

Architecture and Application of Wireless Sensor Network

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ABSTRACT

Wireless sensor network (WSN) refers to a group of spatially dispersed and dedicated sensors for monitoring and recording the physical conditions of the environment and organizing the collected data at a central location. A WSN consists of sensor nodes. The sensor node equipment includes a radio transceiver along with an antenna, a microcontroller, an interfacing electronic circuit, and an energy source, usually a battery. The size of the sensor nodes can also range from the size of a shoe box to as small as the size of a grain of dust. As such, their prices also vary from a few pennies to hundreds of dollars depending on the functionality parameters of a sensor like energy consumption, computational speed rate, bandwidth, and memory.

Keyword: - Sensor network, security, attack, communication protocol, defense.

1. Introduction

A Wireless sensor network can be defined as a network of devices that can communicate the information gathered from a monitored field through wireless links. The data is forwarded through multiple nodes, and with a gateway, the data is connected to other networks like wireless Ethernet's is a wireless network that consists of base stations and numbers of nodes (wireless sensors). These networks are used to monitor physical or environmental conditions like sound, pressure, temperature and co-operatively pass data through the network to a main location. It is a rapidly emerging field which will have a strong impact on research and will become an integral part of our lives in the near future. The huge application space of WSNs covers national security, surveillance, military, health care, environment monitoring and many more.

2. Sensor Network Communication Architecture

The sensor nodes are usually scattered in a sensor field. Each of these scattered sensor nodes has the capabilities to collect data and route data back to the sink and the end users. Data are routed back to the end user by a multi hops infrastructure less architecture through the sink. The sink may communicate with the task manager node via Internet or Satellite. The task manager or base station is centralized point of control within the network, which extracts information from the network and disseminates control information back into the network. It also serves as a gateway to other networks, a powerful data processing/storage center and an access point for a human interface. Hardware-wise the base station is either a laptop or a workstation.

3. Application of WSN

Wireless sensor network are being deployed widely and they give an economical solution to many problems. In this section, we give a nice survey on applications of Wireless Sensor Networks. Here are some typical and promising applications of WSN.

3.1 Agriculture Monitoring:

Precision agriculture is one of the most promising application domains where Wireless Sensor Networks can deliver a feasible or even optimal solution to monitor moisture, humidity, temperature etc. In precision agriculture, more number of the parameters are to be controlled. They are increasing day by day because of the development in

agriculture technology. In this situation, the Wireless Sensor Network with additional hardware and software is an efficient solution.

3.2 Industrial Monitoring

Wireless Sensor Network technology has demonstrated a great potential for industrial applications, specifically in monitoring data such as pressure, humidity, temperature, flow, level, viscosity, density and vibration. Measurements can be collected through sensing units and transferred wirelessly to a main system for operation and management. Adopting WSNs for process monitoring provides great advantages over traditional wired system.

3.3 Environmental Monitoring

Environmental degradation has become one of the biggest concerns for almost every country. Water and air quality are essential to maintain the equilibrium between human development and a healthy environment. The solution proposed for this is an environmental monitoring system based on a Wireless Sensor Network. Wireless Sensor Networks are widely used in monitoring pollutions like air, water etc. It can be deployed in several cities to monitor the concentration of dangerous gases for citizens.

4. CONCLUSION

In this paper we presented wireless sensor network, security requirement and different type of attack and their prevention mechanism at different layered protocol stack of wireless sensor network. This paper gives brief introduction of WSN, sensor network communication architecture and some application of wireless sensor network.

6. REFERENCES

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