ABSTRACT

Wireless Sensor Network (WSN) refers to a group of spatially deployed sensors that are used to sense or detect phenomena. In the recent years, there is an increase in the adoption of Wireless Sensor Network. The sensor device which is tiny in size and lower in cost, can deploy thousand to million nodes in a particular area. It plays a major role in various applications such as area monitoring, health care monitoring, forest fire detection, landslide detection, water quality monitoring and natural disaster prevention. The important contribution of the sensor nodes in the above mentioned application is to sense the environmental changes or an unexpected event occurred in the target area and to send the sensed data to the sink node /Base Station (BS). Resource limitations of the sensor node and unreliability of low power wireless links, in combination with various performance demands of different applications imposes many challenges in designing an efficient communication protocols for WSN.

Routing, a major issue to be considered to fulfill different performance demands of various applications in a WSN. The latency, throughput, energy utilization, and network life time are the important considerations for most of the proposed protocols. However, the attributes of sensed data may vary depending on the type of application. It may be delay sensitive or reliability demanding data. For example, the sensor network that is used for monitoring the normal temperature in weather monitoring station may not require the sensed data within certain time limit. On the other hand, the sensor network used for fire detection in a forest requires the sensed data for processing centre on time. In addition, the advent of multimedia sensor

devices along with the increasing attention in real time applications has made stringent constraints on both energy and delay.

Providing applications in sensor networks require energy and QoS awareness in order to maximize the network lifetime and utilize the network resources efficiently. Generally, routing protocol can be classified in to single path routing, multipath routing and multiple disjoint routing. In single path routing, there exists only one path between source and sink/BS. Multi path routing, which lacks load balancing traffic, learns routes and can select more than one path to a sink/BS. These protocols are enhanced for performing load balancing. Multiple disjoint routing is similar to the multipath routing where there are constraints for selecting the path: the node participated in the path should not participate in another path and also the node participated in one path should not participate in the same path in order to avoid looping. Both these routing techniques are not certain that all paths will have equal energy and set of hop count from source node to sink node. In this research work, both multi path routing and multiple disjoint routing features are considered for obtaining better performances. Along with the suggested idea and the various biological beliefs the malleability problems can be rectified. The area of bioinspired network engineering has a greater number of well known approaches which are swarm intelligence (Particle Swarm Optimization) and Evolutionary Algorithms. These above mentioned two algorithms are used in this research work to optimize the performance of multipath routing.

In this research work, multi path routing algorithm has been designed for efficient transfer of data from source to sink node or base station in wireless sensor network. The main objective is to achieve efficient utilization of network resources and to extend the network life time by considering the performance parameters such as average remaining energy,

routing overhead, network life time and end-to-end delay. It is always better to start with the analysis of the performance of existing work. The first work is comparing the routing protocols in WSN that are categorized in to single path routing, multipath routing and multiple disjoint routing. The standard protocols that are considered for comparison among them are taken from each category such as DSR(Dynamic Source Routing), AOMDV (Ad hoc On demand Multipath Distance Vector) and MCP-DE (Multi Constraint Path-Delay Expected transmission cost).

Interference Aware Multipath Routing (IAMR) is an on demand routing approach which establishes multiple disjoint paths between source and sink/BS node where IAMR is implemented. The main objective is to construct a maximally disjoint route to prevent certain nodes from being congested and to utilize the available network resources efficiently. Usage of multimedia data has been increased. Processing of multimedia data in wireless sensor network is a potential technology. In Cost Based Multipath Routing (CBMR), the objective is to transfer the multimedia data efficiently across the network with less energy consumption, reduced end-to-end delay and increased network lifetime.

CBMR-Genetic Algorithm, the objective of this work is to select the optimized path between source node and sink node and to maximize the network life time depending on energy consumption of the node. The CBMR approach is extended by using Swarm intelligence and is used in this proposed system because multipath routing is a NP-Hard problem. Since multipath routing technique depends on multiple solutions, Comprehensive Learning Particle Swarm Optimization (CLPSO) and Non-dominated Sorting Particle Swarm Optimization (NSPSO) are utilized for better improvement.

The CBMR and IAMR concentrate on reducing energy consumption, maximizing the network life time and minimizing the end to end delay. The Efficient Priority Based Mulitpath routing (EPBMR) approach addresses the efficient use of multiple paths in order to reduce the end to end transmission delay and prioritize the need of data based on the situation. This work focuses on finding out the multiple optimized routing paths based on priority. Here the path cost and type of data are considered as priority parameters.