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Design Analyze and Implement Wireless Sensor Network Performance

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Abstract --- Wireless sensor networks (WSN), also known as sensor and actuator networks (WSAN) are spatially distributed autonomous sensors to monitor physical or environmental conditions, such as temperature, sound, pressure, etc. and to cooperatively pass their data through the network to a main location. The more modern networks are bi-directional, also enabling control of sensor activity. The development of wireless sensor networks was motivated by military applications such as battlefield surveillance; In today such networks are used in many industrial and consumer applications, such as industrial process monitoring and control, machine health monitoring, etc.These Sensor Nodes communicate with each other through various protocols. The problem of the conventional method is, during gathering of sensed data each node transmits its sensed data directly to the base station for which it will deplete its power quickly. In hierarchical structure higher energy nodes are used to aggregate and send the information whereas low energy nodes are used to sense the data. This is an energy efficient routing protocol which improves network lifetime Example- LEACH, TEEN, A.PTEEN. Among them clustering based hierarchical protocol, proves to be most feasible for energy efficient routing in wireless network. Some of them are LEACH (Low energy adaptive clustering hierarchy) PEGASIS (Power efficient gathering in sensor information system) TEEN (Threshold sensitive energy efficient sensor network protocol) APTEEN (Adaptive threshold sensitive energy efficient sensor network protocol).
Keyword --- APTEEN, Bi-directional, Clustering, LEACH, TEEN, WSN

I. INTRODUCTION

The Wireless Sensor Network (WSN), a specialized network, consists of two main components: Sensor Nodes and Base Station. The nodes monitor various environmental conditions such as temperature, pressure, sound and share (wirelessly) the information obtained with either the base station or amongst various nodes. WSN is foreseen to be appropriate solutions to many applications in fields of defense, industry monitoring, health monitoring, etc. A military example is the use of sensors detect enemy intrusion; a civilian example is the geo-fencing of gas or oil pipelines The medical applications can be of two types: wearable and implanted. Wearable devices are used on the body surface of a human or just at close proximity of the user. The implantable medical devices are those that are inserted inside human body. There are many other applications too e.g. body position measurement and location of the person, overall monitoring of ill patients in hospitals

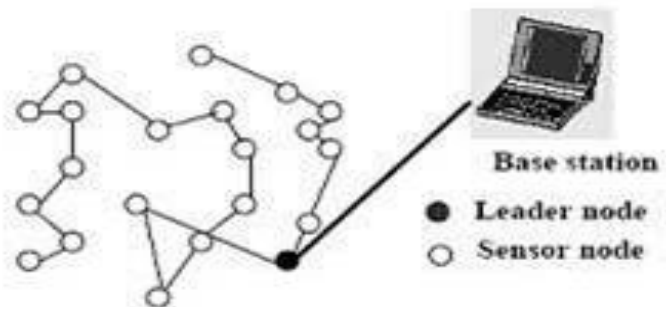

Fig 1.1

and at homes. Body-area networks can collect information about an individual's health, fitness, and energy expenditure. There are many applications in monitoring environmental parameters, examples of which are given below. They share the extra challenges of harsh environments and reduced power supply.

II. EXISTING SYSTEM

In the previous system the PEGASIS (Power-Efficient Gathering in Sensor Information System), is near optimal chain-based protocol for extending the lifetime of network. In PEGASIS, each node communicates only with a close neighbors, performing a chain, elect a leader from the chain who collects the data from the neighbors to be transmitted to the base station. As a result the average energy spend by each node per round is reduced and to lower the bandwidth requirement. By using certain algorithm we can propose the shortest path of transmission of data to the base station. As a result less power consumption can be achieved to increase efficiency and life time of the network.
Emphasis has been done on the cluster-based routing protocols in wireless sensor networks. Based on observations, it has been concluded that in PEGASIS protocol the cluster head election procedure depends on residual energy and threshold value. Once the cluster head selection process is completed then the data transmission procedure takes place. Primarily, the PEGASIS protocol is very much useful in disaster management field.

III. PROPOSED SYSTEM

A. TECHNIQUE

In our protocol a network field consist of base station, selection of chain leader and cluster head. Based on residual energy and distance chain leader and cluster head are elected.

INITIALIZATION PHASE

The 'N' nodes in the network and are denoted by numbers starting from 1 to N. The nodes are at first distributed randomly in the play field, The destination node/sink node initiate session by broadcasting hello packet to all node in the domain, the hello packet contains details of base station such as the coordinate values(x,y) to declare its base station location and distance between each node in the network, all nodes which are in the range and alive will receive the hello packet, so the coordinate of the sender(sink node) will entered to the routing entry corresponding to that node. And each node will memorize the coordinates of the BS.

CHAIN LEADER SELECTION PHASE

After the event detection, the node which is more closed to the particular event become Chain leader at a time, Then the Chain leader node will broadcast the interest packet to all nodes which are not beyond its position from the base station, the interest packet request every received node to declare its node id, location and residue energy value, those alive node will respond back the packet to the Chain leader and un alive node will be noted as the dead node. Then the source node will be compare the its residue energy value with the rest, and the node with high residue will be selected as the leader node at a time

CLUSTER HEAD SELECTION PHASE

The data gathering process begins once the Cluster head selected and the nodes becoming the starting point for the chain formation. In every data gathering cycle each node in the network forms a data packet of its own. Chain formation is a bottom-top approach.

DATA TRANSMISSION PHASE

For every data gathering cycle a cluster head is elected among all the nodes within the shortest path to Cluster head, during a data gathering cycle each node in the network receives a data packet from its neighboring node fuses it with its own data packet and transmits it to its other neighbor in the selected path, until it reach the Cluster head node which will transmit to the Chain leader which will further transmit it to base station and complete the cycle.

ANALYSIS

Evaluating performance and observing the number of node involve during the chain formation through simulation result obtain .Simulation are conducted using network simulator frame work with more than x nodes deployed on the network field, the wireless channel is used because the nodes deployed on the network are communicating based on the wirelessly based on the distance and the transmission range, residual energy.

B. SCOPE OF THE PROJECT

Area monitoring is a common application of WSNs. In area monitoring, the WSN is deployed over a region where some phenomenon is to be monitored. A military example is the use of sensors detect enemy intrusion; a civilian example is the geo-fencing of gas or oil pipelines The medical applications can be of two types: wearable and implanted. Wearable devices are used on the body surface of a human or just at close proximity of the user. The implantable medical devices are those that are inserted inside human body. There are many other applications too e.g. body position measurement and location of the person, overall monitoring of ill patients in hospitals and at homes. Body-area networks can collect information about an individual's health, fitness, and energy expenditure. There are many applications in monitoring environmental parameters, examples of which are given below. They share the extra challenges of harsh environments and reduced power supply.

- It has near optimal chain based protocol for extending the lifetime of network.
- Average energy speed by each node per round is reduced and to lower the bandwidth requirement
- Less power consumption.

IV. FUTURE SCOPE

Wireless sensor networks represent a very interesting multidisciplinary field of research, characterized by a very large number of possible applications. Their main advantage is the ability to be applied to any field, and in any environment unlike standadnih networks that for its application require substantially stringent conditions. Future scenarios "Are Aware of the World" or "Internet of Things" are as real scenarios, and there are good chances to achieve in the next ten years. All authors have also pointed to the increasing technological challenges. Sensor networks can provide in the future a very heterogeneous data: images, sound, distance, acceleration, and perhaps smell, taste, etc. In future, sensor network will be everywhere in order to make future technologies/environment/infrastructure as smart as possible as

IV. CONCLUSION

Wireless Sensor Networks are categorized into proactive and reactive sensor networks. In Proactive sensor networks, nodes at regular intervals switch on their sensors and transmitters, sense the atmosphere and transmit the data on hand with them. Wireless Sensor Network nodes are battery supplied which were implemented to carry out a specific assignment for a comprehensive period of time may be years. If WSNs nodes are more powerful or mains supplied devices in the surroundings, it is useful to utilize their computation and communication resources for complex algorithms .The purpose of this project is to eliminate the overhead of dynamic cluster formation, limiting the number of

transmission to Base Station (BS) per round. As a result less power consumption can be achieved to increase efficiency, life time of the network and useful in disaster management field.

- To apply clustering algorithm
- To be energy aware and location aware
- To do the computations well in advance

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