ENERGY EFFICIENT ANALYSIS USING GRAPH BASED THEORY BASED ON CLUSTERING TECHNIQUES IN WIRELESS SENSOR NETWORKS

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Abstract— Using sub-meter spatial resolution of Wireless Sensor Networks is a large number of sensor nodes and data send from a sink with the help of radio transmitter. The major issues in wireless sensor networks are limited energy. The applications of wireless sensor networks have increasing every day in life suitable for monitoring and environmental applications like household, industrial, military affairs, traffic management, medical applications, surveillances etc. The group of nodes is connected in a single network called cluster. Each cluster is controlled and monitoring by a cluster head. The data is easily communicated through base station with the help of cluster head. So we introduced the energy efficient clustering algorithm to enhancement of the network capacity and also network life time. A wireless network is any sort of computer network that uses wireless data connections to plug network nodes. Wireless networks are computer networks that are not connected by cables regardless of the sort. The use of a wireless network enables enterprises to prevent the costly means of introducing cables into buildings or as a connection between different equipment locations. The cornerstone of wireless systems is radio waves, an implementation that occurs at the physical higher level of network structure. Wireless technologies differ in a number of dimensions, most notably in just how much bandwidth they provide and how far apart communicating nodes can be. Other important differences include which perhaps the electromagnetic spectrums they choose (including whether or not this has a license) and exactly how much power them consume (very important to mobile nodes). In this section we discuss four prominent wireless technologies: Bluetooth (802.15.1), Wi-Fi (more formally generally known as 802.11), WiMAX (802.16), and third-generation or 3G cellular wirelesses. Energy Efficiency is important role of the Wireless Sensor Networks Researchers. The Energy Efficiency is one of the roles where the data is transmitted to the base station. Energy Techniques is used to improve the reliability of a link. When the data is transmitted communicates to the nodes at exact power to the clustering technique algorithm using graph theory approaches. Secure data aggregation is a challenging task in the wireless sensor networks. These issues are needed to overcome using the clustering efficient techniques. We propose a graph theory based secure data aggregation which has a three phases. We assume the transmitted power and sensing power of the nodes. First phase performs the clustering and cluster head election process. Second phase performs the each clusters are calculated the distance, Energy and also dependence. Third phase performs the shortest path calculation was transmitted the data to secured or not. Finally the aggregated data was transmitted from the cluster heads to the base station. Our proposed models are analysis the acknowledgement through the base stations.

Keywords – energy efficiency, wireless sensor network, clustering technique, graph based theory

I INTRODUCTION

Any Non Uniform data contains underlying structure due to the heterogeneity of the data. The process of identifying this structure in terms of grouping the data elements is called clustering, also called data classification. The resulting groups are called clusters. The grouping is usually based on some similarity measure defined for the data elements. Clustering is closely related to unsupervised learning in pattern recognition systems. A basic task in unsupervised learning is to classify a data set into two or more classes based on a similarity measure over the data, without resorting to any a priori information on how the classification should be done. Graphs are structures formed by a set of vertices (also called nodes) and a set of

edges that are connections between pairs of vertices. Graph clustering is the task of grouping the vertices of the graph into clusters taking into consideration the edge structure of the graph in such a way that there should be many edges within each cluster and relatively few between the clusters. Graph clustering in the sense of grouping the vertices of a given input graph into clusters, which is the topic of this survey, should not be confused with the clustering of sets of graphs based on structural similarity; although many of the techniques involved are closely related to the task of finding clusters within a given graph.

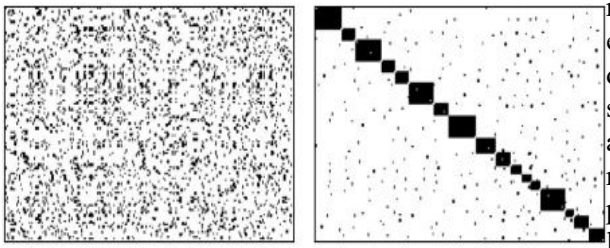

Fig: 1 Adjacency Matrix of a 210-Vertex Graph with 1505 Edges

Wireless sensor networks have emerged as an equally valuable and novel platform for wireless communication and other areas of applications. The potential of wireless sensor networks include wider areas of coverage such as environmental monitoring, defense machinery and surveillance, ecology evaluation, industrial products manufacturing, home appliances, transportation, medical applications, general applications etc. Wireless sensors are portable devices integrated with a combination of transmitter and receiver along with low energy sources. Common features of a wireless sensor node constitute memory, energy and economical processor for computation purpose.

The main operational sustainability concern in WSN is its energy resource constraint. This brings along in recent years that a great number of energy efficient routing protocols have been proposed for WSNs based on the network organization and the routing protocol operations. Some of these focused on minimizing the communication distance to reduce the energy consumption and a handful of them focused on fair energy distribution to avoid the routing hole (hot spot) problems [25, 26]. The routing hole issue was described and addressed in [25–28] by utilizing mobility based energy efficient routing protocols. These protocols are suitable in certain situations; however they may not be applicable in cases where mobility is not feasible such as earthquake, forest fire, and disaster management [29]. Mobility techniques do have other challenges like increased energy overhead owing to frequent network topology changes and data packet drops due to high latency [30, 31]. Various other research papers focusing on energy efficiency routing protocols can be found in [32–37]. Many researchers pay attention to the WSN energy issue by designing different routing techniques and MAC-layer protocols to raise the energy level in WSN. Our literature review reveals that a range of different energy efficient routing protocols in the recent past were designed mostly based on the network structure such as hierarchical routing, location routing, and flat based routing. Our extensive literature review also reveals that the existing routing protocols are still facing energy efficiency limitation issues. Critical analyses of some of the popular existing energy efficient routing protocols are presented in this section.

II METHODOLOGY

We present different cluster head selection algorithms in order to compare their performances with our proposed algorithm. When each sensor node cooperatively monitors or collects environmental data or conditions (i.e., temperature or humidity), it sends information to a base station via a cluster head selected from a cluster head selection algorithm. In our experiments, nodes are grouped into clusters where they are within a transmission range. Data packets are forwarded from sensor nodes to a cluster head toward the base station. Note that sensor nodes can be grouped into a number of clusters which may be in different layers depending on location and distance to the base station. A low layer cluster refers to a group of nodes located within a transmission range closer to the base station than higher layer clusters. We assumed that each node knows the location of its neighbor nodes within the maximum transmission range by using arrival time of “Hello message” during the connection setup process. The information of energy consumption, residual battery level, and distance to the base station (assuming that all nodes know the position of the base station) will be also learnt from the connection setup process. In typical wireless sensor networks, a clustering

algorithm which simply selects a cluster head with minimum distance or maximum residual battery level is usually used. Some other clustering algorithms have been proposed to consider important issues of both energy consumption and battery level in wireless sensor networks. A cost function is commonly used in a clustering algorithm for cluster head selection.
Clustering is a technique in which the sensors are organized into different number of clusters. In each cluster, one node acts as a cluster head (CH) and the remaining nodes form the members of the cluster.

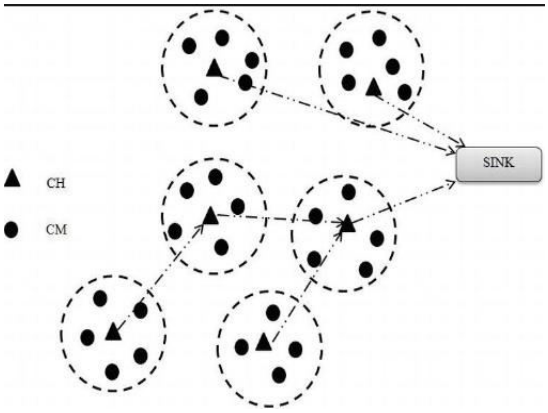

Fig: 2 Clustering Techniques in Wireless Sensor Network

GRAPH BASED THEORY

According to the constructed graph, the critical path with the all arcs weights maximum total value is calculated when following from the initial graph (source) vertex to the final (sink). This critical path will correspond to the optimal enterprise ISS. In turn, the critical path calculating process can be automated by developing a simple computational software module.

Given a graph G = (V, E), we can relate it to different topological structures. The relation between topology and graph theory is undergone many investigations. In 1967, J.W. Evans et.al [7] proved that there is a one to one correspondence between the set of all topologies with n points and the set of all transitive digraphs with n points. He established the result as follows. Let V be a finite set and T be a topology on V. The transitive digraph corresponding to this topology is got by drawing a line from u to v if and only if, u is in every open set containing v. Conversely let D be a transitive digraph on V. The family B = {Q(a) : a ∈ V } forms a base for a topology on V , where Q(a) ={a} ∪ {b ∈ V : (b, a) ∈ E(D)}.

III SIMULATION AND RESULT ANALYSIS

Here propose a graph theory based secure data aggregation which has a three phases. We assume the transmitted power and sensing power of the nodes. First phase performs the clustering and cluster head election process. Second phase performs the each clusters are calculated the distance, Energy and also dependence. Third phase performs the shortest path calculation was transmitted the data to secured or not. Finally the aggregated data was transmitted from the cluster heads to the base station. Our proposed models are analysis the acknowledgement through the base stations.

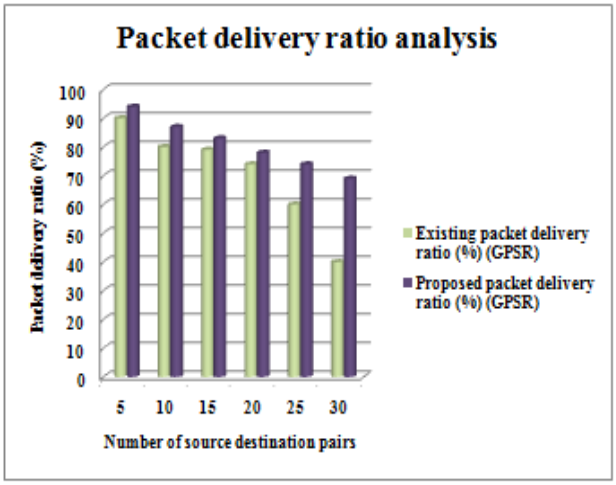

Fig 3: Packer Delivery Ratio Analysis

The Simulated results are done by NS-2 Simulator. The table.1 shows that there is analysis of the packet delivery ratio compare

with existing and proposed methodology. The figure.5 shows that there is the analysis of the packet delivery ratio compare with existing and proposed methodology.

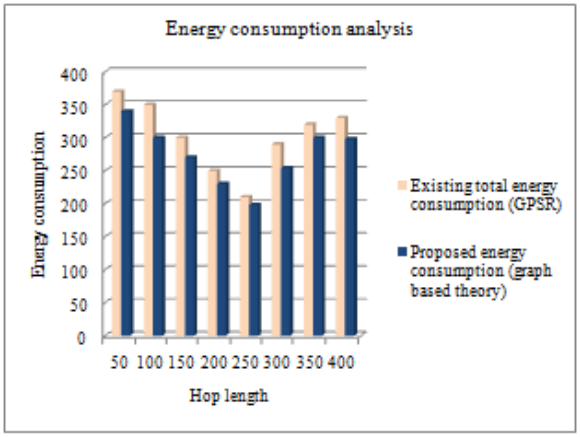

Fig 4: Energy Consumption Analysis

VII CONCLUSION AND DISCUSSIONS

This paper introduces a new methodology of clustering of each node and also overall potential of each cluster. The efficiency of the proposed model is analysis using NS-2 and the results showed above. The sensor nodes utilize extremely less power and stay in the networks for a greater period of time. The detect the shortest path in a network is good mobility of each node to transmitted the power from the source node to the destination node. As a future work, the clustering techniques are used to detect the shortest path in a network using Fuzzy Logic.

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