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Data dissemination and effective Path Management on Wireless Sensor Network

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Abstract: - *Energy efficiency is very important in wireless sensor network. When data is transmitted through WSN then Ant based algorithm is followed. Also same data may be transmitted multiple times. In order to solve the problem Selective data transmission can be followed. We here suggest Range based algorithm rather than Ant based algorithm. In Ant based algorithm major stress is toward identifying the validity of path but the method involved, utilize too much energy and resources. In range based algorithm concept of signal strength will be used.*

Keywords: WSN, SDT,Path management, Queue.

1.1 INTRODUCTION

Mobile Ad-hoc network(MANET) use wireless signals in order to transmit the information from source to destination. But the problem with the WSN is its limited storage

It is applied in a wide range of distributed, remote and Wireless sensing function. Wireless sensor network perform its main role in the principle of sensing various parameters. It consists of number of nodes. Nodes mean number of computer that Connect and form a network. Wireless Sensor Network includes Battery, Sensor, Microprocessor, Memory and Radio.

The major characteristics of a WSN include:

- Using batteries or energy harvesting power consumption can be occur
- possibilities of point failures
- Wireless nodes
- Communication failures
- Heterogeneous points means different environments condition in the case of crop
- Improvement in large geographical area
- Handle the harsh ecological situation
- Easy to use
- Frequent topology change
- Self Configurable
- Data Redundancy

Sensor node is a small computer including its component and interfaces which have limited memory, limited power, sensors, microprocessor and radio transceiver. The support stations are main part of the WSN by a lot of computational, energy and communication property.

In these days a new method which is applied in information communication technology accelerates the communication between different industries. So to construct a successively new invention in agriculture environment a better sensor hardware services for farming environments is required.

1.2 NETWORK ARCHITECTURE FOR WSN

In WSN, architecture of wireless sensor network is introduced in a two way first is a Sensor Node architecture and Second is architecture of Wireless Sensor Network.

1.2.1 Sensor Node Structure

A Sensor node is consisting of four components: a sensor (for sensing), microprocessor (for processing), a Radio (for communication) and Battery (for power).

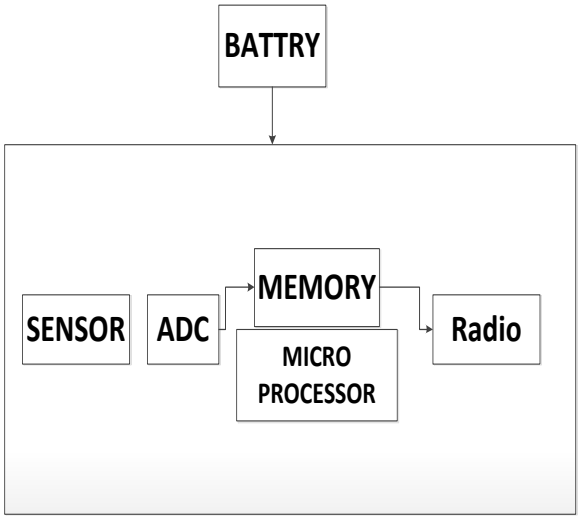


Figure.1 Sensor Node Structure

Sensors Unit: Sensor unit consist of two or more sensor which is used for monitor according to their condition or environment. It also consist of analog-to-digital converters (ADCs) which convert analog to digital signal and then fed for further processing. When we construct a sensor node after that their future purpose is depend upon the sensors.

Power Source: Power source in WSN has its own purpose and advantage. It plays an important role. The power source consists of power battery to drive other component of the sensor node system. There are some smart nodes which gather enough energy to maintain themselves from light or vibrations.

Radio: Radio consists of small range radio which is used for communication, data transmission and receives by the help of radio channel. It contains two parts Radio spreader and Radio receiver.

The Electronic Brain: The sensor nodes consist of electronic brain or we can also say processing unit. It consists of a microprocessor or microcontroller and a few flash memories. Also it uses connectors to contain extra processes and sensors in an easy way. The MEMS nodes also have an analog-digital converter.i.e modulation and demodulation can arise. The main motive of the electronic brain is to deal with collect data and make decisions and store data in its memory. After the storage of the information microprocessor section of the electronic brain put the information in packages of data format so that transfers of data arise with great efficiency. After it microprocessor transmits these packages to radio for broadcasting. For the establishment of effective network the brain communicates with other motes. The electronic brain is a base of sensor node which is interacts with sensor and radio.

1.2.2 Network Architecture

Network architecture of WSN includes big amount of sensor node that deploy inside a region of interest and inside the region there are one or more than one base stations is located.

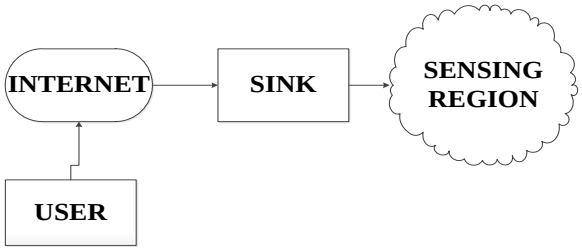


Figure 2. Sensor Network Architecture

1.4 RELATED WORK

1.4.1 Routing and Network Deploying issues in WSN

There is many limitations under WSNs, for example, limited battery, processing unit, and bandwidth. The networks propose challenges and routing issues has important aspects in WSN. The design challenges in WSN include following aspects:

Limited energy capacity: Sensor Network consists of battery for energy or power that has limited capacity. Limited energy is a major face for system designer within hostile environment. Such as, in battlefield it is not possible to contact sensor and boost batteries. While the battery reaches certain threshold it become faulty and it decrease the performance of the sensor network.

Sensor location: location of the Sensor is another challenge of WSN for network design and routing. Design and routing protocol is based on location either it will be set in the Global Positioning System (GPS) or use localized system.

Data Aggregation: Wireless sensor node can make unneeded information (redundant data); same packet can be aggregated from various nodes by this the quantity of transmission will be compact.

Data aggregation method is use to get better energy utilization.

Scalability: Sensor should not be able to scale in term of energy, processing, sensing and communication. A couple of sensor is not capable to communication in both the direction. It is done by routing protocol because it should be capable to balance the network size.

Data delivery Model: The data delivery model is based on function of the sensor network. It has various phases continuous data delivery, event-driven, query-driven and hybrid. In continuous, every sensor transmits information from time to time. In Event-driven and query-driven, the transmission of information is trigger then information is delivered when a query is produce by the sink node. In Hybrid model it uses a combination of these three data delivery model which are mentioned above. The routing protocol in WSN is greatly influenced by this model.

2. PRESENT WORK

At present instant of time, many investigates have been carried out and many are going on to effectively reduce the power consumption of the wireless sensor nodes used to transmit data about the moisture present in the soil. Researches are done keeping in view that the power requirement are minimum and the circuitry is also light and simple. In order to maintain a healthy sensor node environment, we need to consider the basic terminology of the working of the sensor network.

The simple and starter focus is on the network formation by the sensors which are in locality of one another. To last communication between each other, the same needs to interact with each other by the means of radio links (because of wireless sensory networks). This is what the current studies focuses on; that is; lessening of power necessities to form radio links. One may consider that to rise the efficiency of the sensor node with favors to power consumption, there is an immediate requirement of a suitable routing protocol that is capable of making a low-power robust and stable network that can be used to spread information to the parent gateway. According to fresh researches and papers available, designers are accomplished of routing the data using an ad-hoc network formed by the wireless radio devices used in sensor node. But the problems lies between the area of sending data to the control gateway or to the remote computer using small range radio transmitters and to control the irrigation system, the remote controller device must remain in contact with the sensor nodes. The sensor nodes may or may not simultaneously transmit data to the gateway which is further connected to the control device. The continuous transmission of data is also a problem and the power source is also exhausted. As the wireless sensor nodes, most probably, depend on the exhaustible power source such as a chemical battery, the continuous deployment of energy used for sensing and processing of data and transmission of data in the form of radio waves add up in power feeding at a higher level. This forms the basic reason for the main issue of power feasting.

3. PROPOSED WORK

In this paper, we purpose energy efficient algorithm for selective Data Transmission and Path Management

Working mechanism of SDT With Path Management is as follow:

First of all, Receive the data in the form of packets with different or same sequence numbers (e.g 1,2,3,4,1,2,3 etc) after receiving the packets store them in buffer. Buffer will be divided into slots (b1,b2-------,bn). When one packet is stored within the buffer then its sequence number can be compared against incoming packet sequence number. If the sequence number is same then the incoming packet will not be moved forward and system will go into sleep mode. Otherwise packet will be accepted. After receiving the packets nodes will be analyzed along with the path. If there is an interference or node is down then sensor will detect some other path using Bellmen Ford Algorithm. Interference will be detected using Sphere Intersect Algorithm. By the above mechanism overall reliablity, power management and efficiency will be increased.

Concept of SDT with Path management is followed. First of all SDT will be achieved using the following Algorithm

SDT(A,B)

returns (Non_Redundant,Redundant)

1) Input Packet Sequence(p1,p2,----------,pn)

2)Initialize k=1

2) Store the packets in Buffer slots (b1,b2,----------bn)

3) Repeat the steps for i<=n

a) Repeat the steps for j<=n

a1) if (pi=bi) then

a1.1) k=2

End of if

a2) j=j+1

end of Inner loop

b) if(k=1)

b1) return Redundant

else

b2) return non_Redundant

end of if

c) i=i+1, k=1

end of outer loop

In the given algorithm first of all we are going to Determine whether there is a collision in the transmission or not. Also interference will be detected with this algorithm. We can also use queue in all the routing node which hold the packet until it cannot be received at destination side.

sphere intersect(A, B)

returns (OVERLAP,DISJOINT)

1: l = c2 − c1

2: Square of (d) = l.l

3: if (square of(d) < (r1 + r2)*(r1+r2))

4: return (OVERLAP);

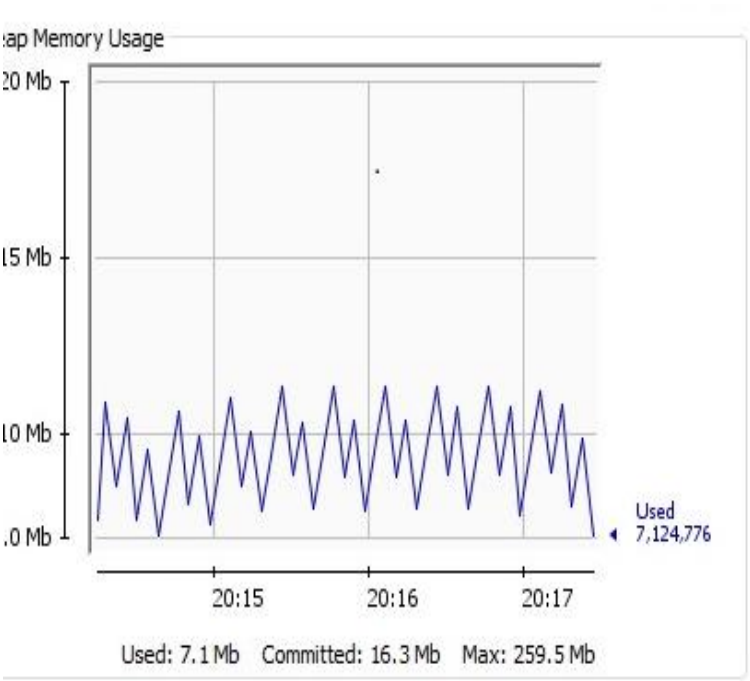
5: else

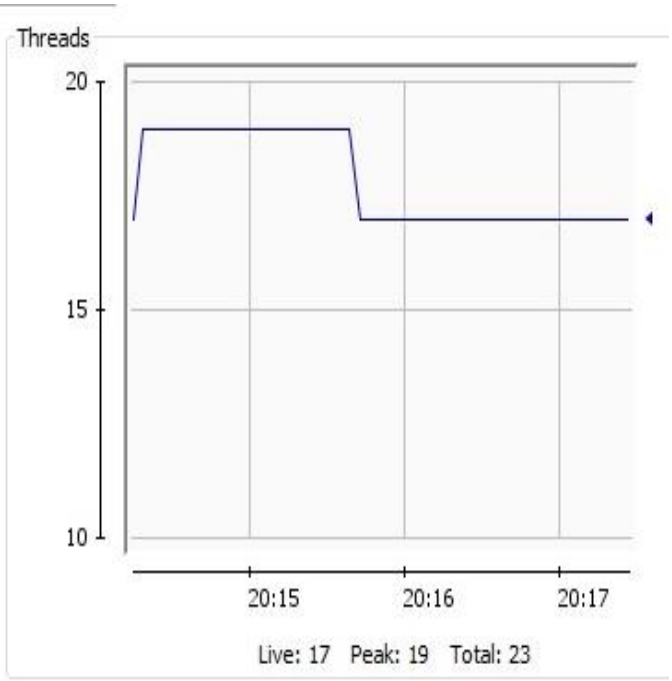
6: return (DISJOINT);

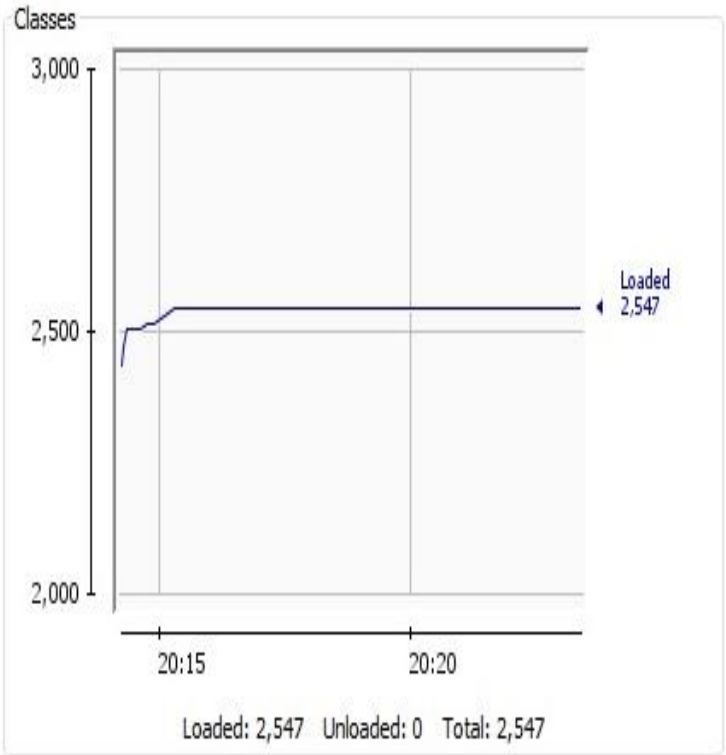
If the interference is high then the signals do not intersect with each other and data will not be moved forward. Signals from two distinct sensors will intersect with each other only if distance between there centers c1 and c2 is less then sum of their radius r1 and r2. If the interference is present then either separate path will be followed to transmit the data.

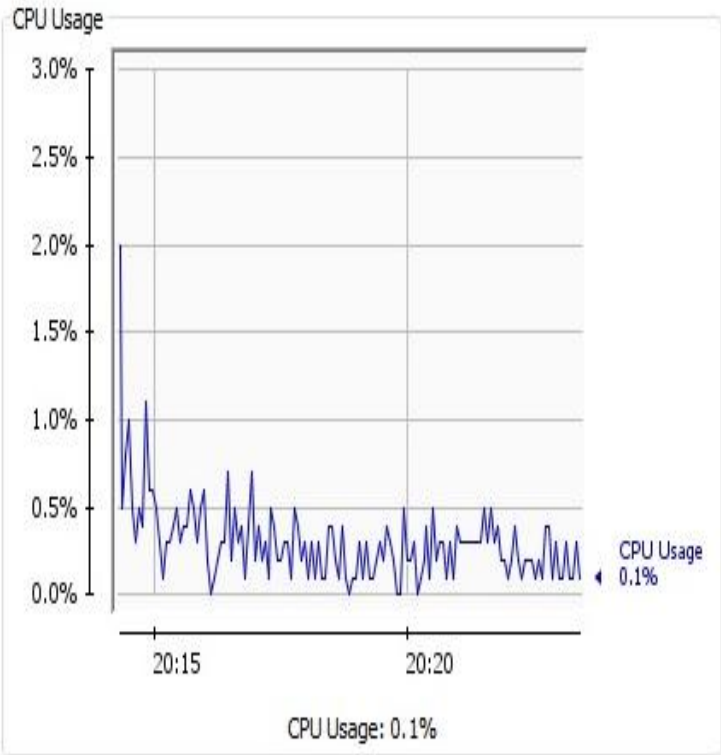
5. CONCLUSION AND RESULT

The purposed algorithm is to be energy efficient in energy usage,reliability, Path management, and efficiency increases. The scheme proposed in the paper addresses to all the power efficiency related problems that a WSN faces today. Reduction of power consumption has always been a major factor in designing any network model as this ensures efficient operation of the network at low operation costs. The proposed ad-hoc network reduces power consumption contrary to the conventional wireless network. The protocol itself is designed suck that the decisions are implemented without wasting much of power. Sensors and switching logics are optimized too to run on low power.









6. FUTURE WORK

The still remains a great deal to be improved in this area. Power sources can be re-designed to last longer. Smart wireless sensors can be implemented that can take switching decisions themselves. This would reduce the transfer cost of data from centralized network to nodes thus reducing power consumption. The protocol can be enhanced too to increase power efficiency.

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