A Review on different types of Wireless Sensor Networks

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ABSTRACT *The wireless convergence of communication, sensation and cost-effective calculation has produced a new set of intelligent devices and developed a new technology called Wireless Sensor Networks (WSNs) with thousands of devices in self-organization networks. WSNs use sensory nodes in open areas or public places and with a huge number that creates many problems for network researchers and designers to create a suitable design for the wireless network. Problems are security, Data routing, and processing of large amounts of data, etc. This article describes the types of WSN.*

Key words: *Basic knowledge of WSN, Networks, Sensors, MANETs, GPS, GIS.*

I. INTRODUCTION

The Wireless Sensor Network (WSN) is increasingly viewed by the scientific community as the future of environmental monitoring. The idea of automating the collection of physical data to monitor the environment is not new. But WSN allows real-time data processing at minimal cost. Their ability to spontaneously organize into a network makes them easy to implement, expand and maintain sensors have been used in precision farming for years. They are used in convergence with other technologies such as Global Positioning System (GPS), Geographical Information System (GIS), miniature computer components, and automatic control and remote detection. WSN consists of a large number of small detection nodes that communicate wirelessly between them.

By developing technologies and reducing technology costs and reducing the size, sensors are involved in almost all areas of life. Agriculture is one of those domains where sensors and their networks are successfully used to gain many benefits. Agriculture has played a key role in the development of human civilization. Because of the growing demand for food, people are trying to exert additional efforts and techniques to multiply food production. The use of different technologies for agriculture is one of these efforts. Today, information technology is widely used in this area.

The use of wireless sensor networks supports agricultural practices in very positive directions. For varieties of sensor terminology Terminologies are now used as Precision Agriculture, Intelligent Agriculture, Variable Rate Technology (VRT), Precision Agriculture, Global Positioning System (GPS) . WSN is an emerging field of research and development due to the large number of applications that can be significantly beneficial from these systems and has led to the development of cost-effective, low-cost and independent, not usable, also known as node-guided sensors.

These sensor nodes can accept the input from a connected sensor and process the input data collected by the sensor nodes. Then the process data transmits the results wirelessly to the transit network. WSNs are highly distributed light and small wireless nodes distributed in large numbers to monitor the system or environment by measuring physical parameters such as relative pressure, temperature or humidity.

WSNs are similar to mobile ad-hoc networks (MANETs). WSNs also create a network that contains nodes of sensors that connect ad hocly and there is no proper infrastructure for both, but WSNs have data capture with sensor nodes, but MANET may or may not use the sensor nodes. In this article we have described the WSNs, their topologies and their types with the revision of the literature.

2.Types of WSN

Various types of Wireless Sensor Networks are-

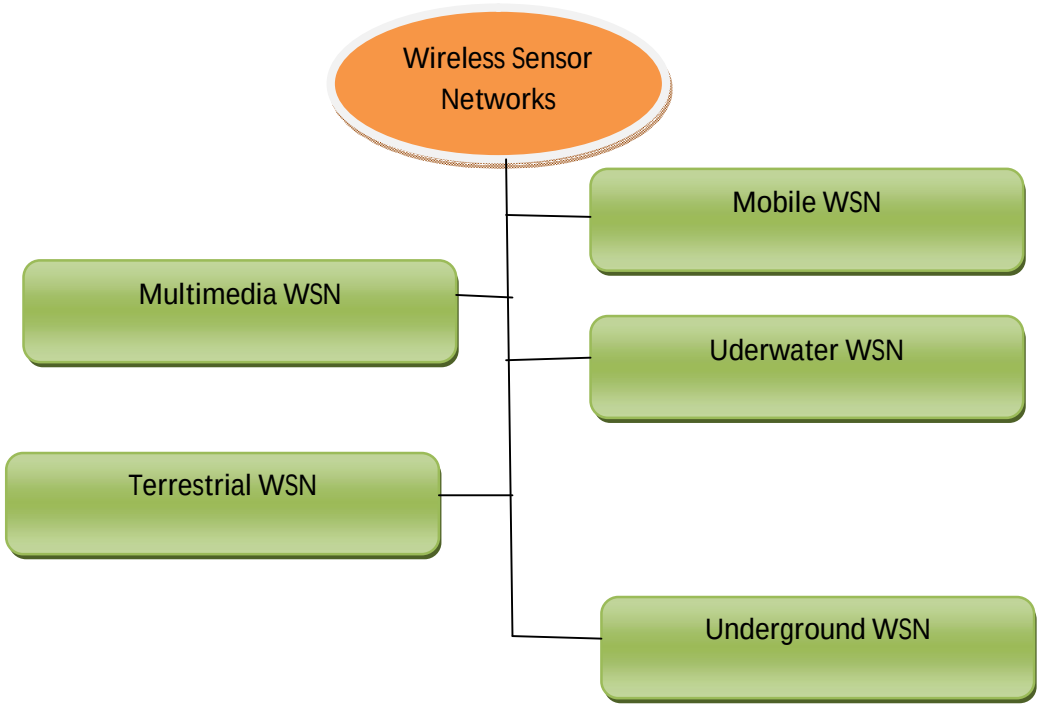
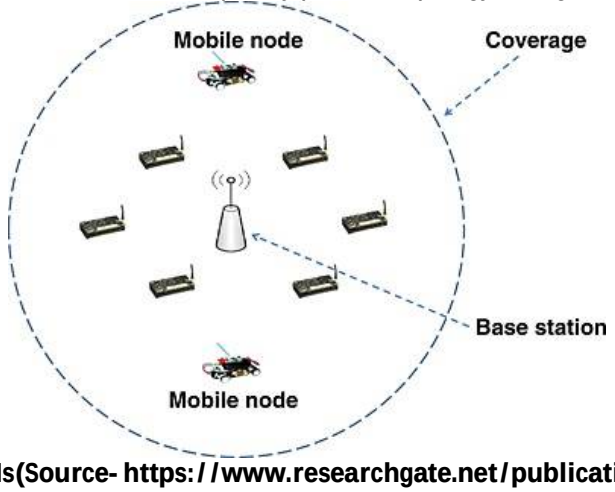


Figure (a)- Types of WSN

(a) Mobile Wireless Sensor Networks (MWSNs)

MWSNs can be defined as WSNs having moving sensor nodes with respect to the WSN, which are commonly used where the sensory nodes are static. MWSNs have more versatility than static WSNs because MWSNs can be used for any scenario and can quickly process topology changes.



Figure(b)-MWSNs(Source- https://www.researchgate.net/publication/259543714)

The normal WSN is simply used with static nodes to achieve monitoring missions in the area of interest, but due to dynamic changes to the environment and hostile events, a pure static WSN can handle the following problems:

(i) The entire network connectivity and full coverage coverage was not possible with WSN, as with robots or aircraft for the enemy area.

(ii) For some special applications as monitoring applications, the network requires larger nodes to cover the entire area, which ultimately increases grid costs.

(iii) Because sensor nodes normally operate with the battery and are subject to errors. The node can be dead when the battery power is over and this causes the break in the sensor network communication and the replacement of new nodes is also a difficult task.

(iv) For some applications, you need some sophisticated sensors to perform some specific military operations that require a camera with each sensor node to collect images that are not possible
Node with separate camera.

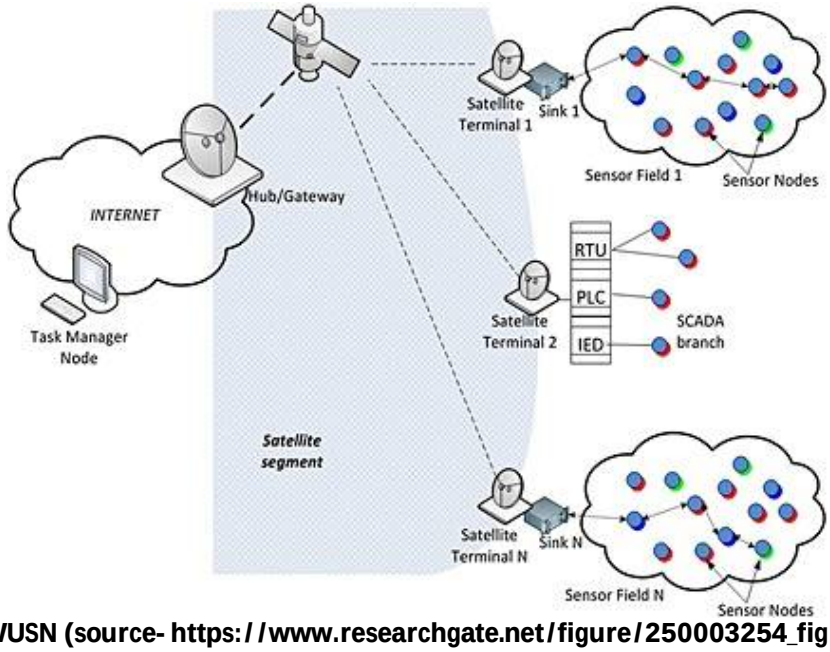
Through the introduction of mobility all the problems listed above can be overcome and many other topics can be covered. We can improve the flexibility and performance of WSN by adding mobile nodes.

2.2. Space-Based Wireless Sensor Networks (SB-WSNs)

Wireless sensor networks are integrated micro-sensors networks for monitoring and capturing data for some of the ambient conditions, ie temperature, vibration, sound, movement and pressure. During low-Earth orbit (LEO) or the implementation of wireless sensor networks within a spatial vessel in individual mission probes or for exchanging electrical wires or as small nodes (sensors) that fly in compact formations and sensors, chemical and physical means of soils, surfaces and atmospheres of other planets. The multipath routing system is a perfect candidate for spatial emissions of micro sensors. WSNs need to be optimized when used for space exploration or the solar system.
Changes must correspond to the space requirements. Design problems such as antenna, software and power selection and design have to be completed by thorough examination of the features of the mission.

The concept of terrestrial wireless sensors (TWSNs) can be applied to space, that is, to the network of satellite sensors. Group the design and enabling technologies of the Pico satellite formations. The idea is to use cheaply

Constellation of sensor counts to gather important information, rather than the same at great cost Satellite. The research, carried out at the Surrey Space Center, was focused primarily on space wettermissions in the lower orbit Future craftsmen are considered miniature, autonomous and distributed.
In this regard, the set of flower constellations is considered to be the best for orbital configuration in nano- and micro-Satellite emissions While there are some emissions in flower constellation related to the positioning satellite, can be solved with inter-satellite communication. Communication problems related to Open Systems Network Network Interconnection (OSI), a space-based wireless sensor network (SB-WSN) summarized.



Figure(c)- WUSN (source- https://www.researchgate.net/figure/250003254_fig11_Figure-7-Collaborative-beamforming-configuration)

2.3. Underwater Wireless Sensor Networks (UWSNs)

Underwater wireless communications is one of the biggest challenges for building UWSN. It has been observed that radio frequencies and acoustic waves (with narrow bandwidth) are greatly attenuated and altered in water. An alternative, but a feasible solution that can be considered is the use of optical communication in the case of a short distance. This approach focuses on a PHY physical layer, taking into account the characteristics of the infrared WLAN (IEEE 802.11) and compatibility with the latest wireless

wireless network protocol, such as IEEE 802.15.5. Compared with the acoustic communication, when using green-blue wavelengths (short distances) optical communication, they provide broadband communication and increased spread in water.

Terrestrial wireless sensors are an active area for development and research. The basic characteristics of these networks are low performance, a number of small cooperating nodes that are able to observe, monitor, and monitor different objects and events within a particular environment. This makes these networks very attractive for a variety of military and industrial applications. Within the global area of the wireless sensor network, underground wireless sensor networks (UWSNs) are an emerging area of wireless search engine applications that are growing steadily. Most UWSN applications can be classified as seismic, monitoring, supported monitoring and navigation, localization reference points, and security applications. During future UWSN applications for attack purposes and unmanned submarines. When it comes to UWSN, there are still so many challenges and challenges, such as power consumption, security and time synchronization, UWSN communication, installation, implementation, power calculation and recovery.

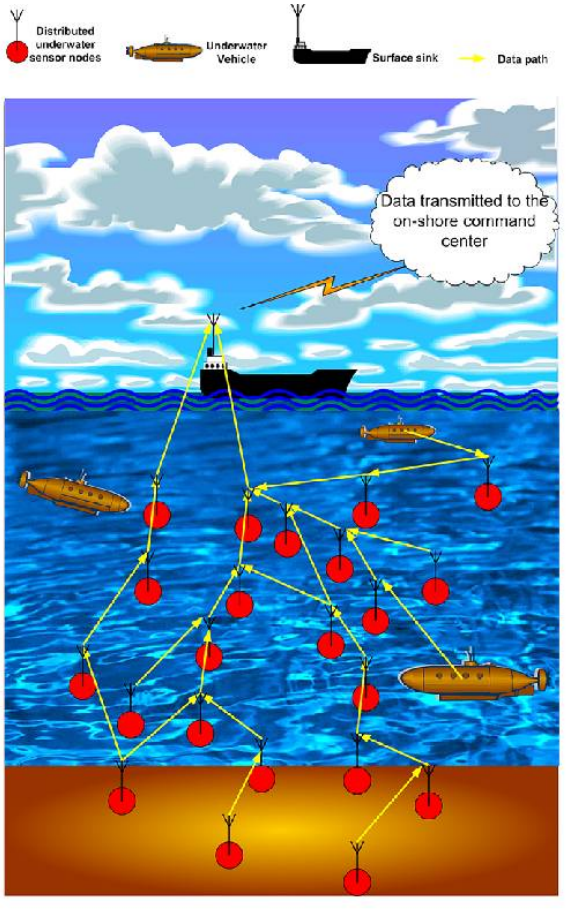


Figure-(d) UWSNs (source-https://www.researchgate.net/publication/222655793)

2.4. Wireless Underground Sensor Networks (WUSNs)

WUSN's probabilistic connectivity was discussed. WUSNs are one of the unique extensions of WSN landers The heterogeneous architecture of the WUSNs network and channel functions, connectivity. The study is much more complicated than in ad-hoc networks and land-based WSNs. This problem of connectivity perhaps not yet addressed. Therefore, a mathematical model has been developed to investigate and investigate the probabilistic connectivity in WUSNs, which is the impact of environmental parameters, ie soil composition and soil moisture, and various system parameters, sensor digging depth, operating frequency, density sensor sensors, Sink height, number of wells and mobility of the above wells and tolerable network ligation. The upper and lower limits for the connectivity probability are calculated systematically. Simulation and survey studies have been conducted while theoretical boundaries have been authenticated and the impact of system parameters and some environmental performance parametershave been explored.

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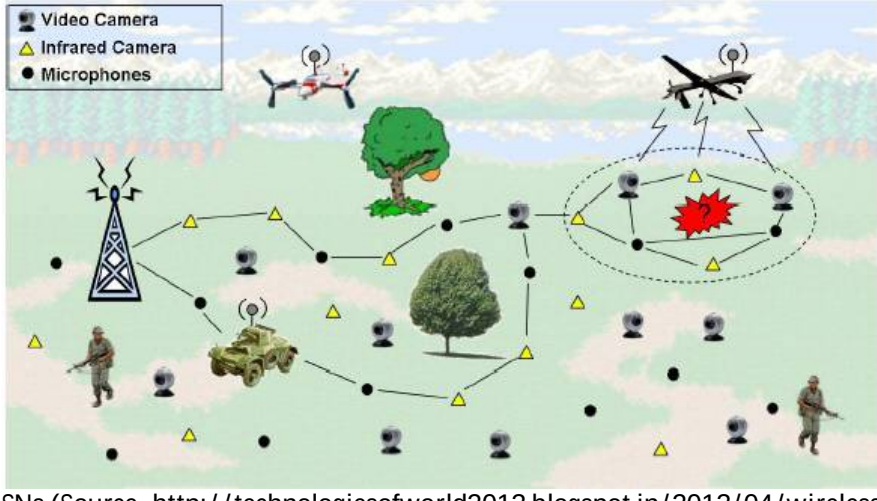
Figure(e)- WUSN (source- http://bwn.ece.gatech.edu/wusn/)

2.5. Terrestrial Wireless Sensor Networks (TWSNs)

In general, ground-based WSNs contain hundreds and thousands of cheap wireless sensor counts that are installed in a specific geographic area. The provision can be made in an ad-hoc network or pre-planned networks based. In the case of ad-hoc networks, sensor nodes can be released from the level and placed anywhere in the target area. In the case of the pre-planned, there are four different positions as follows, raster, Optimal 2-D and 3-D positioning models.

2.6. Wireless Multimedia Sensor Networks (WMSNs)

Networks of wireless multimedia sensors (WMSNs) include small sensor nodes that detect, calculate, implement, communicate and control components. Various applications of the Wireless Sensor Multimedia Networks (WMNs) include target tracking, home surveillance, traffic management and environmental systems Monitoring. These types of applications include the effective communication of event and event functions in multimedia format, namely picture, audio and video. Wireless Network Sensor Network (WMSN) is a new Wireless Sensor Networks (WSN) device because multimedia data streaming, bandwidth, memory, and power require low latency, so WMSN requires much attention. To date, several routing protocols have been proposed for the communication of relevant data in WSNs. Typically, in WSNs, routing algorithms designed to track small scalar data for a relatively short time interval. The core components of the WSNs routing protocol are the use of hop minima, maximizing available power, low latency and reduced traffic load, finding more than one way to the destination, and so on. In the case of sensor networks, another important concern is the creation of holes due to the fact that during the routing the nodes near the destination are used more frequently, so that the batteries of such nodes run out in advance. Thus, these nodes have not transmitted the sensor information to the base station.



Figure()-WMSNs (Source- http://technologiesofworld2013.blogspot.in/2013/04/wireless-multimedia-sensor-networks.html

3. Conclusion

Networks are routed from wired to wireless, but wireless networks are expensive, but in wireless networks. WSNs grow day by day and hot field in the search field. WSNs are convenient because it saves that Energy with small sensors from low-power sensors, which make it popular with the addition of other different properties. WSNs have a variety of functions and types that can accommodate many problems that occur in different scenarios.The only need is choosing the right approach to the right place to get the most benefit WSN and its types.

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