Wireless Sensor Network Using Zig-Bee Technology

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***Abstract*- In today's world sensor is present everywhere. Wireless sensor network use this sensor to sense the minute change in the environment. This system has opened a lot of new door. And have a variety of application. WSN communicates with this sensor; centralize this information responds and alert control.**

This paper is an overview wireless sensor network using zig bee technology. Sensors (nodes) are highly limited in power computation, and storage capacities. WNS uses different sensor for sensing environment changes such as earth quack, avalanche, tsunami, etc. detection, industrial process control, war field monitoring, etc.

Keywords: Types of wireless sensor network, Zig Bee Technology, Sensor, Topology,

I. INTRODUCTION

Wireless sensor network (WSN) refers to a group of specially designed and dedicated sensors for inspection and recording the physical conditions of the environment and structured the collected data at a central location. Wireless sensor network means the network which contains many and different types of sensor and they are communicating wirelessly [1]. WSN can be structures in two ways they are as following 1. Unstructured WSN: it has dense collection of nodes, ad-hoc deployment, and it may leads to create difficulty in network maintenance. 2. structured WSN: few and scarcely distributed nodes, full network will be pre planed, so the lower maintenance required for this network. Main reasons of using the WSN are they avoid excessive wiring, its maintenance is so easy, it access through centralized system, and any new device can accommodate to it.

This sensor network process in three parts firstly we can send any value from sensor second we can use any kind of protocol to communicate with this information and finally we have the external system to save the data.

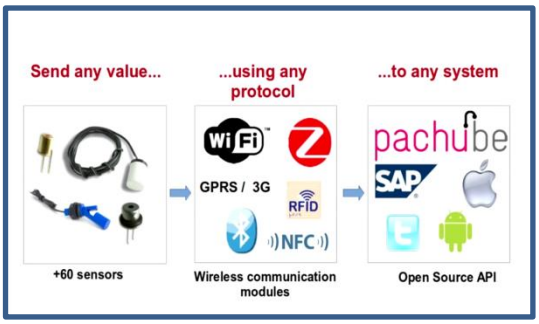

Fig.1. basic structure of WSN

II. Types of wireless sensor network

Terrestrial WSNs

Terrestrial WSNs are capable of communicating base stations efficiently, and consist of hundreds to thousands of wireless sensor nodes deployed either in unstructured (ad hoc) or structured (Pre-planned) manner. In an unstructured mode, the sensor nodes are

randomly distributed within the target area that is dropped from a fixed plane. The pre-planned or structured mode considers optimal placement, grid placement, and 2D, 3D placement models.

In this WSN, the battery power is limited; however, the battery is equipped with solar cells as a secondary power source. The Energy conservation of these WSNs is achieved by using low duty cycle operations, minimizing delays, and optimal routing, and so on [3].

Underground WSNs

The underground wireless sensor networks are more expensive than the terrestrial WSNs in terms of deployment, maintenance, and equipment cost considerations and careful planning. The WSNs networks consist of a number of sensor nodes that are hidden in the ground to monitor underground conditions. To relay information from the sensor nodes to the base station, additional sink nodes are located above the ground.

Under Water WSNs

More than 70% of the earth is occupied with water. These networks consist of a number of sensor nodes and vehicles deployed under water. Autonomous underwater vehicles are used for gathering data from these sensor nodes. A challenge of underwater communication is a long propagation delay, and bandwidth and sensor failures.

Under water WSNs are equipped with a limited battery that cannot be recharged or replaced. The issue of energy conservation for under water WSNs involves the development of underwater communication and networking techniques.

Multimedia WSNs

Multimedia wireless sensor networks have been proposed to enable tracking and monitoring of events in the form of multimedia, such as imaging, video, and audio. These networks consist of low-cost sensor nodes equipped with microphones and cameras. These nodes are interconnected with each other over a wireless connection for data compression, data retrieval and correlation. The challenges with the multimedia WSN include high energy consumption, high bandwidth requirements, data processing and compressing techniques. In addition to this, multimedia contents require high bandwidth for the contents to be delivered properly and easily.

III. SENSOR

The sensor node is one of the main parts of a WSN.

The hardware of a sensor node generally includes four parts: the power and power management module, a sensor, a microcontroller, and a wireless transceiver. The power module offers the reliable power needed for the system [6].

The sensor is the bond of a WSN node which can obtain the environmental and equipment status. A sensor is in charge of collecting and transforming the signals, such as light, vibration and chemical signals, into electrical signals and then transferring them to the microcontroller. The microcontroller receives the data from the sensor and processes the data accordingly. The Wireless Transceiver (RF module) then transfers the data, so that the physical realization of communication can be achieved.

It is important that the design of the all parts of a WSN node consider the WSN node features of tiny size and limited power.

IV. ZIG BEE TECHNOLOGY

Zig bee Technology is a Wireless Communication Standard that defines a set of protocols for use in low data rate, short to medium range wireless networking devices like sensors and control networks. The target of Zig bee Technology is low cost, low power, battery operated wireless sensors that do not

need to constantly update its status and also allows sleep mode or low power mode for its electronics and radio. Zig bee Technology is based on IEEE 802.15.4 Standard Zig bee Technology is based on IEEE 802.15.4 Standard Zig Bee has the following features. Zig Bee uses a variety of power-saving modes to guarantee that it could be used for at least six months to two years powered by two AA batteries[2][5].

V. TOPOLOGY

Power of sensor network nodes is usually provided by batteries, so the transmission distance of WSN nodes is short. The transmission distance can be up to 800 to 1 000 meters in the open outdoor environment with line of sight.

It will sharply decline in the case of a sheltered Indoor environment to an estimated few meters .In order to expand the coverage of a network, the sensor network uses multi-hop transmission mode. That is to say the sensor network nodes are both transmitter and receiver. The first sensor network node, the source node, sends data to a nearby node for data transmission to the gateway.

The nearby node forwards the data to one of its nearby nodes that are on the path towards the gateway.

VI. ARCHITECTURE ISSUES

Due to limited battery life power now the efficiency is the most important aspect in sensor network. Depending on the need different topology can be implemented. Security should be maintained and Maintenance should be done on a regular interval. The data processing unit must be capable to handling traffic and must provide a very response.

VII. APPLICATIONS OF WSN

Wireless sensor network introduces us a new concept in our life which is a smart cities. As smart cities permits us to know several information such as city pollution, noise points smart, smart lighting management and many application.

Generally, a WSN consists of a number of sensor network nodes and a gateway for the connection to the internet. The general deployment process of a WSN, the sensor network nodes broadcast their status to the Surroundings and receive status from other nodes to detect each other. Secondly, the sensor network nodes are organized into a connected network according to a uncertain topology (linear, star, tree, mesh, etc.). Finally, suitable paths are computed on the constructed network for transmitting the sensing data. The

Sum of the applications offered by the sensor network are as following:

Smart cities:

- **Air pollution and radiation level**: in this application sensors will monitor the dangerous gasses, CO level in the air. Even monitors and generate leakage alerts the radiation dose and radionuclide contamination which mainly found near nuclear power station [7].
- **Traffic congestion and street light management**: it monitors vehicles and pedestrian affluence to optimize driving and walking routes.
- **Structural health monitoring**: this application monitors the vibration and material conditions in buildings, bridges and historical monuments.
- **Water quality and water leakage**: study of water which is suitability in rivers and sea farming and eligibility for drinking use. Detection of liquid Pressure outside tanks and pressure variations along pipes.

VIII. CONCLUSION

In this article we have tried to give an overview of sensors network which are communicating wirelessly (WSN) and connecting different areas of sensing using

zig-bee protocol. Description of applications based on the wireless sensor network (WSN) using the same protocol.

IX. REFERENCES

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