VIRTUAL REALITY BASED STUDY OF CLUSTER-BASED PROTOCOL IN WIRELESS SENSOR NETWORK

Dr.M.Mohammed Ismail[1], Dr.P. Rizwan Ahmed[2]

1 Associate Professor & Head, PG & Research Department of Computer Science,

Mazharul Uloom College, Ambur, Tamil Nadu, INDIA

2 Assistant Professor & Head, Department of Computer Application (UG &PG,

Mazharul Uloom College, Ambur, Tamil Nadu, INDIA

ABSTRACT

The modern growth in fabricate energy efficient Wireless Sensor Network is liberal a novel way to systematize WSN in applications like surveillance, industrial monitoring, traffic monitoring, habitat monitoring, cropping monitoring, crowd including etc. The rising use of these networks is making engineers evolve novel and efficient ideas in this field. A group of research in data routing, data density and in network aggregation has been proposed in recent years. The energy consumption is the main apprehension in the wireless sensor network. There are many protocols in wireless sensor network to diminish the energy consumption and to put in to the network lifetime. Among a range of types of techniques, clustering is the most efficient technique to diminish the energy expenditure of network. In this effort, LEACH protocol has been second-hand for clustering in which cluster heads are nominated on the basis of distance and energy. The LEACH protocol is been implemented in a simulated environment and analyze their performance graphically.

KEYWORDS:- Wireless sensor networks, energy efficiency, Clustering, LEACH protocol

1. INTRODUCTION

A wireless sensor network is complete up of a huge quantity of sensor nodes and a sink [2]. The WSN is self-confident of sensor nodes from hundreds or thousands and every node is coupled to one sensor nodes. A wireless sensor network entire up of a large number of nodes extend over a precise area. A sensor node self-confident of the sensor, actuators, memory, a mainframe and they do have communication aptitude. All the sensor nodes are permitted to communicate in the course of a wireless intermediary. The wireless standard is of infrared, radio frequency that having no wired tie friendly. So the sensor nodes are deployed in a random conduct and it make ad-hoc network because they can discuss themselves [1]. If the node is unable to converse with other nodes of the network through a direct link, it means the node is out of range. In such kind of networks

data broadcast from one node to another is perform via in the middle of nodes. This idea is referred as multi-hoping. All sensors nodes work helpfully to serve the requests [4].

2 CLUSTER BASED ROUTING PROTOCOLS

A. Low-Energy Adaptive Clustering Hierarchy

The Low-Energy Adaptive Clustering Hierarchy (LEACH) is an adaptive and self-organizing protocol that minimizes energy consumption in wireless sensor networks. The underlying idea behind LEACH is the use of randomized rotation of cluster heads so that energy dissipation is shared evenly among all participating sensor nodes]. The operation of LEACH can be categorized into two phases, namely; the setup phase and the steady phase. In the set-up phase, a sensor node selects a random number in the range of 0 and 1. If this number is greater than a specified threshold, the sensor node will be elected as a cluster head. After selecting the cluster heads, advertisements will be done by the newly-elected cluster heads to other nodes. Upon the reception of these advertisements, each node will determine the cluster to belong to based on the signal strength of the advertisements. This is because a strong signal strength means the cluster head is nearer to the node, hence minimum communication energy is required. Afterwards, the nodes notify the nearest cluster heads of their interest in becoming a cluster member. After cluster formation, the cluster heads allocate the time for sending data based on a Time Division Multiple Access (TDMA) approach. Subsequently, the nodes start sensing and sending data to cluster heads. Data aggregation is performed by the cluster heads before finally sending data to the sink. After successfully conveying the data to the sink, the network goes into reconfiguration and it selects new cluster heads. Finally, LEACH uses single-hop communication.

B. Threshold-Sensitive Energy-Efficient Sensor Network Protocol

TEEN (Threshold-Sensitive Energy-Efficient Sensor Network) and APTEEN (Adaptive Periodic Threshold Sensitive EnergyEfficient Sensor Network) were proposed in [8-9] respectively for time-critical applications. TEEN is a protocol developed to respond to abrupt changes in the sensed attributes [3-5]. In the beginning, cluster formation is done by grouping nodes that are proximate to each other as clusters. Cluster heads of clusters nearer to the sink will be assigned higher priority while cluster heads of clusters farther from the sink will be assignedlower priority.

C. Geographic Adaptive Fidelity Protocol

Geographic Adaptive Fidelity (GAF) is a protocol originally developed for mobile ad hoc networks (MANETs) but found useful for sensor networks. The fundamental idea behind GAF is that for each grid area, a node serves as a leader to convey data to other nodes but unlike other cluster routing protocols, these leader nodes do not perform data aggregation. The protocol commences with forming a virtual grid over the deployed area. Afterwards, nodes use a Global Positioning System (GPS) to associate themselves with a location in the virtual grid. Nodes associated with the same location are equivalent nodes hence they form clusters.

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3 ENERGY CONSUMPTION ISSUES

The chief complicatedness in WSN, sensor node have classified battery life because the sensor nodes size is small so battery size, processor, storage liberty for data, these all are small as sensor nodes. So the main central point on lessening energy expenses in wireless sensor networksWSN a package of sensed information and routing in order has to be send which after have some time constraint so that information can be employable before any disaster occurs e.g. manufacturing monitoring, apparatus Monitoring etc. In WSN the power authority utilization is much better-quality data communication then internal processing. So, Energy preservation in WSN is the need to the address [3].

LEACH is conscious as the most fashionable routing protocol that exploit cluster based routing in order to weaken the energy consumption, in this paper suggest a development on the LEACH protocol that supplementary recover the power consumption, simulation results express out that our protocol outperforms LEACH protocol in term of energy consumption and overall throughput. LEACH is "Low Energy Adaptive Clustering Protocol" [10]. LEACH form clusters and selects randomly cluster Heads for each cluster. Non-cluster heads sense the data and broadcast this data to cluster head, and then cluster head combined the data and forward this data to sink. The principle of this protocol is that it assigns overall energy consumption of the network uniformly to each node by selecting periodically different nodes as a cluster head. There are two phases of LEACH that are Setup phase and Steady state phase. In set up phase, clusters are shaped and cluster heads are chosen. In steady state phase, data from non-cluster heads is transmitted to sink. The sensor nodes communicate with cluster heads with allotted time using TDMA.

4. SIMULATION SET UP

In this section, we evaluate the performance of LEACH protocol using NS2 tool. NS2 is used as simulation podium. NS is a distinct event simulator, where the go forward of time depends on the timing of events which are preserve by the scheduler. NS simulator is depending on two languages: C++, and an OTcl (an object-oriented tool command language).

5 CONCLUSIONS

The conclusion of this paper is to apply and evaluate the performance of LEACH protocol using QoS parameters such as energy consumption, packet loss, End-to End-Delay, Throughput, and Control Overhead. The energy consumption of LEACH is very high because each cluster heads straight communiqué with BS no material the distance between Cluster head and the base station; it will use a group of its energy if the remoteness is far. Due to far distance packet does not arrive at the sink, packet loss problem is occurred so the overall performance of the networks is decreased. With the outcome obtained in this paper, a further issue worthy of consideration with RFID protocol can be done named as R- LEACH protocol. The design system can be extended using R-LEACH protocol; Of course, since we have focused only on LEACH protocol in this

paper, the diagnosis can be done using R- LEACH protocol. We would like to consider these issues in subsequent work.

REFERENCES

[1]   S. Pant, N. Chauhan,P. Kumar, "Effective Cache based Policies in Wireless Sensor Networks: A Survey," International. Journal of Computer Application., vol. 11, no. 10, pp. 17–21, 2010.

[2]   I. Akyildiz, W. Su, Y. Sankarasubramaniam,E. Cayirci, "Wireless sensor networks: a survey," Comput. Networks, vol. 38, pp. 393–422, 2002.

[3]   D. Zhang, G. Li, K. Zheng, X. Ming, Z. H. Pan, "An energy-balanced routing method based on forward-aware factor for wireless sensor networks," IEEE TRANSACTIONS ON INDUSTRIAL INFORMATICS, vol. 10, no. 1, pp. 766–773,2014.

[4]   L. Jian-qi, C. Bin-fang, W. Li, W. Wen-Hu, "Energy optimized approach based on clustering routing protocol for wireless sensor networks," 2013 25th Chinese Control Decision. Conference, pp. 3710– 3715, 2013.

[5]   S. Singh and C. S. Raghavendra, "PAMAS---power aware multi-access protocol with signalling for ad hoc networks," ACM SIGCOMM Computer.Communication.Review., vol. 28, pp. 5–26, 1998.

[6]   Yassein, "Improvement on LEACH Protocol of Wireless Sensor Network (VLEACH)," International. Journal of Digital Content Technology and its Application, vol. 3, pp. 132–136, 2009.

[7]   P. Nayak and D. Ph, "Comparison of Routing Protocols in WSN using NetSimSimulator : LEACH Vs LEACH-C," vol. 106, no. 11, pp. 1–6, 2014.