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Energy Effective Data Collection In Problematic Disseminated Sensor Network

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Abstract— In this propose system, a new mobile sink routing and data collecting method through network clustering based on modified Expectation Maximization (EM) technique. For this technique attaining energy efficient data collection in sensor network. In future, the Optimal Clustering Protocol can be applied for improving the cluster performance and also data transmission in on demand sensor network. In Optimal Clustering have two phases called Setup and data transmission for choosing the efficient cluster and also effectively transmit the data's in on demand sensor network. For this process is evaluated to accomplishing more energy efficient data collection in on demand sensor network.

I. INTRODUCTION

Recent development of various regions of Information and Communication Technology (ICT) has contributed to a volatile growth in the size of data. Based on a report distributed by IBM in, 90 percentage of the data in the world was generated in the earlier two years. As a consequence, the concept of the big data has emerged as a widely familiar trend, which is currently inviting much attention from government, business, and academic world, the big data consist of high volume, velocity, and variety information resources, which are difficult to collect, store, and process by using the available technologies. The variety designates that the data is of highly varied structures (e.g. data generated by a wide range of sources such as Machine-to-Machine (M2M), Radio Frequency Identification (RFID), and sensors) while the velocity refers to the high speed processing/examination for example click-streaming, fast database communications, and so forth. On the additional hand, the volume mentions to the fact that a lot of data requirements to be collected for processing and analysis. Although presently used services for example social networks, cloud storing, network switches, and so forth, are already making much volume of the big data, Collecting the large capacity and wide variety of the sensed data is, definitely, dangerous as a number of important domains of human endeavour are becoming progressively reliant on these remotely sensed data. For example, in smart-houses with compactly organised sensors, users can access hotness, moisture, healthiness information, electrical energy consumption, and so forth by using smart detecting devices. In order to gather these information, the Wireless Sensor Networks (WSNs) are assembled whereby the sensors relay their data to the "sink". However, in case of widely and densely distributed WSNs for example in schools, city areas, foothills, and so forth, there are two problems in gathering the data sensed by lots of sensors. First, the network is distributed to some sub-networks because of the some degree of wireless communication range. For example, sensors organised in a construction may not be able to transfer with the sensors which are distributed in the neigh boring constructions. As a result, limited communication array may pose a challenge for data collection from all sensor nodes. Next, the wireless communication consumes the energy of the sensors. Even though the size of data generated by a separate sensor is not significant, each sensor needs a lot of energy to transfer the data generated by neighbouring sensors. Exclusively in dense WSNs, the life time of sensors will be very short because each sensor node communicates a lot of data generated by incredible number of neighbouring sensors. In order to solve these problems, we want an energy-efficient technique to collect giant volume of data from a large number of sensors in the densely distributed WSNs.

II. LITERATURE SURVEY

To achieve energy-efficient data gathering in densely distributed WSNs, there have been many existing methodologies. For example, the **data compression technology** [1] is capable of shrinking the measurements of the transferred data. Although it is easy to be applied, the data compression technology requires the nodes to be furnished with a big size of storage and great computational power. Additionally, the **topology control technology** can estimate the best logical topology and decrease redundant wireless transmissions [2]. When the redundant wireless transmissions are compact, the required energy for wireless transmissions can be also reduced. In addition flow control and routing can choose the path which contains of nodes consuming high residual energy [3]. However, these technologies are not able to covenant with the disseminated networks problem.

To dense with both the disseminated sub-network problem and the energy consumption issue, the mobile sink schemes have received great consideration in literature. In such idea, the data investor, mentioned to as the "**sink node**" (or simply the sink) is assumed to be mobile such as Vehicle, **Unmanned Aerial Vehicle** (UAV), and so on. As the sink node travels

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around the sensing area, the sensor nodes transmit data to the sink node when the sink node originates in their proximity. Thus, energy consumption can be reduced by decreasing the amount of relays in the WSN. Since the mobile sink schemes target to reduce wireless broadcasts, the trajectory of the sink node is decided based on the sensor nodes' info (e.g., location and remaining energy). The sink node separates the sensor nodes into a number of clusters based on a definite condition. Then, the sink node roams all over the place in these clusters.

In this paper, proposed an energy reduced clustering algorithm by using the Expectation-Maximization (EM) algorithm for 2-d Gaussian mixture distribution. Our proposal aims to reduce the sum of square of wireless communication distance since the energy consumption is proportionate to the square of the wireless communication distance. Moreover, our main concentration on the "data request flooding problem" to choose the optimal number of clusters. The data request flooding problem states to the energy inefficiency that take place when all the nodes broadcast data request messages to their corresponding adjoining nodes. This problem rubbishes energy, for the most part in the high density WSNs. Earlier research work sponsors increasing the number of clusters to decrease the data transmission energy. However, in this paper, we socket out that a too much number of clusters can result in performance dreadful conditions, and therefore, we propose a suitable method for developing the optimal number of clusters.

The data transmission protocols of or WSNs, including cluster-based protocols (LEACH-like protocols), are vulnerable to a number of security attacks [9] and it cannot achieve optimization.

Data compression techniques requires big volume of storage and high computational power and not able to deal with the divided network problem. And also it causes request flooding problem.

Using centralized clustering algorithms like PEGASIS (Power-Efficient Gathering in Sensor Information Systems) does not achieve minimization energy consumption because it uses greedy algorithm. Mobile sink might fall to collect information from all nodes because without considering the communication range limitation.

III. PROPOSED METHODOLOGY

To deal with both the divided sub-network problem and the energy consumption issue, the mobile sink schemes have received great attention in literature. In such schemes, the data investor, referred to as the "sink node" (or simply the sink) is assumed to be mobile such as Vehicle, Unmanned Aerial Vehicle (UAV), and so on. As the sink node moves around the sensing area, the sensor nodes transmit data to the sink node when the sink node comes in their proximity. Thus, energy consumption can be decreased by reducing the amount of relays in the WSN. Since the mobile sink schemes aim to reduce wireless transmissions, the route of the sink node is determined based on the sensor nodes' information (e.g., location and residual energy). The sink node divides the sensor nodes into a number of clusters based on a definite condition. Then, the sink node roams in the region of in these clusters.

We propose energy minimized clustering algorithm by using the Expectation-Maximization (EM) algorithm for 2-dimensional Gaussian mixture distribution. Our proposal aims to decrease the sum of square of wireless communication distance since the energy consumption is proportional to the square of the wireless communication distance. Moreover, we first focus on the "data request flooding problem" to decide the most favourable quantity of clusters. The data request flooding problem refers to the energy inefficiency that occurs when all the nodes broadcast data request messages to their respective adjacent nodes. This problem wastes energy, specifically in the high density WSNs. Earlier research work advocates raising the number of clusters to reduce the data broadcast energy. However, in this paper, we point out that an extreme number of clusters can outcome in performance degradation, and therefore, we propose a sufficient technique for deriving the optimal number of clusters.

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