ABSTRACT

Wireless Sensor Network has emerged as an attracting and challenging research area as it has laid its hand significantly in the real time applications. WSN consists of small node which poses sensing capability. In real time digital circuit has made its part in WSN as a significant partner which has made the communication with such a small, low power, inexpensive and devices which are distributed capable of sensing the environment where it is deployed. After sensing, the sensed data is processed and is communicated to the client. Sensor nodes are designed with energy constraint nature. This condition becomes the key criteria when there is a dense deployment of nodes. Hence for the successful network performance and increased lifetime, the routing should be energy efficient.

Researchers have proposed many energy efficient protocols which has primary goal of focusing on maximizing the network lifetime. Single hop routing and disjoint routing are some of the conventional routing techniques for energy efficient routing but these are proved as incapable to meet the real time application specific and hence this has made a vacuum and an immediate requirement for newer energy efficient routing protocols. But developing such energy efficient protocols stipulate the implementation of routing protocol more application specific which need to meet some of the very basic and critic area of WSN routing as traffic load balance, service differentiation and finally assurance of the desired quality of service in terms of reliability, resilient to varying node density and sped of delivery.

To meet the above said criteria for an efficient routing, we propose an innovative routing which combines the properties of braided multipath and Dijkstra based approach. This approach helps to have a load balanced service in real time applications. In may real time applications networks are expected to have longer network lifetime in a remote environment where access to sensor nodes are difficult which has minimal monitoring requirement. The proposed DPDBMR provides a justified service in a differentiating traffic environment. Its objective is to provide a highly reliable with priority based data service for an efficient
routing. Based on its service it can be defined that the proposed routing with Quality of Service and reliability for successful communication. Dijkstra shortest path approach is used to find the shortest path. The primary path is constructed based on the braid theory.

The braided alternate paths are also constructed which kept in sleep mode unless it is required under the condition of the failure of the primary path. When there is a failure of primary path, the alternate paths are activated based on the priority of the alternate paths. The constructed alternate paths are stored in a table and are updated frequently. The priority for the alternate paths is assigned based on the length of the paths. To find the shortest alternate path, Dijkstra algorithm is implemented which is based on the positive weighted nodes. Only the nodes with positive weights are considered for the construction of shortest alternate path.

Hence the constructed alternate paths are found to be highly efficient as it is almost in similar length of the primary path and more energy is saved since flooding of nodes is not required every time when there is a failure of the primary path. Since all the alternate nodes are kept in sleep mode energy is conserved more. The proposed clustering strategy to find out the compromised nodes help in increasing the reliability of the network. It also improves the network performance, by including the idle nodes which do not belong to any cluster in the network. Though there are some complexity in clustering the single node, this approach has reduced the construction of single and double clusters. The number of single and double cluster is inversely proportional to the efficiency of the network.

The energy consumed by nodes in the network is comparatively less resulting in the prolonged network lifetime. Since the proposed routing protocol is partially disjoint nodes taking part in primary path also take part in the construction of alternate paths. Thus the number of node involved is also reduced when compared with the other existing techniques. With appropriate simulations are performed for the evaluation of the proposed routing and clustering techniques and the results are compared with the existing protocols. The results shows that our protocol have an energy efficient communication than other protocols.

**Keywords:** Wireless Sensor Network, clustering, routing, braided multipath, Dijkstra, energy efficiency.