Review on a Lifetime Maximization of Wireless Sensor Network Using Support Vector Machine

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Abstract: The use of wireless sensor networks (WSNs) has grown very fast in recently year. WSN is a network made by grouping some or many sensor nodes, which are able to make communication with each other within the network range for performing many different tasks when needed and collecting the necessary data or information for reaching the purposed destination of the network and then forward that whole information to the base station of that network, technically called sink. In recently years WSN has made its presence in most of the fields for example forest application, water application, medical application, military application and industrial application areas. As Wireless sensor network is being widely used but there are still many problems are present in WSN. Minimizing energy dissipation and maximizing network lifetime are important issues. In this paper,we propose a cluster of cluster head based algorithm where we will be selecting at least two nodes from each cluster to become the cluster and perform all communication via this cluster head. The main advantage of this protocol over the existing protocol is that this protocol has a backup of cluster head which when the current cluster head has lost enough energy, thereby further improving the lifetime of the network. Also by using SVM increase the network lifetime.

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1. INTRODUCTION

In a Wireless Sensor Network (WSN) there are a number of sensor nodes which are distributed randomly over an area or a place or a location in order to collect information and proceed it.A sensor node normally consists of four basic components are Sensing unit, Processing unit, Communication unit, Power unit. Wireless sensor networks are composed of a large number of tiny sensing self-powered nodes which gather information about their environment and cooperate to communicate the collected data in a wireless fashion to a base station called the sink. Devices are capable of detecting change like temperature, pressure, humidity, sound and many more. These wireless sensors are connected and communicate with each other in a random and multi-hop fashion. They collect the information and pass it to the next hop (sensor). In this way, the information is reached to the server and appropriate action took place. There are lots of applications where we can use wireless sensor network like Area Monitoring, Health care Monitoring, Environmental / Earth Sensing (Air pollution Monitoring, Forest Fire Monitoring, Landslide Detection, Water Quality monitoring, National Disaster prevention), Industrial Monitoring(Machine Health Monitoring, Data logging, Water/waste Water Monitoring, Structural Health Monitoring, Wine production) health care application (Behavior Monitoring Medical Monitoring), home intelligence applications (Smart Home, Remote Metering) in home and building automation to industrial control. But the problem with sensor network is that when we are using them in outfields (e.g. valleys or hills area) is related to the battery. Because whenever the battery discharges it is not possible to replace it or recharge it so to avoid this problem. In a sensor node, there are three main functions which consume the energy most – Sensing, Computation, Radio operation. Radio operation means transmitting the collected information. The major part of energy loss comes from transmitting. This energy consumption can be reduced at some level.

Rapid technological advances in wireless communication have enabled the deployment of large scale wireless sensor networks. The potential applications of sensor networks are highly varied, such as environmental monitoring, target tracking, and battlefield surveillance Sensors in such a network are equipped with sensing, data processing and radio transmission units. Distinguished from traditional wireless networks, sensor networks are characterized of severe power, computation, and memory constraints. Due to the strict energy constraint, energy resource of sensor networks should be managed wisely to extend the lifetime of sensors.In order to achieve high energy efficiency and increase the network scalability, sensor nodes can be organized into clusters. The high density of the network may lead to multiple adjacent sensors generating redundant sensed data, thus data aggregation can be used to eliminate the data redundancy and reduce the communication load. In periodical data gathering applications, both methods promise to efficiently organize the network since data

collection and processing can be done "in place". Among the sources of energy consumption in a sensor node, wireless data transmission is the most critical

2. LITERATURE REVIEW

[1] In this Paper Wireless Sensor Network is finding its application in various fields and is becoming very popular. Data communication in WSN should be supported by the limited resources of the nodes. Clustering of nodes in wireless sensor networks increases the scalability of the network and energy conservation. Data aggregation using ANN technique increases the network lifetime and throughput by eliminating the defected node. More efficient energy balancing technique should be devised to conserve nodes battery energy and result with improved network lifetime

[2] In this paper It has been observed that the improvement in network varies according to the network topology. From the survey, it has been observed that ART 1 is better than ART and the improvement in lifetime in ARTI is consistently around 45%. The maximum network lifetime improvement is found to be 47%. This effectively improves the bandwidth of the communication channel and also reduces the energy consumption The Fuzzy ART neural network is self-learning, processes any input sequentially, needs no buffering of samples, and adapts to both, changing environmental conditions and new evolving signals. Finally, the high compression rate lowers communications costs. Self-organized mapping which is trained on sample two-dimensional data collected from various active nodes which results enormous energy saving which is around 48.5%. This paper presented a classification for the most important applications of neural networks in energy efficiency of WSNs depend on different research studies have been done so far. The most important application of neural networks in WSNs can be summarized to sensor data prediction, sensor fusion, path discovery, sensor data classification and nodes clustering which all lead to less communication cost and energy conservation in WSNs. The classification for neural network based methods by Self Organizing Maps has been found to be providing good performance than the ART, ART! FUZZY ART and NBEF for the purpose of energy conservation of nodes, and also shows more applications in recent WSN platforms. **[3]** In this paper, we investigated the problem of scheduling the wireless energy transfer in wireless sensor networks to prolong network lifetime. We studied the requirement on energy transfer efficiency and the packet generation rate such that the network can be immortal. For larger network sizes or packet generation rates, we studied the lifetime maximization problem and proposed a solution algorithm. We showed that the algorithm achieves an optimal schedule, when the ratio of the received energy at a sensor node to the transmitted energy at the base station is low.

[4]In this work we proposed Energy control protocol through SOM neural networks. This protocol applies energy levels and coordinates of nodes as clustering input parameters. It uses some nodes with maximum energy levels as weight vectors of SOM map units. The clustering phase is performed by two phases namely, SOM, and K-means clustering method. Also in the proposed model changing the number of cluster in final phase (k-mean phase) has a great influence on the result, in another word chose 20 clusters which is close to LEA2C and 10 clusters selection are proposed. The simulation results show 45% Profit of our algorithm over LEACH in the terms of increasing first dead time and also using 10 clusters gives 10% profit over using 20 clusters and also simulation results show the profit over LEACH in the terms of reserved energy in network then changing the number of nodes is direct proportion to number of live nodes

[5]Energy Consumption is a main factor in designing wireless sensor networks. During clustering scheme, While LEACH is a most popular routing protocol and Distributed Energy Efficient Clustering (DEEC) which can be used in the existing approach, but in the proposed approach, we used an ABC (Artificial Bees Colony) optimization technique. By using the ABC optimization technique, we effectively designed the CH which is closest to the BS. Energy in the farthest node (i.e., far away from CH) can get optimized using ABC optimization technique. By doing this lifetime of the nodes in the wireless sensor networks can get increased. The simulation results show that the proposed ABC technique is more efficient than the existing DEEC technique.

3. PROBLEM DEFINITION

In the previous work, the system of WSN was used for reducing the power consumption in the network. This allowed the network to improve its lifetime by using cluster head based algorithm. In cluster head based algorithm the system selects the nodes with the highest energy in the network and sends data via this node only. This allow the network to perform multiple communication in a given period of time and the lifetime is automatically improved. We propose a cluster of cluster head based algorithm where we will be selecting atleast two nodes from each cluster to become the cluster and perform all communication via this cluster head. The main advantage of this protocol over the existing protocol is that this protocol has a backup of cluster head which when the current cluster head has lost enough energy, thereby further improving the lifetime of the network. Also by using SVM increase the network lifetime.

4. PROPOSED METHODOLOGY

- Network formation and communication.
- Selection of cluster heads for communication.

- Selection of cluster of cluster head for energy efficiency.
- Integration SVM for nodes selection.
- Result analysis and comparison.

5. CONCLUSION

After Reviewing some previously done important researches in this paper, we propose a cluster of cluster head based algorithm. The main advantage of this protocol over the existing protocol is that this protocol has a backup of cluster head which when the current cluster head has lost enough energy, thereby further improving the lifetime of the network.

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