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Distributed Energy Efficient Clustering Algorithm to Optimal Cluster Head by Using Biogeography Based Optimization

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Abstract Wireless sensor network consist of hundred to thousand of sensor nodes with limited energy capacity. It is generally difficult to recharge or replace these sensor nodes. Energy efficiency is thus a primary issue to maintain a wireless network. The problem of energy depletion of nodes is common for all data collection scenarios in which cluster head have a heavy burden of gathering and relaying information. In this paper we propose an energy efficient clustering algorithm "Distributed energy efficient clustering biogeography based optimization algorithm" to elect optimal cluster head based on highest residual energy and appropriate packet forwarding to the sink with respect to sensor nodes. This algorithm gives the better simulation results in comparison to DEEC algorithm.
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I. INTRODUCTION

With the advancement within the field of extremely integrated digital electronics technology and wireless communication, a new category of distributed system known as Wireless Sensor Network (WSN) has come into existence. Wireless Sensor Networks are used for collecting high fidelity data where setting up of wired network is

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not possible or too difficult or too costly. Building a wireless sensor network first of all needs the constituting nodes to be developed and available. These nodes have to compelled the requirement that comes from the precise requirement of given application, they may have to be compelled to be tiny, low cost or energy efficient, they need to be equipped with the right sensor, the mandatory computation and memory resources and that they would like adequate communication facilities.

As sensors in wireless sensor network changes there location regularly, so organizing a communication system for them could be a typical task. To solve this problem clustering algorithms for WSN are introduced which provides a structured way of communication for unstructured WSN as shown in the fig1 & 2. This algorithm divides WSN nodes into clusters selecting a cluster head for every node that performs data aggregation and processing task for whole cluster to saving energy. Cluster head therefore consume a lot of energy than other nodes.

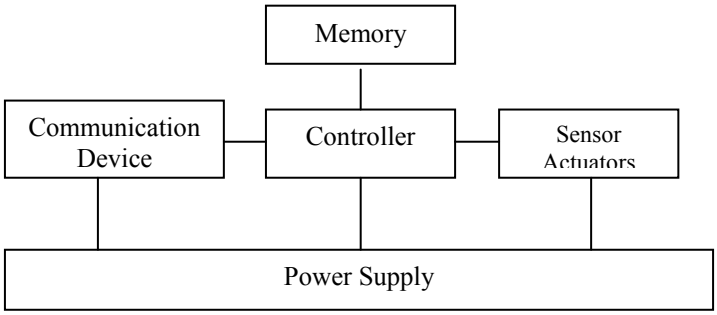

Fig 1.Sensor Network Architecture

Clustering is the activity of creating sets of similar objects. Nodes during a clustered wireless sensor network may also be classified as primary nodes and secondary nodes. Primary nodes can perform information aggregation and data processing function alternately secondary nodes only performs data forwarding functions .

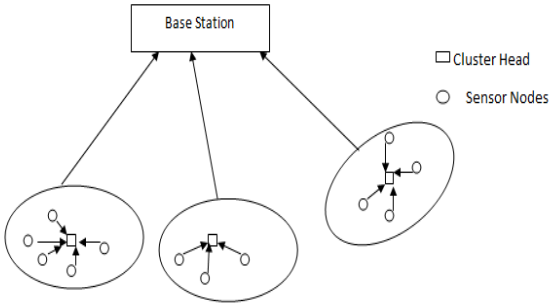

Fig.2 Wireless Sensor Network with Clusters

The clustering is done in such a way that data has to travel minimum distance. Only cluster heads communicates with cluster head thus diminishing the data redundancy which usually happens when each node perform its own data aggregation and transmission function uniformly. This algorithm provides very efficient way of communication in sensor networks. Clustering in WSN network makes them appropriate to be use in uneven environments.

II. RELATED WORK

There are two types of energy efficient clustering technique for WSNs. The clustering techniques applied in homogeneous WSNs are called homogeneous clustering technique, and the clustering techniques applied in heterogeneous WSNs are called heterogeneous clustering technique. Low energy adaptive clustering hierarchy (LEACH) is one of the first clustering algorithms which play an excellent role in reducing energy consumption of

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