ISSN XXXX XXXX © 2018 IJESC

Research Article Volume 8 Issue No.5

Stable Cluster Head Selection in MSN using Hierarchical Leach

M.S.Vijaykumar[1], S.Revathi[2]
Assistant Professor[1], Student[2]
Department of CSE
Tejaa Shakthi Institute of Technology for Women, Coimbatore, Tamil Nadu, India

Abstract:
Wireless sensor network (WSN) are major technologies due to their diverse application such as health concern monitoring, smart phone, military, disaster supervision, as well as other surveillance systems. Sensor nodes are naturally place in large number that work independently in unattended harsh environments. Due to constraint resources, naturally the insufficient battery influence, these wireless nodes are grouped into cluster intended for power resourceful communication. During clustering hierarchical design have achieved great interest for minimizing energy consumption. Hierarchical scheme are regularly categorize as cluster-based in addition to grid-based approaches. In cluster-based approaches, nodes are grouped into clusters, where a resourceful sensor node is selected as a cluster head (CH) while in grid-based move toward the system be separated into restricted effective grids typically performed by the base station. Energy conservation plays a crucial role in sensor network design. Hierarchical cluster design be one of the approaches to keep power of the sensor network. Though, for mobile phone sensor network, package losses occur due to the mobility of antenna nodes be as well an main issue. An improved low-energy adaptive clustering hierarchy (LEACH) protocol for mobile sensor networks has been planned toward not only extend the network life span other than also reduce the packet loss using fuzzy inference systems (FISs). Model outcome indicate that the proposed approach is more effective than the other existing ones within conditions of the system life span, power utilization, package deliverance percentage, with cluster deviation.

I. INTRODUCTION

The importance of touchtone phone Wireless Sensor Networks (MWSNs) within supervise also collect records though the environment have been improved during the latest years. A MWSN typically consists of cell phone antenna nodes and/or cell phone sink(s) to facilitate be able to progress within the system. Mobility achieved by attending the mobile elements with mobilizers for controlling their locality or they can be attached to transporters like vehicles, animals, robots, and so forth .Some real-world applications demand environments composed of fixed also cell phone antenna nodes within the same system, at the same time as other application request complete mobile sensors location. The antenna nodes are tiny devices also can perform many tasks, including event sense, records processing, and records communication. Recently, due to the rapid advances in sensor electronics, digital communications, and miniaturization manufacturing technology, small-sized sensor devices with computing, sensing, and networking function have become possible. Wireless sensor networks (WSNs) are composed of hundreds or even thousands of such tiny devices which be deploy in a region of interest to collect data for a variety of monitor and track applications. In general, antenna nodes are stationary as well as remain fixed in their positions once they have been deployed. However, for several application, such as animal tracking, habitat monitoring, with escape navigation during a failure, mobile antenna nodes would be applied to a system, leading toward many topology changes with elevated packet loss. Hence, for these kinds of cellular phone sensor network, mobility is an main issue during the system formation with information transmit. In WSNs, energy conservation is commonly considered as a crucial challenge since antenna nodes are usually powered by limited energy source. Hierarchical clustering design is one of the methods to save the power of antenna nodes because only some devices, namely cluster heads (CHs), be permitted to communicate with the base station. CH gathers the information from antenna nodes in its cluster, compress it, as well as send the aggregated data to the base station. A typical design is the low-energy adaptive clustering hierarchy (LEACH) protocol, which employs a purely probabilistic approach to select CHs and regularly rotates the CHs so as to balance power dissipation. However, the LEACH protocol is unable to support MSNs since the mobility of antenna nodes is not measured inside its design where all antenna nodes be assumed to be stationary after deployment. Hence, the realization of the LEACH method brings about serious packet loss during mobile application.

II.PRELIMINARIES

1)CH SELECTION

During CH selection stage every sensor node generates a chance amount among 0 and 1. Though the possibility quantity of a individual node be bigger than a predefined entrance Twitch is a part of the desired tentative CHs, this node turns into a CH candidate. After with the function of, the node evaluate the chance by the utilize of the fuzzy inference system which is described earlier in adding together to advertises a Candidate-Message beside with the chance. This message indicates to help the transmitter node be a applicant of CH with the value of chance. As soon as a node broadcast a Candidate-Message, the node waits for Candidate-Messages from the other nodes. If the chance of itself is larger than all chance values as of the others, the antenna node be chosen as a CH.

2)CLUSTER FORMATION

During cluster formation stage a chosen CH broadcasts a CH-Message for advertisement. If a non-CH node receives the CH-Message, the node select the next one as its CH as well as send a

JOIN-REQ request to the chosen head.At this point, the planned LEACH-MF grouping approach is completed. After a determined phase, all CH would generate its parallel TDMA schedule and pass on it to cluster members.

3) DATA TRANSMISSION

During steady-state stage, the data communication from sensor nodes to their CH is begun according to their TDMA schedule timeslots. The membership declaration proposed in LEACH-M is here applied to avoid packet loss at this stage. When receiving a DATA-REQ message from the CH, the sensor node switches on its radio source and adjusts communication power before sending data. At the end of the communication, the node turns off its radio so as to minimize energy consumption. On the other hand, CH will use the information from all its senor nodes as well as forward it to the base station using carrier sense multiple access among the collision avoidance mechanism.

III. EXISTING SYSTEM

In WSNs, energy preservation is normally considered as a main challenge for the reason that antenna nodes be typically powered by incomplete power supply. Hierarchical clustering plan is one of the methods to keep the energy of sensor nodes. Because only a few devices namely cluster heads (CHs), are permitted to communicate with the base station. A usual design is the low-energy adaptive clustering hierarchy (LEACH) protocol, which employ a purely probabilistic move toward to select CHs as well as regularly rotates the CHs so as to balance power dissipation. However, the LEACH protocol is unable to support MSNs from the time when the mobility of sensor nodes is not measured in its design where all sensor nodes are implicit to be stationary after employment. Hence, the realization of the LEACH protocol brings about serious packet loss in mobile application.

Drawback of Existing System

- Data loss arises due to mobility of antenna nodes.
- The LEACH technique is not enough to support MSNs.
- LEACH protocol brings about serious packet failure in mobile applications.

IV. PROPOSED SYSTEM

An enhanced LEACH protocol for mobile sensor networks has been proposed to prolong the network lifetime. Reduce the packet loss using fuzzy inference systems. The hierarchical clustering approach applies fuzzy logic to synthesize different parameters to the CH . Network is homogeneous and each node has the same starting energy. Each node knows its own residual energy, moving speed, and pause time during operation. During CH selection, an FIS has been adopted to provide the chance value for each node. Three input variables for the FIS are the residual energy, moving speed, and pause time. One output parameter is the probability of a node to be selected as a CH, named chance. The higher the value of chance, the more possibility to be selected as a CH. Sensor nodes are randomly deployed, and then in order to continuously monitor the sensing environment, mobile nodes roam around a fixed deployment area. Each sensor nodes could operate in either sensing mode to monitor the environment and send data to associated CH or CH mode to gather data forward to the base station. The data gathered by CHs is transmitted to a base station situated outside the deployment area. In addition to the residual energy, the moving speed and pause time (as mobility) have been introduced to act as fuzzy descriptors during the CH selection process. Hence, through evenly balancing energy consumption among all nodes, the network lifetime would be increased. Also, the packet loss would be decreased by selecting much more stable CHs with less mobility.

Advantages of Proposed System

- Outstanding power, the moving speediness as well as pause time parameters be planned for cluster head collection.
- Network life time has been enhanced.
- Packet loss is reduced through selecting stable CH.

V. IMPLEMENTATION

Low-energy adaptive clustering hierarchy (LEACH) procedure intended for mobile antenna network. LEACH has been planned to not only extend the system lifetime but also reduce the packet loss using fuzzy inference systems (FISs). CH gathers the records from antenna nodes in its cluster, squeeze it, as well as send the aggregated records to the base station. A set-up phase to organize the cluster and then followed by a longer steady-state stage to move records to the base station. After the clusters be formed, the steady-state stage be alienated into a number of frames, in which antenna nodes broadcast their records to the CH in their assigned time slot at most once per frame. The system is uniform as well as every node has the same starting power. Each node knows its own outstanding power, moving speed, along with pause time during procedure. If the chance of itself is larger than every chance values from the others, the sensor node is chosen as a CH. Cluster arrangement stage a chosen CH broadcasts a CH-Message for advertisement. If a non-CH node receives the CH Message, the node selects the nearest one as its CH and sends a JOIN-REQ request to the chosen leader. The records transmission from sensor nodes to their CH is begun according to their TDMA schedule timeslots.

VI.CONCLUSION

The major challenge in antenna system supporting the mobility is that the procedure should be able to deal with the node mobility and topology change in the system. An improved LEACH procedure, namely LEACH-MF, has been planned to expand the system life span as well as decrease the packet failure intended for mobile sensing environments. In the future approach, fuzzy inference system have been adopted to the cluster leader collection. Nodes which hold high outstanding power, slower moving speed, as well as longer pause time would have a higher possibility to be selected as CHs. The model outcome point out that via applying the planned LEACH-MF approach, significant improvements in the system life span, power utilization, packet delivery ratio, along with cluster deviation. The goal is not only to expand the life span of a mobile sensor system intended for a certain amount of power, but also to decrease the packet failure in a mobile sensing environment.

VII. REFERENCES

[1]. A. A. Abbasi and M. Younis, "A survey on clustering algorithms for wireless sensor networks", *Comput. Commun.*, vol. 30, no. 14-15, pp. 2826-2841, Oct.2007.

[2]. C. Lee and T. Jeong, "FRCA: A fuzzy relevance-based cluster head selection algorithm for wireless mobile *ad-hoc* sensor networks", *Sensors*, vol. 11, no. 5, pp.5383-5401, 2011.

[3]. D. S. Kim and Y. J. Chung, "Self-organization routing protocol supporting mobile nodes for wireless sensor network," in *Proc. Int. Multi-Symposiums Computer &Computational Sciences*, vol. 2, Hangzhou, China, June 2006, pp. 622-626.

[4]. D. C. Hoang, R. Kumar, and S. K. Panda, "Realization of cluster based protocols using fuzzy C-mean algorithms for wireless sensor networks", *IET Wireless Sensor Syst.*, vol. 3, no. 3, pp. 163-171, 2013.

[5]. G. Anastasi, M. Conti, M. D. Francesco, and A. Passarella, "Energy conservation in wireless sensor networks: A survey", *Ad Hoc Netw.*, vol. 7, no. 3, pp. 537-568,May 2009.

[6]. H. Taheri, P. Neamatollahi, O. M. Younis, S. Naghibzadeh, and M. H. Yaghmaee,"An energy aware distributed clustering protocol in wireless sensor networks using fuzzy logic," *Ad Hoc Netw.*, vol. 10, no. 7, pp. 1469-1481, 2012.

[7]. I. Butun, S. D. Morgera, and R. Sankar, "A survey of intrusion detection systems in wireless sensor networks," *IEEE Commun. Surveys Tuts.*, vol. 16, no. 1, pp.266-282, Feb. 2014.

[8]. J. S. Lee and W. L. Cheng, "A fuzzy-logic-based clustering approach for wireless sensor networks using energy predication," *IEEE Sensors J.*, vol. 12, no. 9, pp.2891-2897, Sep. 2012.

[9]. J. S. Lee and T. Y. Kao, "An improved three-layer low-energy adaptive clustering hierarchy for wireless sensor networks," *IEEE Internet Things J.*, vol. 3, no. 6, pp.951–958, Dec. 2016.

[10]. M. Al-Jemeli and F. Hussin, "An energy efficient cross-layer network operation model for IEEE 802.15.4-based mobile wireless sensor networks," *IEEE Sensors J.*, vol. 15, no. 2, pp. 684-692, Feb. 2015.

[11]. M. M. Afsar and M.-H. Tayarani-N, "Clustering in sensor networks: A literature survey", *J. Netw. Comput. Appl.*, vol. 46, pp. 198-226, 2014.

[12]. M. J. Handy, M. Haase, and D. Timmermann, "Low energy adaptive clustering hierarchy with deterministic cluster-head selection," in *Proc. Int. Workshop Mobile Wireless Commun. Netw.*, Stockholm, Sweden, Sep. 2002, pp. 368-372.

[13]. R. Velmani and B. Kaarthick, "An efficient cluster-tree based data collection scheme for large mobile wireless sensor networks," *IEEE Sensors J.*, vol. 15, no.4, pp. 2377-2390, Apr. 2015.

[14]. S. Tyagi and N. Kumar, "A systematic review on clustering and routing techniques based upon LEACH protocol for wireless sensor networks," *J. Netw.Comput. Appl.*, vol. 36, no. 2, pp. 623-645, 2013.

[15]. S. A. B. Awwad, C. K. Ng, N. K. Noordin, and M. F. A. Rasid, "Cluster based routing protocol for mobile nodes in wireless sensor network," *Wireless Pers.Commun.*, vol. 61, no. 2, pp. 251-281, 2011.

[16]. S. Deng, J. Li, and L. Shen, "Mobility-based clustering protocol for wireless sensor networks with mobile nodes," *IET Wireless Sensor Syst.*, vol. 1, no. 1, pp.39-47, 2011.

[17]. S. A. Sert, H. Bagci, and A. Yazici, "MOFCA: Multi-objective fuzzy clustering algorithm for wireless sensor networks," *Appl. Soft Comput.*, vol. 30, pp. 151-165,2015.

[18]. T. Rappaport, *Wireless Communications: Principles & Practice* (2nd Edition).Englewood Cliffs, NJ: Prentice-Hall, 2002, pp. 105-168.

[19]. T. Camp, J. Boleng, and V. Davies, "A survey of mobility models for *ad hoc* network research," *Wireless Comm. Mobile Comput.*, vol. 2, no. 5, pp. 483-502,2002.

[20]. W. B. Heinzelman, A. P. Chandrakasan and H. Balakrishnan, "An application specific protocol architecture for wireless microsensor networks," *IEEE Trans.Wireless Commun.*, vol.1, no.4, pp. 660- 670, Oct. 2002.

[21]. W. B. Heinzelman, A. P. Chandrakasan and H. Balakrishnan, "Energy-efficient communication protocol for wireless microsensor networks," in *Proc. IEEE Annu. Hawaii Int. Conf. Syst. Sci.*, Cambridge, MA, Jan. 2000, pp. 1-10.