Priority based Multi SenCar Technique in Wireless Sensor Networks

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Abstract

Background/Objectives: In recent years Mobile WSN (Wireless Sensor Networks) has obtained more attention because it has an ability to allow economical and effective solutions in different fields. When designing the Mobile WSN, energy saving becomes an issue. So a network clustering technique is used to divide the network into small group of clusters and every cluster group is controlled and examined by one node called CH (Cluster Head). An effectual procedure for clustering and LEACH (Low Energy Adaptive Cluster Head Election) can forcefully decrease the consumption of energy and improve the lifetime of network. The existing WSN contains more sensor nodes that vary from one to another based on performance, computing power, initial energy, etc. According to decrease congestion and undesirable power, during the transmission of data long distance, stable number of transmit nodes are placed and selected as router to keep the connectivity. Then the Transmitted node collects the aggregated data using cluster head and moves it to base station. In this system, we are going to work the tradeoff between data assembly latency and power saving in gathering of mobile data by exploring an aggregation of local data and the SenCar moving length. A framework of three layers is suggested in WSN for mobile data group, which comprises layer of cluster head, layer of mobile collector and layer of Sencar. **Methods:** This framework deals with Dual Data Uploading and Load Balanced Clustering which is abbreviated as LBC-DDU. In emergency situations the signal priority is not mentioned in LBC-DDU. To achieve this problem, we suggested the Multi sensor techniques of priority Based in WSN (Wireless Sensor Networks). To assess the efficiency of the suggested priority scheme a large simulation are regulated. The proposed algorithm of shuffling allows the base station to identify the head of cluster and transmit node on the basis of residual energy, node density, base station distance and nodes overlapping ratio, etc. **Findings and Improvements:** We correlate the SenCar mobility in multi-hop routing to complete the advantages of double data uploading, which eventually shows data collection in priority based with both short time uploading of data and short path of moving.

Keywords: Data Collection, Dual Data Uploading, Load Balanced Clustering, SenCar, Wireless Sensor Networks (WSNs)

1. Introduction

A Wireless Sensor Network (WSN) is a group of micro sensor nodes. They have volume of establishing and sensing wireless communication along with nodes and executing processing and computational operations. A WSN containing sensor node is installed in geographical area to watch physical phenomena such as temperature, vibration, humidity and so on[1]. Normally Wireless sensor network contains one or more sinks (or base station) and a more number of sensor nodes, which helps to observe or monitoring data. The main impartial of WSN is to identify an incident and evaporate the same reliably to other nodes. The main problem in sensor networks is limited availability of energy for the remotely installed sensor nodes. Nodes of WSN need to function with the required resources[2,3] like extra desired lifetime and low utilization of energy. These nodes mention the parameter of environmental and return back results over the network to base station where data can be examined and finally serve to begin some movement[4]. The process of existing system is Load Balanced Clustering and Dual Data Uploading (LBC-DDU) algorithm which is helpful for three stable conditions. The above mentioned Algorithms are used to arrange the sensor in clusters, Cluster heads of Group within an area can cooperate with each other head

to execute power efficient transmissions of inter-cluster and technique of MUMIMO, which allows compressing the latency of data transmission for dual data uploading particularly cluster head, create straight communication with station of base[5]. In this proposed system we use Low Energy Adaptive Clustering LEACH for identifying the head of cluster[6]. Because of the inherent nature of Multihop routing, packets should encounter multiple transmission before it reaches the base station. In a result of multi-hop, more energy is saved on data transmission through the path. In the transmitting path Instead of reducing power consumption, it can certainly extend lifetime of network. Because of the unsure nature of the outside environment events in WSN, the Sencar may require dealing with multiple emergencies occurring concurrently at various locations but our proposed system removes this issue[7,8]. Then, it coordinate and plan the SenCars to collect information from nodes with their lifetime of residual while reducing the SenCars cost which is called recharge optimization of emergency with more Sen-Car issues in this proposed system. In this proposed system, the suggested protocol works in a Multi sensor technique of priority based algorithm, which contain the no of process with four modules. These are 1. Deployment of Node – each node detect the stable position to execute round-and-round of message reporting and sensing until a nodes of sensor evacuate out their energy of battery; after the WSN dies. 2. Point Selection of Rendezvous – every cluster head of self-selected, transmits an advertisement message by non-persistent carrier sense of multiple access protocol. 3. Schedule creation in Sencars – The SenCars will continually gather the close sensor nodes information and then plan where to go to and when to go. So in our proposed system we use Senscar technique for uploading in multi-hop to avoid some problems. 4. Send Data to Base Station- Finally SenCar of Mobile handover the data to base station, such as data sink.

An Algorithm for Clustering used in similar type of network is called as homogeneous schemes of clustering and if it is applied in different type network it is called as heterogeneous schemes of clustering like LEACH, Q-LEACH[9], etc. where all nodes of sensor contain same initial energy which are the sample of homogeneous scheme of clustering. DB-SEP, DEEC, SEP, etc.[10] are sample scheme of heterogeneous clustering. Now a day's most of application doing time critical and multiple sensing actions based on heterogeneous WSN. One of the important

distributed clustering protocols for routing in WSN is LEACH [Low Energy Adaptive Clustering Hierarchy[11]. Throughout the phase of initialization, LEACH performs selection of cluster head which successfully achieve load balancing between all nodes in homogeneous, LEACH randomly selects cluster head nodes every round. The selected head of cluster group accomplish aggregation and fusion of data coming from nodes that depend on the relevant cluster. After that the data is forward to data sink (base station) periodically. Basic Operation of LEACH contains two phases, the phase of Setup and phase of Steady-State. In Phase of Setup, electing and managing of head of cluster process takes place. In Phase of Steady-State, normal data forwarding from head of cluster to data sink process takes place. Benkirane et al. proposed[12] DB-SEP an altered SEP version, in two level energy related protocol for heterogeneous routing. The main objective of the protocol is to maximize the heterogeneous WSN lifetime by electing heads cluster on the initial energy basis, space between base station and nodes. This process is entirely probabilistic and more systematic when compared to SEP but not better regarding the network lifetime and energy efficiency. Li Qing et al. suggested DEEC (Distributed Energy Efficient Clustering)[13] which gives good lifetime of network. For selection of cluster head in DEEC there is no needed of possessing global understating about node power at each round for the selected cluster head. Selection of cluster takes the probability that is related on node residual power ratio and whole network average energy. In DEEC forming the clusters is dynamic; it takes more energy at each resulting new round[14]. This process is helpful in identifying what type, how many, where the nodes of heterogeneous are used in field of sensing. In network of Manhattan grid these above results are identified to be sustainable. In Manhattan grid network nodes deployment is achieved by following pattern of grid which is impossible application where deployment of random is achieved like fire detection in forest, emission detection of radioactive, etc.[15,16]. In WSN the possibility of MIMO works is desirable in[17]. Because of some troublesome for multiple antennas to mount on a one type sensor node, in WSN Multiple Input Multiple Output (MIMO) is acquired to pursue co-operations from more nodes to attain diversity and minimize the rate of bit error[18]. In this framework, deploying two antennas is not hard on mobile collector, when pair of compatible transmitting nodes and mobile

collector places is specified, we can allows Multi User - Multiple Input Multiple Output (MU-MIMO) uploading on the mobile collector to significantly decrease the latency of data collection[19]. However, a conversation of this type of protocol is outside the article because of the outstanding variance in particular classification features between such suggested schemes of routing and protocols. It introduces a novel location routing protocol that handling smart antennas to measurement of nodes position, named LBRA[20]. The main purpose of LBRA is to invalidate network control overhead as much as feasible. Quality of Service (QoS) is enhanced for part of the QoS parameters like packet loss and crowding[21]. A novel method to progress the QoS based on Artificial Neural Network (ANN) is used to train the unqualified nodes to make them as quality nodes. In this work an intelligent Spybot is precede to identify the alive humans in the war field and also in several disaster field[22]. The effectively alerts the target to the Spybot and produces the defined path between the Spybot and the target.

2. Proposed System

2.1 Overview

In Multihop-Routing of mobile data collection framework, it describes Dual data uploading and LEACH Clustering by algorithm of shuffling which contain three layers that is sensor layer, sensor car layer and cluster head layer. In first the full network can be split into little group. After that every cluster group creates head for that cluster group. Then the technique of MUMIMO, allows dual type of data uploading to reduce waiting of data transmission. Then the Coordination among the sensor car mobility helps to entirely enjoy the advantages of dual type data uploading, which eventually guides to tour of data collection with both short time of data uploading and trajectory of short moving. In this paper we proposed priority based data collecting technique, in this the size of the packet information is forwarded to base station, until dual cluster reach over the value limit of threshold rate. In this system it describes four modules with algorithm, they are 1. Set multi-hop routing nodes, 2. Clustering by LEACH technique, 3. Identify shortest route through MUMIMO technique and 4. Finally data will be Handover to Base Station by Sencar.

2.2 Multi-hop Routing Protocol with Sensor Nodes

In this module a group of sensors moved in a network of geographical. The following speculations are taken into reflection in the WSN. Normally the nodes of sensor are seemingly stationary; this is needed in application of sensor network. Links of various sensor nodes are symmetric. The power transmission is equal for all nodes in sensor network. In sensor network nodes formation are self-organized and also all nodes contain similar capacity and same substance. The nodes have transmission level of power in fixed number. Node failures may take place because of depletion of energy of sensor nodes. If we need interface between two nodes that communication is based on the multi-hop protocol. The communication is symmetric and sensor can calculate approximate distance depending on the signal strength. We clarify the model for radio dissipation hardware energy. When the first item are available in radio dissipation energy consumption and the item of second will available in the energy consumption for amplifier radio.

2.3 Applying FCM Technique for Clustering

In FCM technique, we proposed LEACH algorithm and clustering technique in WSN. In this system multi-hop communication is achieved within the normal nodes and from head of cluster to Base Station. After starting every node realize its cluster head. The cluster head receives one packet at a time from member of the cluster nodes in each time and the cluster head compress and aggregate the data collected node that is attached in the cluster group. Then it describe the cluster head in the starting phase, the communication of multi-hop is used in transmission packets and cluster head forward the control message to close the cluster heads so that correct path would be identified. Choosing the correct path is a procedure in which the cluster head has more power and it is near to base sink and it has no traffic. After that the data is collected by cluster head and are forwarding to similar path and to the next head of cluster until it reach to base station.

2.4 FCM Clustering with Energy Evaluation

Clustering is achieved by Fuzzy C-means algorithm. During that time 10% information on energy is forwarded directly based on the scheme of Kim et al. Other 90% of

the remaining time, the energy consumption of Cluster Head and C-Means is calculated based on the model of radio propagation.

2.5 Algorithm 1for FCM Clustering with Energy Evaluation

- Initialize minimum degree membership, coefficient of fuzziness, k
- if Round 10% = 1 then
- Gather information of Energy from nodes
- Apply FCM clustering and report k Clusters
- else
- Forecast CM and CH Energy Usage
- Calculate < LDthr then
- if EiNode < LDthr then
- Reject the Nodei from repository
- end if
- Apply the clustering of FCM and report k Clusters
- end if

2.6 Shortest Routing and MUMIMO Technique

In shortest routing technique we use the MIMO for consumption of energy in circuits which could be higher than the approach of SISO (Single-Input-Single-Output). In this system, it is indicated that MIMO can perform better than SISO when the forwarding distance is more than the particular threshold value (ex, 25 m). It is shown that using the correct system designs parameter, important energy consumption can be done with MIMO technique. To requite the consumption of energy in circuit, transmission time optimization and parameters of modulation was presented in it. In our system, it is not a problem to install to antennas on mobile collector, when transmitting nodes compatible pair and the mobile collector location are given. To reduce the latency of data collector we can allow Multi User – Multiple Input Multiple Output (MU-MIMO) uploading to the mobile collector.

2.7 Communicate between BS and SenCar

In this system we use mobile SensCar protocol and some other policy are used to transmit data by Senscar mechanism. These policy or approaches provides the solution only for data forward issue but it fails in answering energy consumption in the routing. For that we used Load Balanced Clustering (LBC) and Dual Data Uploading

(DDU) technique in WSN. Normally SenCar protocol has long-standing life for forward data to destination in Wireless Sensor Network. For this approach this survey shows various researchers issues and their benefits. These surveys on SensCar and the gather sensed data straightly from the sensor nodes and thereby help sensor nodes to save power. Otherwise it would be ingested by Multihop communications. By considering multi number of SensCar devices the time taken for the data collection and data delivery time is less than the existed one. And also by using multi number of SensCar devices the consumption of energy decreases when comparing to previous one.

2.8 Overall Architecture

All sensor nodes in the network forms cluster and choose the cluster head for every cluster group. The cluster head is selected based on the properties of more energy, battery level, etc… Then source and destination nodes will be identified in the multi hop wireless sensor network. Once source and destination is identified, source sends packets to destination node. These packets have different priority. Here Bayesian model is used to select most priority packets and forward the packets to closest cluster head. The closest cluster head will be finds based on the utility function. Utility function chooses the nearest cluster head based on cluster head energy. In this system sencar is used to deliver the packet from source to base station. Sencar starts to move the packets when nearest cluster head is choosed. Finally, our proposed system helps to send the packet with short time and based on packet priority shown in Figure 1.
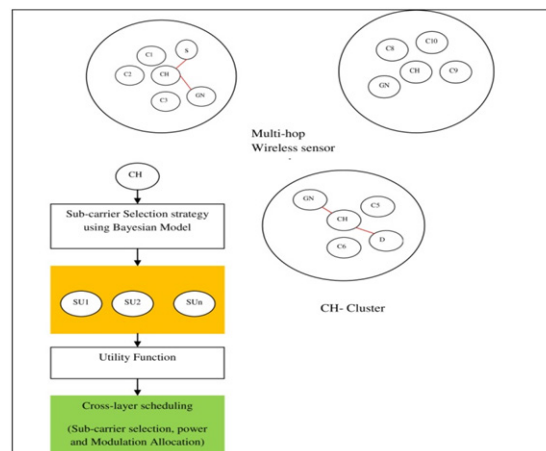
Figure 1. Architecture of priority based Multi Sencar technique in WSN.

3. Result and Discussion

In this system we propose priority based clustering algorithm to select best cluster head in Multihop routing protocol for data forwarding to BS (Base Station) within a short period of time. First we assign sensor nodes between distance and energy in network. Then, we to all nodes about energy based on distance. In this paper we are using Leach technique to define Cluster Head (CH), in which the node having more energy value considered as CH. Figure 2 shows the number of sensor nodes plotted in network and select the cluster node.

Figure 2 defines a shortest cluster node and desire which CH node finally send packet to BS. Using shuffling algorithm we detect shortest CH. Our proposed process is based on node distance and node energy; that energy level will change when the node moves in network. If the node packet have more priority level then that data will be sent to base station by sensCar.

Figure 3 shows the comparison of the clustering process between LEACH and FCM. Our proposed clustering process is better than the existing system. FCM cluster is proved to be best than LEACH clustering, we proposed priority based cluster to reduce the SenCar waiting time and improve the accuracy and speed.

Figure 4 shows the comparison of existing and proposed system. This technique has an advantage of efficient time, and percentage. This proposed technique is used to send the packet delivery to BS easily and quickly.
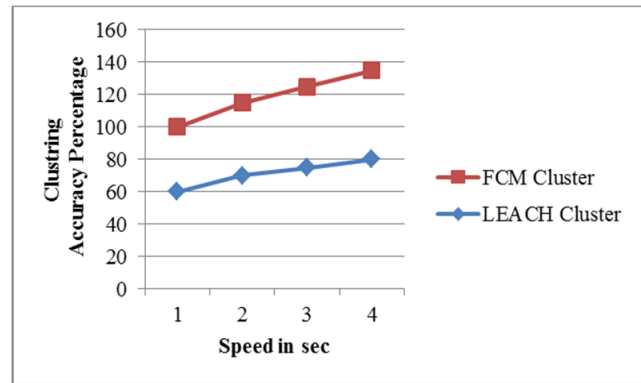

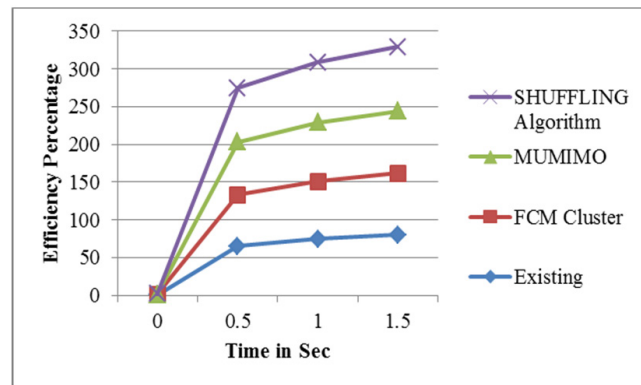**Figure 3.** Comparison of speed and accuracy between FCM and LEACH cluster.

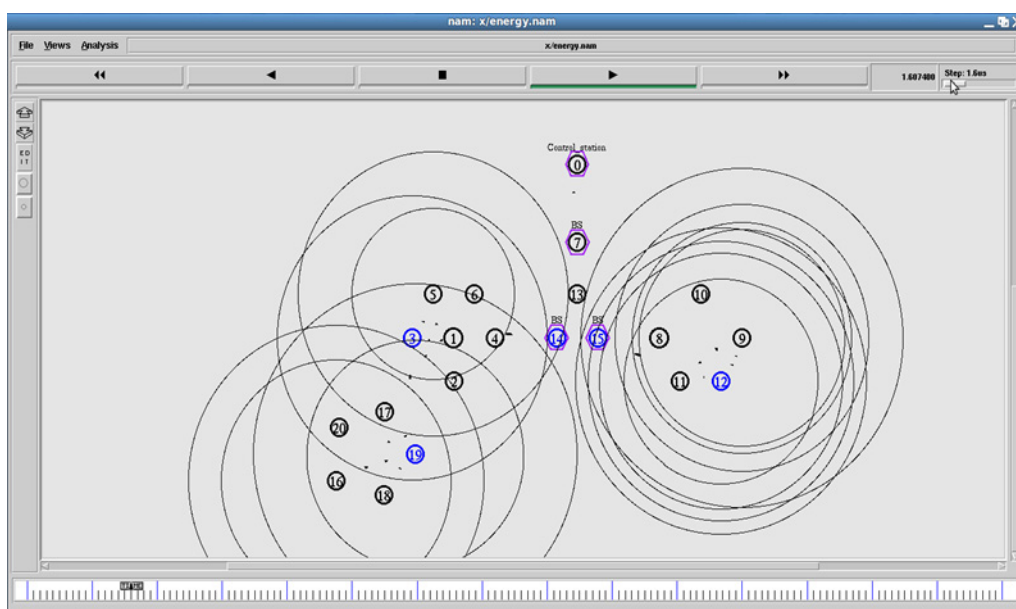**Figure 4.** Efficiency comparison.

Figure 2. Sensor nodes plotted and select Cluster Head.

4. Conclusion

In this paper, we propose priority based clustering algorithm to increase the speed and select CH to send the data packet to BS. It uses dual packet description. In this Paper we are using FCM and Shuffling algorithm with MUMIMO technique. In the previous system the problem faced are data collection in WSN (Wireless Sensor Network) based on the path taken by the mobile SensCar nodes, especially in application of delay-sensitive, and later all sensed data must be gathered within a given time restriction. The main problem is consumption of non uniform energy in networks; packet dead rate is high because of waiting SensCar and no priority selecting. So, we use multiple mobile SensCar devices for data aggregation in the network. Huge simulations have been tacked out to prove the efficiency of the system. And priority data delivered in time by the transmission nodes. This paper help the Emergency data to transmit the data to base station and it gives mobility for saving the energy and consumption of uniform energy. Since centrality, computed on the base of the count of the other nodes squared distances from given node, is one of the accouter for selecting suitable cluster-head, a network with nodes biased distribution can be trailed in the future experiments.

5. References

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