Fast Data Collection in Ring Based Wireless Sensor Network

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Abstract—How fast can information be collected from a wireless sensor network organised as a ring? To solve this problem we evaluate number of techniques using various simulation models. We want to eradicate the limitation of ring topology in which we would like our system to continue to work even after the node failure as in ring any single node failure will make system dead. We evaluate the problems and proposed the system to overcome the problem routing such ring will also make the system power efficient resulting in the reduction of power

Keywords— **routing ring, topology, wireless sensor network, simulation models**

I. INTRODUCTION

Wireless Communication is an application of science and technology that has become vital for modern existence. From the early radio and telescope to current devices like mobile phone and laptops, accessing the global network has become the most essential and indispensable part of our lifestyle. Wireless communication is an ever-dispensable field, and the future captures many possibilities in this area. As the wireless technology is increasing well around the globe it is very important for us to understand different topologies and select the best one. The collection of data from set of sensors in ring based routing topology, is a fundamental question that arises in (WSN).

While styding networking we come to know that there are various topologies like star, bus, ring, tree etc all of them can be easily implemented in wired structures but the implementation in wireless is a very difficult task for the designers to work on but to study the different aspects of topologies in wireless mode can be a very challenging part. Fast delivery of data is very important in any aspect as there may be such situations where you are bounded by structured system like any organisation keeping in view of security point as data has to be send over the ring topology.

A sensor is a device that detects events or changes in qualities and provides a corresponding output, generally as an electrical or optical signal .A sensor is a device that detects events or changes in qualities and provides a corresponding output, generally as an electrical or optical signal .A sensor network is defined as composition of a large number of low cost, low power muilti functional sensor nodes which are highly distributed in the whole system. These nodes are very small in size consist of sensing, data processing and communication components. The position of these tiny nodes not necessary to be absolute, they gives random placement but

that protocols of sensor networks and algorithms must posses self organising abilities in in accessible areas.

A wireless sensor network is network of thousands of inexpensive miniature devices capable of communicating; computing and sensing providing bridge between real, physical and virtual worlds it has ability to observe the unobservable things at a fine resolution.

What is ring topology? A network topology that is built in a circular fashion in which data travels around the ring in one direction either clockwise or anti clockwise and each device on the ring acts as a repeater to keep the signal strong as it travels. Each device has a receiver for the incoming signal and a transmitter to send the data on to the next device in the ring. The network is dependent on the ability of the signal to travel around the ring. When a device sends data, it must travel through each device on the ring until it reaches its destination

Advantages

- This type of network topology is very organized.

- Even when the load on the network increases, its performance is better.

- There is no need for network server to control the connectivity between workstations.

- Additional components do not affect the performance of network.
- Each computer has equal access to resources.

II. LITERATURE REVIEW

This section literature review has provides an overview and a critical evaluation of a body of literature relating to a research problem. Literature review is the most important step in software development process

There are number of applications in which this topology can be implemented. Various authors have presented various applications. Recent research is going on in the concept of "labs on a chip" supported by latest technologies like nano techniques. The use of WSN for biological applications has been accelerated due to the advancement in micro electrical mechanical system.

A. Biomedical Signal Monitoring

WSN have revolutionized the field of medicine in many ways. Telemedicine is the field which involves the treatment and care of patients from a distance and also aids in biomedical diagnosis.

B. Security of intra – car

Fuel efficiency and reduction in the weight of automotives can be achieved by replacing wired sensors and cables with wireless sensors. However the inherent vulnerabilities of the wireless platform makes the security issues of such a replacement, highly questionable.

III. PROPOSED APPROACH

The proposed technique attempts to cluster the sensors in the wireless network according to their locations with the base station to construct multiple power-efficient rings chosen by the genetic algorithm which is used to get the least power. Routing information is broadcasted from the base station to all the sensors to be stored and used in delivering data. Every sensor can reach the base station through a path which is part of the constructed ring. We proposed an algorithm in which we have introduced the concept of virtual ring that the constructed ring may have intersections in the actual topology. A healing feature of the proposed technique enables network to continue its operation even after the number of failed nodes exit. Therefore we proposed the ring structure to minimize load, processing and memory usage. Also focus on minimizing the consumed power and maximizes the network lifetime.

IV. SYSTEM DESIGN

Consider network connected together in the form of a ring where data can be send in either clockwise or anti clockwise .The nodes defect can be easily identified in ring. It has an easy approach. The input design is the link between the information system and the user. It comprises the developing specification and procedures for data preparation and those steps are necessary to put transaction data in to a usable form for processing. This can be achieved by inspecting the computer to read data from a written or printed document or it can occur by having people keying the data directly into the system. The design of input focuses on controlling the amount of input required, controlling the errors, avoiding delay, avoiding extra steps and keeping the process simple.
The input is designed in such a way so that it provides security and ease of use with retaining the privacy. Following are considered for input design.

- What data should be given as input?
- How the data should be arranged or coded?
- The dialog to guide the operating personnel in providing input.
- Methods for preparing input validations and steps to follow when error occur

The output form of an information system should accomplish one or more of the following objectives.

- Convey information about past activities, current status or projections of the future.
- Signal important events, opportunities, problems, or warnings.
- Trigger an action.
- Confirm an action.
- Consistency of data must be maintained.

Each sensor communicates only with two sensors .Every cluster sensor is connected via only a single ring without introducing loops For first advantage, sensor communicates only with two sensors, previous and next hop sensor

A. Objectives of System designed

- Minimizing Schedule Length
- Minimizing Latency
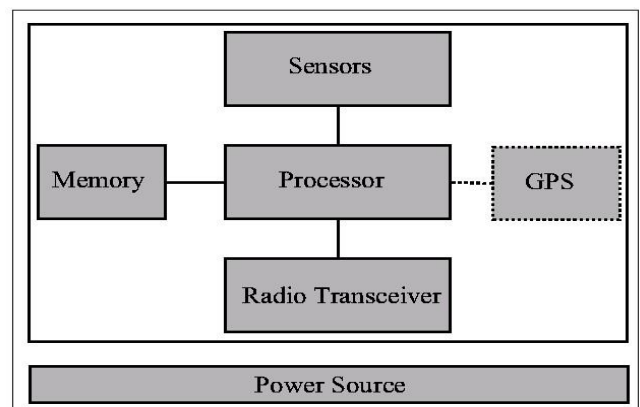- Maximizing Capacity
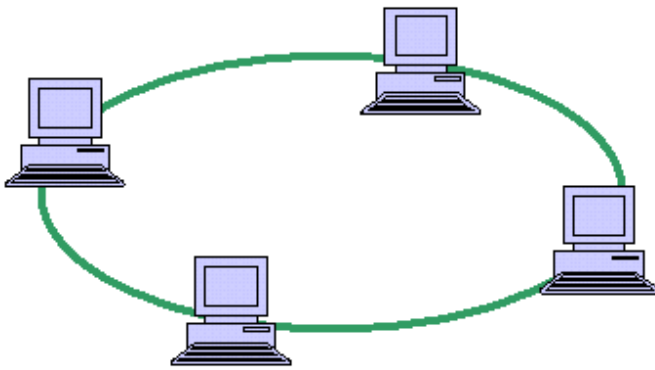- Maximizing Fairness

Fig 1 Components Of Wireless

Fig 2 Ring Topology

Fig 3 Power Consuming Ring

In this we tried to overcome the limitation of ring topology in which node failure is a very big problem. For which we have increased power transmission in which a single node failure can change its path to deliver its data to its next hop.

A ring network is a network topology in which each node connects to exactly two other nodes, forming a single continuous pathway for signals through each node - a ring. Data travel from node to node, with each node along the way handling every packet.

The network is dependent on the ability of the signal to travel around the ring. When a device sends data, it must travel through each device on the ring until it reaches its destination. Every node is a critical link. In a ring topology, there is no server computer present; all nodes work as a server and repeat the signal

Power efficient is also being considered which reduces its power and make it effective to be used. Now we can say that the disadvantage (if one workstation or port goes down, the entire network gets affected) has been rectified to an extent.
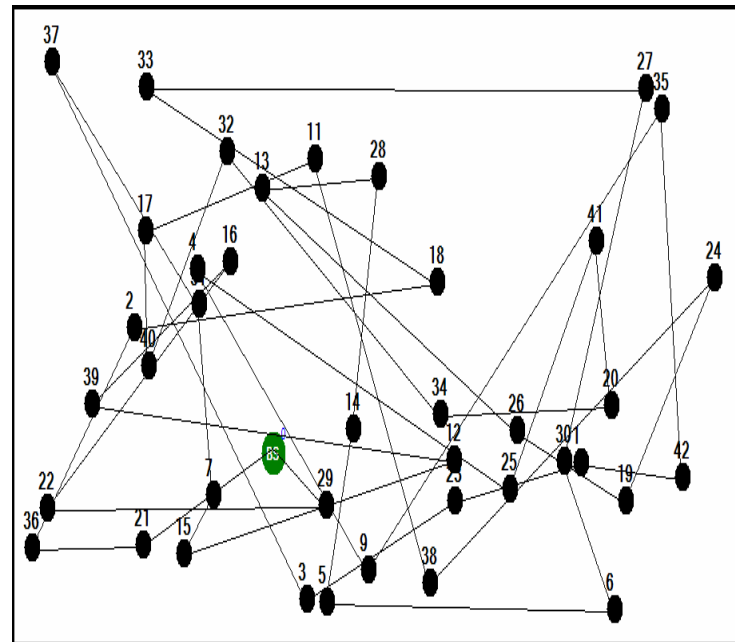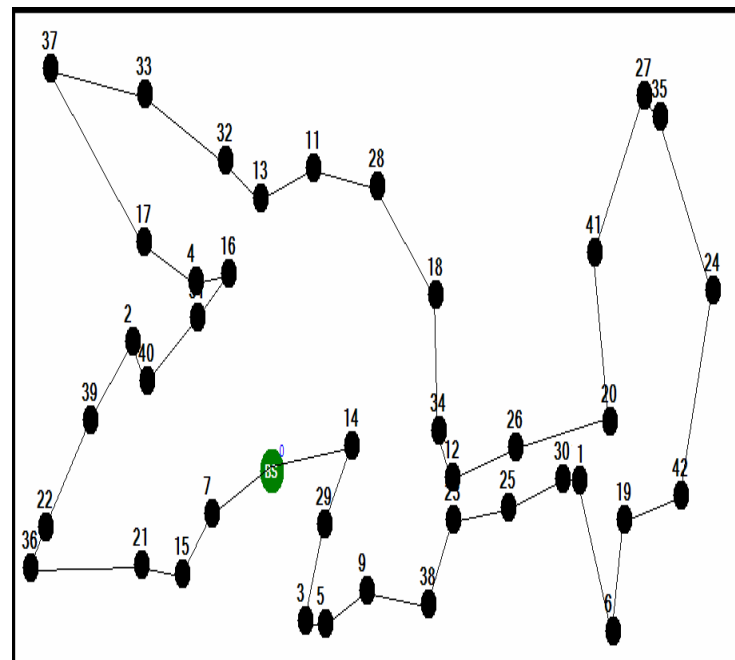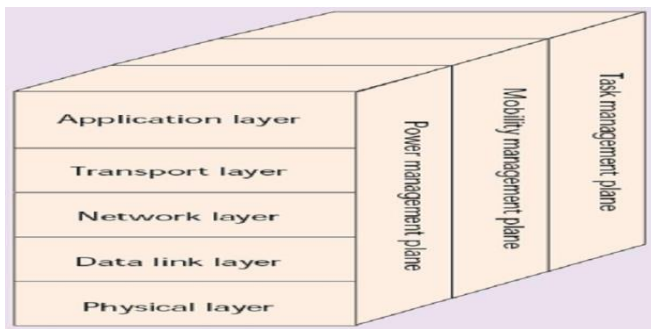

Fig 4 Power efficient Ring

Fig5 Protocol Stack

Wireless technique is being used because of its following advantages mentioned in the below table

IV. ANALYSIS

Following technique have made the system Fault tolerant, simple, applicable and is able to overcome its limitation like if any node fails than It will not become dead but will send data using alternative path

V. CONCLUSION

We studied wireless sensor network which are subject due to its importance and wide applications. Many applications of wireless sensors such as monitoring and reporting are time critical. Also the delay of the system is the important parameter to be taken into account. We introduced topology as concept to be implemented in wireless sensor network. As topology plays a vital role in making the system efficient. We in our proposed work have put forward "**ring topology".** Using genetic algorithm we have implemented ring as a "virtual" ring with clustering technique. Clustering is main task of data mining and is common technique for statistical data analysis .Clustering reduces the time of round and average dissipation. Virtual ring have made us to provide alternative path if any node of the system fails which is the biggest disadvantage Alternative path is being provided by using two previous hop and two next hop as primary and alternative hops. Source sensor will increase its transmission power by a definite amount. This way we have implemented efficient ring in WSN. It also open path to do more research work in WSN using ring topology and can be implemented in many applications like military ,health sector, Industrial applications, home automation and traffic control, Hence it is beneficial for science and technology.

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