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Energy Efficient Mobile Collector Based Routing Scheme Mutihop Wireless Sensor Network

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ABSTRACT

Wireless sensor network (WSN) refers to a group of spatially dispersed and dedicated sensors for monitoring and recording the physical conditions of the environment and organizing the collected data at a central location. WSNs measure environmentalconditionslike temperature, sound, pollution levels, humidity, wind speed and direction, pressure, etc.A WSN consists of anywhere from a few hundreds to thousands of sensor nodesthe current Mobile Data Collector(MDC)scheme is only implemented for improving the energy efficiency in data transmissions. For multihop environment in which multi-hop environment needs data to be transferred from one node to other node until it reaches to the destinations. The MDC scheme which is used only for single hop distance for data transmission. By keeping this system to improve the routing of data in WSN using clustering and mobile data collectors for multi-hop network system. Existing system fails in multi-hop wireless network; therefore implement the MDC scheme for multi-hop environment.

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I. INTRODUCTION

The number of advanced technology made in wireless communications and micro-electronics, wireless sensor networks (WSNs) are widely used in daily life in health, traffic, and many other consumer and industrial areas. [1]. WSNs have already surfaced as a hot area of research, WSN consist of many sensor nodes Which having low cost and have the ability to process and communicate. WSNs must be able to operate autonomously for extended lengths of time in the majority of their applications even though their sensors are tiny devices that possess power supplies which are limited. At each layer of the networking protocol stack suitable solutions are required so that the usage of energy can be better managed and the network lifetime as a whole can be increased. Mostly a massive amount of attention has been given to routing protocols that are energy aware at the network layer.Because of this wireless communication has been well established to be the key cause of the consumption of power in WSNs.The WSN is built of "nodes" – from a few to several hundreds or even thousands, where each node is connected to one (or sometimes several) sensors. Each such sensor network node has typically several parts: a radio transceiver with an internal antenna or connection to an external antenna, a microcontroller, an electronic circuit for interfacing with the sensors and an energy source, usually a battery or an embedded form of energy harvesting. A sensor node might vary in size from that of a shoebox down to the size of a grain of dust, although functioning "motes" of genuine microscopic dimensions have yet to be created. The cost of sensor nodes is similarly variable, ranging from a few to hundreds of dollars, depending on the complexity of the individual sensor nodes. Size and cost constraints on sensor nodes result in corresponding constraints on resources such as

energy, memory, computational speed and communications bandwidth.

Single-sink data collection widely results in a many-to-one traffic pattern from the sensing nodes to the sink. This single-sink data collection is the normal use in WSNs. It is usual for routing protocols to stay away from lossy links at any cost, because WSNs are very resource limited. Hierarchical Clustering architectureis providedfor that purpose which is more easily scaled and that has less power usage; so that it provides the entire network with a longer lifetime. Within cluster Most of the sensing, processing of data and activities involved in communication can be carried out.However, flat and cluster based routing protocols have own benefits but they both created communication holes within the network. Two major types of communication holes are i)Energy, ii)Routing. The energy hole problem in WSN, disturbs the lifetime of network because sensor nodes normally perform as originator and router of data. The communication obeys a many-to-one and converge-cast pattern, where nodes transmit heavy communication load near the base station, causing increased energy dissipation rate. The primary and utmost objective in communicationnetwork is efficient routing. The efficient routing protocol in WSNs is to increase the quality of network services and increases lifetime of the network. Redeploy able and non-redeploy able holes are Two types of routing holesthat can exist in real time sensor networks.[6, 7 and 8].

II. LITERATURE SURVEY

Threshold Sensitive Energy Efficient Sensor NetworkProtocol (TEEN) [10]

The proposes a reactive routing protocol that is specially applicable for time sensitive applications. TEEN uses the principle of hierarchical clustering.The sensor nodes which are geographically close to each other are grouped together with one common cluster head. For this purpose, these cluster heads are seen as first layer cluster heads. This layerfirstly collects the data messages from the sensor nodes within its cluster and then aggregate the collected data messages and forward the aggregated messages to a higher layer. If the hard threshold is never reached, no data messages will beforwarded towards the base stationthat is main drawback of TEEN.

A Novel Application Specific Network Protocol for WirelessSensor Networks

The newly developed self-organizing Hybrid Network Protocol for WSNs has been created on the basis of a cluster-based hierarchical architecture and multi-hop routing. This basis has been used so that energy efficiency can be improved and the lifetime of the network is extended. Multi-hop routing is employed in the hybrid protocol for inter-cluster communication between CHs and the BS rather than direct transmission. In this way, the transmission energy can be minimized and the energy load can be distributed throughout the entire network in an even manner. In addition, the same suppositions as created in the LEACH protocol are created in this protocol; the Carrier Sense Multiple Access (CSMA) MAC protocol, similar to the network model, is employed to reduce the potential of a collision taking place during the set-up phase. The node in the network knows of its own location. This is important to provide the multi-hop routing between CHs and isaccomplished by using the Global Positioning System (GPS) technology. It makes use of a rotation of the local base stations (CHs) that is randomized so that the load of the energy can be allocated consistently among the sensors in the network [11].

A Modified SPIN for Wireless Sensor Network

Paper [9] proposes an altered SPIN protocol named M-SPIN. Performance of M-SPIN protocol compared with the normal SPIN protocol which uses broadcast communication. In this approach Modified-SPIN (M-SPIN) protocol sends data only to a sink node rather than whole network. Because of this huge amount of energy can be saved. Because less number of packets being transmitted in the proposed protocol. In proposed M-SPIN protocol hop-count values of the sensor nodes are used for WSNs. negotiation is also performed in previous SPIN protocol before the actual data is transmitted; Rather than this in M-SPIN, the nodes which are closer to the sink node only transmit REQ packets as a reply to an ADV packet transmitted by the source node. As a result, the dissemination of the data is towards the sink or to the neighboring nodes on towards the sink node. The M-SPIN protocol gains energy savings by not transmitting packets to the direction that is opposite the sink node

III.PROPOSED SYSTEM

Existing work implements the current Mobile Data Collector scheme for improving the energy efficiency in data transmission. But existing system has not implemented the current system for multihop environment. Where multi-hop environment needs data to be transferred from one node to other node until it reaches to the destination node.

In our proposed work we are going to implement the existing system with the multi-hop environment. This is future of existing system and our proposed work.

To keep the current mobile data collector system in the mind to extend this system to implement it for multi-hop environment to achieve better energy efficiency. In proposed architecture MC (Mobile collector) is a resource rich node which has all resources available all the time.

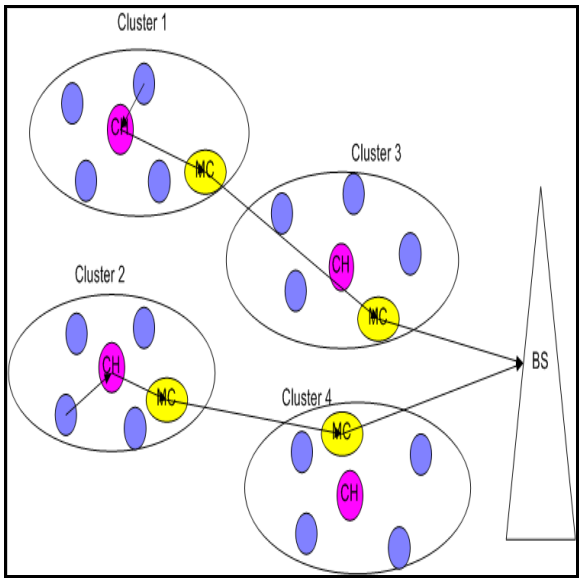


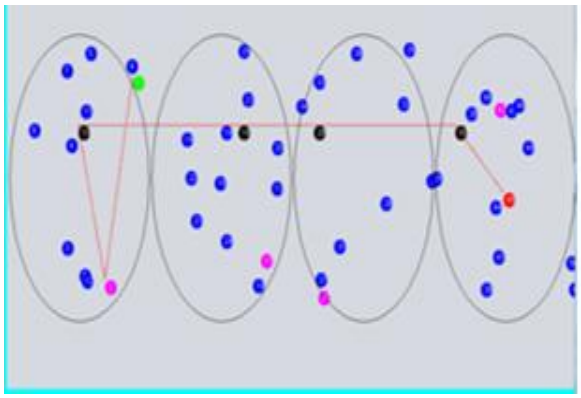
Fig.System architecture

Algorithm for data collection:

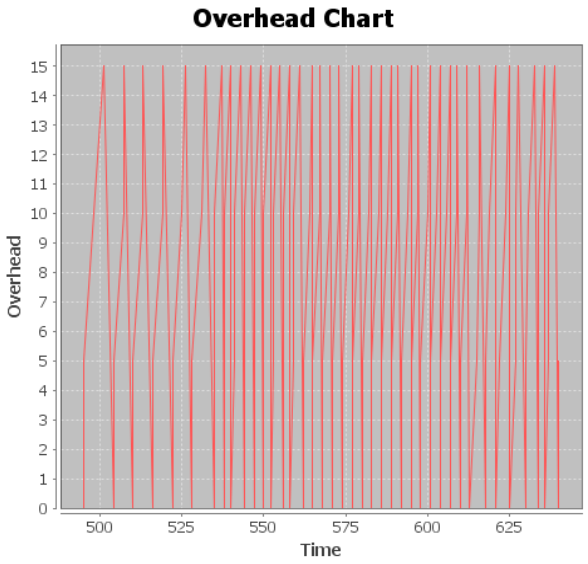
1. Sensor nodes will forward data to the cluster head in its cluster.
2. Mobile Data Collector belonging to each cluster will travel its fixed path, when there is connectivity between cluster head and MDC, cluster head transfer data to the MDC.
3. MDC also receives data from cluster head.
4. When MDC gets connectivity with another MDC in the direction of sink, it transmits collected data to that MDC
5. Above procedure is repeated till the data reach at the sink node.
6. Sink receives data from nearby MDC.

Results:

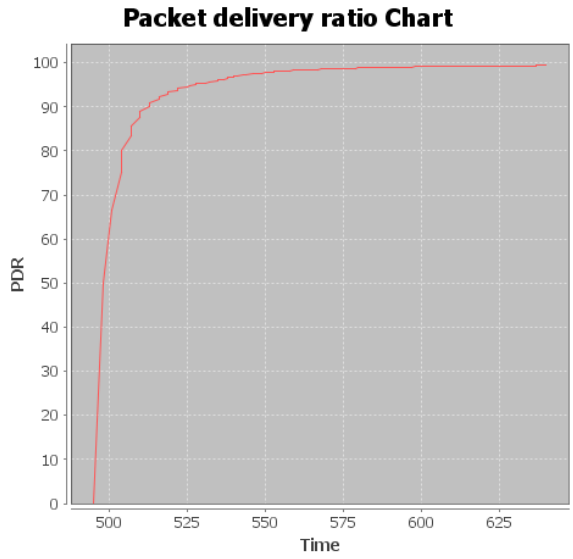
1.Big Data Gathering Using Mobile Node



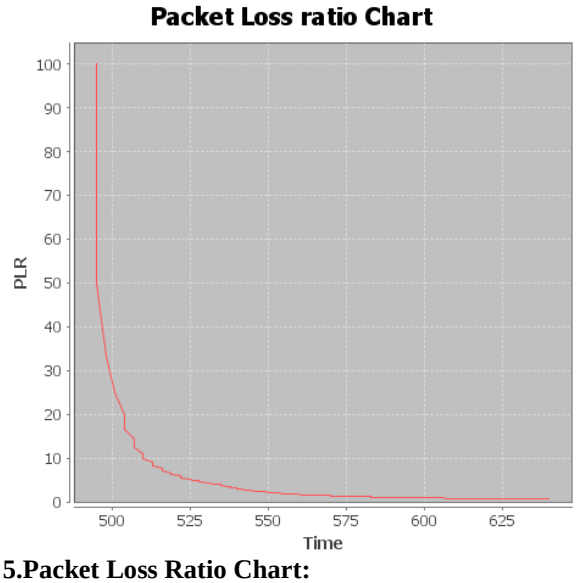
2. MDC data transmission



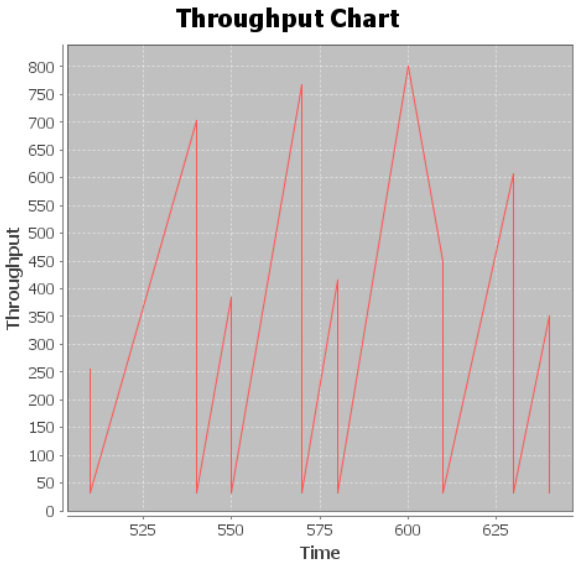
3.Overhead chart



4.Packet Delivery Chart:



5.Packet Loss Ratio Chart:



6.Throughtput Chart

Figure2 shows the mobile data gathering in multihop wireless network. Figure 3 shows end to end delay is kept constant by proposed routing protocol. Figure 4 shows the network overhead which is also consistent. figure 5 shows the packet delivery ratio is very good and increasing with time. figure 6 shows the packet loss ratio decreasing with respect to time. figure 6 shows the throughput which is also good.

IV. CONCLUSION

In the propose mobile data collector approach for big data gathering. Proposed approach improves energy efficient routing by reducing end to end delay. The propose routing protocol increases packet delivery ratio and reduces packet loss ratio.

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