in military. This paper introducing the different application of WSNs, technology used and security aspects.

Keywords: Introduction to WSN, Wireless sensor networks, applications of WSN.

1. INTRODUCTION

WSNs can easily defined by a network of nodes. These nodes sense surrounding environment and establish the interaction between humans or computers. Two types of sensor nodes are used. Homogeneous sensor node and heterogeneous sensor node. Mobile wireless sensor networks (MWSN) are versatile as compared static sensor networks. MWSN give improved coverage increased channel capacity and better energy efficiency.

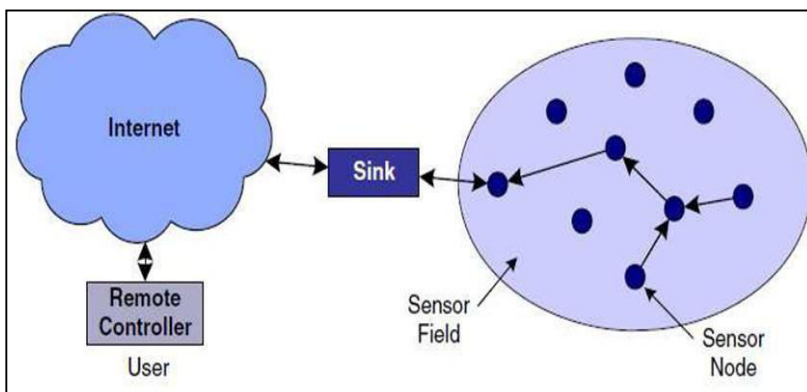


Fig.1 Architecture of a typical WSN

It has widely used in domestic appliance, industrial automatic control and remote Sensing. WSNs has many functions like as data collection, transmission and processing. WSNs has many advantages as compared to traditional wired network. Such as low cost, low power, dissipation, easily organizing network. Bluetooth, wireless local area network (WLAN), infrared are good example of

WSNs.

WSNs are three types. Static sensor network (SSN), Community sensor network (CSN) and Vehicle sensor network (VSN). Location and positioning information can solve using algorithms positioning system (GPS) and local positioning system (GPS). Now a day's new technology developed ZigBee and Zigbee&RFID.

2. WIRELESS SENSOR NETWORKS

Architecture of WSN is very simple. It has sensor node, sink, internet, remote controller. Sensor node sense the environment and collect the information. Now this information transmitted through sink. This information use as locally or connected to other networks. Wireless sensor networks are four types.

- (A) Wireless LAN
- (B) Wireless MAN
- (C) Wireless PAN
- (D) Wireless WAN

(A) Wireless LAN:

This type of technology provide the internet access inside the building. It is used in offices, homes stores and restaurants. Due to COVID-19 Pandemic the use of home networks increased such as students, teachers, office workers.

IEEE 802.11 WAN is the type of wireless LAN.

It works in two mode.

- (a) Infrastructure.
- (b) Ad hoc mode.

In ad-hoc mode mobile unit directly transmit peer to peer. It connects directly. There is no central device. In this mode two types of devices used, one is used for group name and radio parameter. Another is used for connect information to the wireless network.

In infrastructure mode mobile units communicate through a wireless access point (WAP). Basic service set(BSS) use for single access point. Extended service set use for multiple access point.

(B) Wireless MAN:

Wireless Metropolitan area network. WMAN is larger than WLAN. It is spread over several kilometers. Network spread cover a city small region or college campus. WMAN built using several WLANs.

Example of WMAN is cable TV network.

(C) Wireless WAN:

Wireless wide area network is spread over a country or many countries. Many WLANs and WMANs make WWAN.

Example of WWAN is internet.

(D) WPAN:

Wireless personal area network. It is used as computer network for interconnecting electronic devices. It provide data transmission among devices like as computes, smartphones and tablets.

Examples of WPAN are wireless USB, Bluetooth and Zig Bee.

There are different topology used in WSNs. Bus Topology, Circular Topology, Tree Topology, Grid Topology, Star Topology, Ring Topology, Mesh Topology.

There are a lot of challenges to design wireless sensor network.

It should scalable and flexible.

It should good fault tolerance and adaptability.

Wireless medium should error less.

APPLICATION OF WIRELESS NETWORK

WSNs technology used in couple of years in the mine safety, homework industrial and wireless location, Environmental temperature, Landslide detection etc.

Wireless sensor network have following application.

(A) Military applications:

Military intelligence, front line surveillance, investigation and targeting and used in control communications.

(B) Area monitoring:

For monitoring sensor nodes are positional over an area and all activities are display. It notice the temperature, Pressure then a (BSs) base station take action accor3ding to the event.

(C) Agricultural monitoring:

Farming area is monitoring by agricultural monitoring. It is monitor the animals that called animal tracking. It also monitor poultry farm house. It is web based system. Sensor measure the temperature and humidity of the chicken.

(D) Habitat monitoring:

Habitat tells about how a plant or animal naturally grow or live. It prepare a web based graphical data which monitor the pollution because pollution cause negative impact to the health of animal.

(E) Climate monitoring:

Now a days climate change have brought many effects such as increasing in sea water level, glacier melting, lake temperature warming, braking of sea ice and hot waves.

4. CONCLUSION

WSNs technology is useful in various field of human life. Introduction of WSNs technology used WSNs and application of WSNs have discussed in this paper.

WSNs has unique characteristics including low cost, low power consumption. WSNs provide more reliable security technique in the application of military. It is prove that WSNs to be most useful technology.

REFERENCES

- [1] I.F. Akyildiz, S. Weilian, Y. Sankarasubramaniam, E.Cayirci, “A survey on sensor networks”, IEEE Communications Magazine, Vol. 40, Issue (8), pp. 102-114, 2002.
- [2] Samira Kalantary, Sara Taghipour, “ A Survey on architectures, protocols, applications and management in wireless Sensor Networks”, Journal of Advanced Computer Science & Technology, pp. 1-11, 2014.
- [3] KazemSohraby, Daniel Minoli, TaiebZnati, “Wireless Sensor Networks”, Wiley Publications, Second Edition.
- [4] Gaurav Sharma, SumanBala, Anil K. Verma, “Security Frameworks for Wireless Sensor Networks-Review,” 2nd International Conference on Communication, Computing & Security [ICCCS-2012] , No. 6, pp. 978 – 987,2012.
- [5] Muhammad Zahid Khan et al. , “Limitations of Simulation Tools for Large- Scale Wireless Sensor Networks,” Workshops of International Conference