IOSR Journal of Computer Engineering (IOSR-JCE)
e-ISSN: 2278-0661,p-ISSN: 2278-8727
PP 05-08
www.iosrjournals.org

A Study on Wireless Sensor Networks

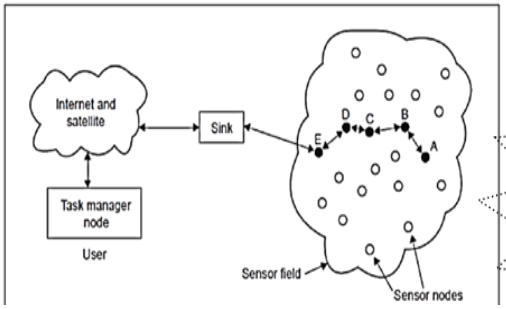
M.Jensila Banu[1], Mrs.S.R.Lavanya[2]
[1](Student, Department of Computer Science, Sri Ramakrishna College of Arts & Science for Women, Coimbatore, India) 16pcs005@srcw.ac.in
[2] (Assistant Professor, Department of Computer Science, Sri Ramakrishna College of Arts & Science for Women, Coimbatore, India)lavanyacs@srcw.ac.in

Abstract: ***Wireless sensor networks*** *(**WSN**) are spatially distributed autonomous* ***sensors*** *to monitor the physical or environmental conditions such as temperature, sound, pressure, etc. It is the collection of large number of sensor nodes in sensor fields. The major application in WSN is like remote environmental monitoring, detections of forest fire and target tracking. This environment is particularly in sensors for recent years that are smaller, cheaper and intelligent. The sensors are associated with wireless interfaces with which the communication takes place with one another to form a network.This paper discuss about wireless sensor networksin addition to that it includes some of the fields in radio networks and also provides new applications for sensing and transferring of information from various environments.*

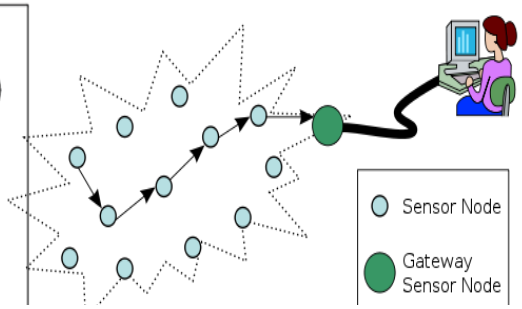
Keywords: *Wireless Sensor Networks Advantages, Applications, Architecture, Characteristics, Design.*

I. Introduction

A wireless network uses wireless data connections to plug network nodes which are not connected by cables. It monitors physical or environmental conditions by using the sensors. A sensor is a device that generates, detects and gives response when there is a change in physical conditions like (Temperature, pressure, light, heat). WSN provides a gateway for wireless connectivity. The sensor fields of sensor nodes that are connected with other wireless devices for communication. WSN were initially used in military applications for surveillance but today it has a large number of applications in many fields like meteorology, agriculture etc.



"Fig.1.1"



"Fig.1.2"

II. Advantages

- **N**etwork arrangements are carried out without immovable infrastructure.
- Reachable places like sea, over the mountains, rural and remote areas and deep forests.
- Pricing execution is inexpensive.
- Plenty of wiring is avoided and flexible.
- Accommodations for the new devices at any time.
- It is opened with centralized monitoring.

III. Applications

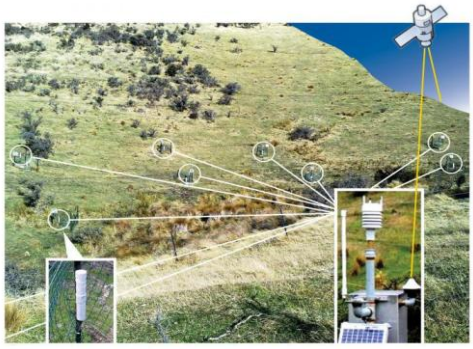
Wireless Sensor Networks arranged in different fields such as agricultural, military, environmental management and medical etc.

3.1 Military Applications

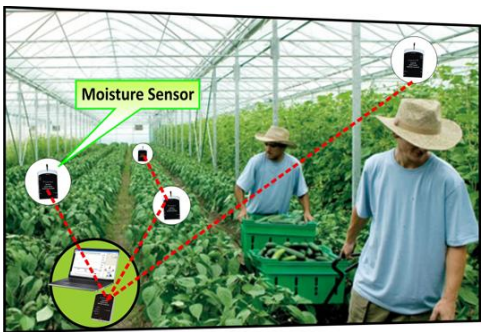
- It monitors friendly forces and equipment.
- Battle damage assessment.
- Nuclear bombs, Biological and Chemical attack detection.

3.2 Environmental applications

- Forest fire and flood detection.
- Precision agriculture.
- Water quality monitoring.



"Fig. 3.1.1"



"Fig. 3.2.1"

3.3 Health applications

- Hospital drug administration.
- Monitoring patient and tracking.
- Human physiological data is telemonitored.

3.4 Home Applications

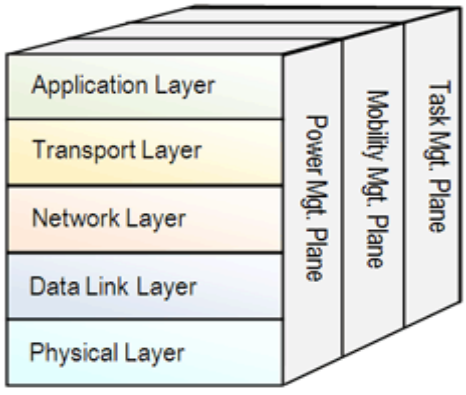
- Automation at home (vacuum cleaners, ovens).
- Smart environment.

3.5 Commercial Applications

- Interactive, detecting and monitoring cars.
- Tracking vehicle and detection.

IV. Architecture

WSN architecture follows OSI Reference Model. Mostly in sensor networks it requires five layers, namely physical layer, data link layer, network layer, transport layer, application layer. The three cross planes are namely power, mobility, and task management. The sensors work is to raise the complete efficiency of the network.



"Fig.4.1"

4.1 Physical Layer

This is the first layer which provides transferring a stream of bits above the physical medium. It is responsible for the selection and generation of carrier frequency, detection of signals, data encryption. It is

typically for wireless sensor networks with less cost, low power consumption, less density, and then the communication range is to improve the battery life.

4.2 Data Link Layer
The second layer includes multiplexing data frame detection, data streams, medium access control & error control and confirms the reliability from point-to- point.

4.3 Network Layer
The main function in this layer is routing, and it has a lot of tasks based on application. The main task is the power conserving, partial memory, buffers, and self-organized. The network layer can be separated into flat routing and hierarchal routing. Otherwise, it can be separated into time, query & event driven.

4.4 Transport Layer
This layer is to deliver the data with congestion avoidance and is exactly needed to contact with other networks. A protocol uses some dissimilar mechanisms for loss recognition and recovery. It provides more efficient energy and it can be separated into Packet and Event driven.

4.5 Application Layer
The function in this application layer is used for traffic management. It mostly offers software for various applications that converts the data to find positive information.

V. Charecteristics

- Power efficiency and Scalability.
- Ease to use.
- Capability to ensure strict environmental conditions.
- Cross-layer design
- Reliability and mobility [1].

VI. Design

6.1 Fault tolerance
The sensor nodes may fail or blocked due to lack of power and physical damage.The failure of nodes should not affect the performance of sensor network.
6.2 Scalability
The number of sensor nodes may be of hundreds or thousands.Depending on the applications, the number may reach an extreme value of millions.
6.3 Production cost
The sensor networks consist of large collections of sensor nodes, the cost of single node gives the overall cost of the sensor networks.

VII. Conclusion

This paper presents about the overview of **Wireless sensor networks** that are designed to meet a number of challenging requirements. The above aspects have been studied and discussed by many researchers.However, the realization of sensor networks needs to satisfy the energy constraints introduced by factors such as fault tolerance, scalability, cost, hardware, topology change, and environment and power consumption. Since these are highly specific for new wireless ad hoc networking techniques .In the future, WSN technologies open up an interesting opportunity to manage human activities in a smart home environment and smart communication. Real-life activities are often more complex than the case studies for both single and multi-user. Future work will focus on the fundamental problem of recognizing activities of multiple users using a wireless body sensor network.

References

[1]. Application and characteristics of wireless sensor networks https://en.wikipedia.org/wiki/Wireless_sensor_network
[2]. WSN definition and its applications https://www.google.co.in/search?q=wsn&oq=wsn&aqs=chrome..69i57j69i60j69i61.1142j0j8&sourceid=chrome&ie=UTF-8
[3]. Wireless Sensor Networks and its Application https://link.springer.com/chapter/10.1007%2F978-3-540-69033-7_10 http://microcontrollerslab.com/wireless-sensor-networks-wsn-applications/
[4]. Architecture of wireless sensor networks https://www.elprocus.com/architecture-of-wireless-sensor-network-and-applications/

[5]. Fred Stann, John Heidemann, -RMST: Reliable Data Transport in sensor networks‖
[6]. Wireless Sensor Networks advantages https://www.researchgate.net/post/What_are_the_advantages_of_cognitive_wireless_sensor_network
[7]. Characteristics of WSN https://wirelessmeshsensornetworks.wordpress.com/2014/02/18/characteristics-of-a-wireless-sensor-networks/
[8]. Wireless Sensor Networks Design for real life deployment http://iopscience.iop.org/article/10.1088/0957-0233/21/12/120101/meta