Literature Survey on Wireless Sensor Networks

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***Abstract*-- This paper gives an essential data of wireless sensor networks and challenges, architecture, requisitions and design factor like versatility, shortcoming tolerance, production cost, fitting demands etc.**

Keywords— WSN, fault tolerance, sensor node, sensor hub.

I. INTRODUCTION

Wireless sensor network is a wireless consisting of large number of distributed low power and in expensive device. Sensor nodes are expecting to be battery operated. Sensor nodes have the following resource constraints Communication Power consumption, Computation, Uncertainty in sensor readings**.** A Wireless Sensor Network is a self-configuring network of small sensor nodes communicating among themselves using radio signals, and deployed in quantity to sense, monitor and understand the physical world. Since vast number of sensor hubs is thickly sent, neighbor hubs may be near one another. Thus, multi hop correspondence in sensor systems is required to devour less power than the conventional single bounce correspondence. Moreover, the transmission force levels could be kept low, which is very fancied in incognito operations. Wireless Sensor nodes are called **motes**.

A wireless sensor network (WSN) has important applications such as remote environmental Monitoring and Have a wide range of potential have applications to industry, science, transportation, civil infrastructure, and security Habitat and Ecosystem Monitoring, Monitoring Groundwater Contamination, Rapid Emergency Response, Industrial Process Monitoring, Perimeter Security and Surveillance, Automated Building Climate Control.

This has been widely used in recent year cause of, sensors that are smaller, cheaper, and intelligent. In this some factor which are open for research issues that can be explored for future work. The design factors like

Fault Tolerance: Singular hubs are inclined to startling disappointment with a much higher likelihood than different sorts of systems. The system ought to support data spread disregarding disappointments.
Scalability: Number in the request of hundreds or thousands. Conventions ought to have the capacity to scale to such high degree and exploit the high thickness of such systems.
Production Costs: The expense of a solitary hub must be low, significantly short of what $1.
Hardware Constraints: A sensor hub is contained numerous subunits (sensing, preparing, correspondence, force, force rummaging and activate). All these units joined together must devour greatly low power and be held inside an amazingly little volume.
Sensor Network Topology: Must be kept up even with high hub densities.
Environment: Hubs are working in difficult to reach areas either in light of antagonistic environment or on the grounds that they are inserted in a structure.

WSNs have the potential to enhance and change the way people interact with technology and the world. The direction of future WSNs lies in identifying real business and industry needs. Interactions between research and development are necessary to bridge the gap between existing technology and the development of business solutions. Applying sensor technology to industrial applications will improve business processes as well as open up more problems for researchers.

II. APPLICATION OF WIRELESS SENSOR NETWORKS

WSN benefit from the advances in computing technology, which led to the production of small, wireless, battery powered, smart sensor nodes. These nodes are active devices with computing and communication capabilities that not only sample real world phenomena but also can filter, share, combine, and operate on the data they sense.

A. Habitat and Environmental Monitoring for Scientific Applications

The periodic information retrieval required by most of the habitat and environmental applications can be performed, in most of the cases, only by means of WSN. WSN enable regular observation of the environment without invading the environment of plants and animals and make possible a 24-hour monitoring. **The PODS project** developed a sensor-network to study the biology of typical rare plant species and the habitats they occupy in Volcanoes National Park in Hawaii. The WSN is used to collect measurements of the temperature, humidity, rainfall, wind, and solar radiation in the habitat of the rare species.

The Great Duck Island Habitat Monitoring project is a pilot application for monitoring migratory seabirds (Leach's Storm Petrel) on Great Duck Island, Maine. The WSN was used to monitor the microclimates in and around nesting burrows. Eventually, data is transferred via satellite to the database at the University of California at Berkeley. Intel and the University at Berkeley proposed WSN for creating a macroscope (sensor nodes strapped at different elevations on a redwood tree) to study the microclimate around redwoods.

The Envisense GlacsWeb project uses WSN for monitoring the glacial environment to study sub glacial bed deformations by collecting measurement samples via pressure, temperature, and orientation sensors and delivering them to a base station located on the glacier surface, from which they are delivered to the sink.

B. Monitoring for Civilian Applications

Forest fire detection, flood detection, and precision agriculture. Alarms, propagated by multihop through the WSN, enable a quick reaction before the fire becomes uncontrollable.

*Health monitoring***:** WSN can be used as part of a health monitoring system that can be worn by the patient. CodeBlue system developed at Harvard University exploits a WSN to raise an alert when vital signs fall outside of the normal parameters. The system monitors heart rate, oxygen saturation, and EKG data and relays the data over a short-range wireless network to a set of devices, including ambulance-based terminals.

Tracking applications: Instead of sensing environmental data, sensor nodes are deployed to sense the presence of persons and objects. In the simplest case, objects can be tracked by tagging them with a small sensor node. The sensor node is tracked as it moves through a field of sensor nodes that are deployed in the environment at known locations. The sensor nodes can be used as active tags that announce the presence of a device.

Intelligent home environment: The smart home can communicate with the environment and people through the use of sensors and can act upon the environment through the use of actuators.

Localization applications: For example, detecting and locating snipers is a challenging goal for armed forces and law enforcement agencies. Most successful sniper-detecting systems are based on exploiting a WSN that takes measurements of the acoustic events generated by a shot: the spherical wave (traveling at the speed of sound) produced by the muzzle blast and the shock wave generated by the supersonic projectile. By exploiting the measurements of acoustic events taken by the sensor network nodes, it is possible to determine the sniper's location and the bullet's trajectory.

Monitoring the aquatic environment: The underwater wireless sensor network have applications including the scientific (e.g., oceanographic data collection for scientific exploration, pollution control, or climate monitoring), military (e.g., tactical surveillance), and civilian fields (e.g., tsunami warnings).

III. WSN ARCHITECTURE

A WSN typically has little or no infrastructure. It consists of a number of sensor nodes (few tens to thousands) working together to monitor a region to obtain data about the environment. There are two types of WSNs: structured and unstructured. An unstructured WSN is one that contains a dense collection of sensor nodes. The advantage of a structured network is that fewer nodes can be deployed with lower network maintenance and management cost. Fewer nodes can be deployed now since nodes are placed at specific locations to provide coverage while ad hoc deployment can have uncovered regions

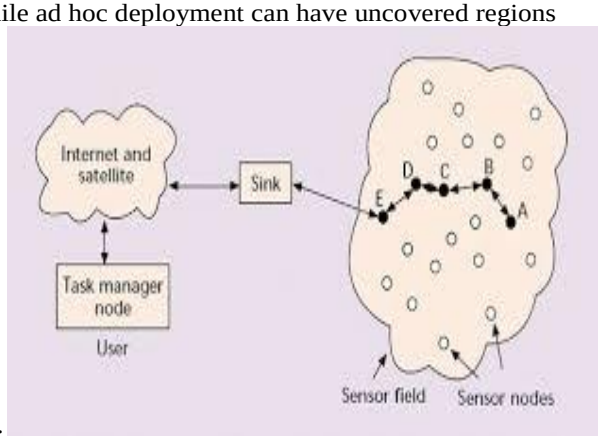

Fig: Basic Structure of WSN

The sensor hubs are normally scattered in a sensor field as demonstrated in Fig. Each of these scattered sensor hubs has the proficiencies to gather information and course information once more to the sink and the end clients. Information are directed once again to the end client by a multi bounce framework less construction modeling through the sink as demonstrated in Fig. The sink may correspond with the errand chief hub through Web or Satellite. This sensor hub purported WINS is created in,

where a conveyed system and Web access is given to the sensor hubs, controls, and processors. Since the sensor hubs are in extensive number, the WINS systems exploit this short separation between sensor hubs to give multi bounce correspondence and minimize power utilization. The route in which information is steered once again to the client in the WINS systems takes after the structural engineering Determined in Fig. The sensor hub that is WINS hub, catches the natural information, and the information is steered jump by bounce through the WINS hubs until it achieves the sink, i.e., a WINS portal. So the WINS hubs are sensor hubs A, B, C, D, and E as indicated by the building design in Fig. The WINS passage corresponds with the client through customary system administrations, for example, the Web.Some challenge for Wireless sensor network like Scalability, Heterogeneity, Systematic Design, Privacy and Security Energy Efficiency, Responsiveness, Robustness, Self-Configuration and Adaptation

IV CONCLUSION

WSN are a widely applicable, major emerging technology. They bring a whole host of novel research challenges pertaining to energy efficiency, robustness, scalability, self-configuration, etc. These challenges must be tackled at multiple levels through different protocols and mechanisms. It's an interesting complex, new technology. Lots of research still to be done existing partial solutions offers much hope for the future, but much work remains to be done.

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