Consuming Less Energy in Hybrid Compressive Sensed WSN

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ABSTRACT
Wireless sensor networks consist of a network in which node are spatially distributed. These sensor nodes communicates with each other for transferring data from one node to another. These sensor nodes while transfer of data consumes energy. So the energy consumption is high in wireless sensor networks. To reduce the energy consumption the compressive sensing method is given known as compressive sensing. Clustering is made in wireless sensor network for effective communication. Compressive sensing method used to reduce the energy consumption by the sensor nodes so that the energy consumed by the wireless sensor network should be less. MEMAC allows only nodes that have data to send to be included in the schedule which increases the energy efficiency of the protocol. SDMMDA protocol is also used with our proposed method to accurately reconstruct the signal at base node.

Keywords
Compressive Sensing, Wireless sensor network, congestion , energy consumption, clusteriing.

1. INTRODUCTION
Wireless sensor network is a collection of sensor nodes which are spatially distributed. In wireless sensor networks sensor nodes needs to send the data to the base node or called as sensor nodes. This energy is consumed by the sensor nodes to send the data and receiving the data.

To transmit data from one sensor to another by multi-hop routing the traditional data gathering and processing method is used. Finally the data will be transmitted to the sink node respectively to the route. Disadvantage of traditional method lies in the unbalanced energy consumption for each sensor and redundant data transmissions. The sensor closer to the sink will consume more energy than other sensors.

To avoid the redundant data transmissions, some researches introduce methods of data fusion to process data in Wireless sensor networks. More completed routing protocols and much higher computation ability will be needed for each sensor. Data fusion methods cannot solve unbalanced energy consumption problems. A novel method named compressive sampling theory (CS) has received more attentions at present. In this paper, we investigate compressive data gathering and original signal compressive data gathering and original signal reconstruction in wireless sensor networks (WSNs). By using the Compressive Sampling theory, the energy consumption can be balanced and the redundant data transmissions can also be avoided.

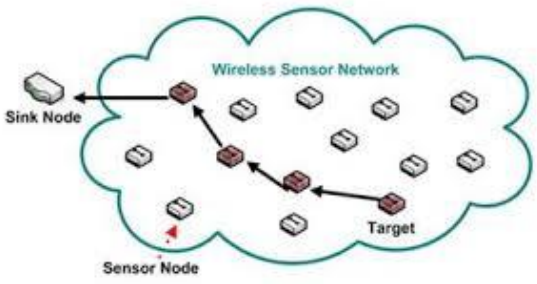


Fig 1 Wireless Sensor Network

Fig 1 shows the wireless sensor network in which the target node sends the collected data to the sink node by multihop routing. It does not do direct transmission from target node to sink node. It uses multihop routing for data transmission. The other nodes in the network are called as sensor nodes and the base node is called as sink node.

2. RELATED WORK
RuitaoXie and XiaohuaJia in 2014 [1] proposed a hybrid compressive sensing approach to reduce the data transmission in wireless sensor network. They proposed a hybrid CS method, to find the optimal size of clusters that can reach to minimum number of transmissions and proposed a centralized clustering algorithm. Within a cluster, data are collected to the cluster heads by shortest path routing; at the cluster head, data are compressed to the projections using the CS technique. Finally, They present a distributed implementation of the clustering method. Extensive simulations confirm that the method can reduce the number of transmissions significantly.

ShivendraDubey and ChetanAgrawal in 2013 [15] gives the survey of various data collection techniques in wireless sensor network. The fault tolerance, low-cost, flexibility and quick development characteristics of wireless sensor networks creates many recent and thrilling application areas for remote sensing. Here a number of techniques are given to improve the aggregated data gathering than a tree topology in wireless sensor network. They also evaluate the efficiency of interference models, dissimilar channel assignment schemes and recommend schemes for both constructing specific routing tree topologies by which the data gathering rate is improved for both aggregated and raw-data converge cast.

FengyuanRen and Jiao Zhang in 2011 [3] proposes a energy balanced routing protocol for data gathering in wireless sensor network. This paper focuses on routing that also balances the energy consumption. It borrows the concept of potential in classical physics to build a virtual hybrid potential field to send packets to move toward the sink through the dense energy area and steer clear of the nodes with low residual energy so that the energy is consumed as evenly as possible in

any given arbitrary network deployment. Their numerous simulation results show that the proposed solution EBRP makes significant improvements in energy consumption balance, network lifetime, and throughput as compared to the commonly used energy efficient routing algorithm.

Liu Xiang,Jun, Luo and AthanasiosVasilakos [4] in 2011 investigated the energy efficient aspect of applying compressed sensing (CS) to collect data in wireless sensor networks (WSNs) and solution techniques to obtain both the optimal and the near optimal aggregation trees. They first defined the problem of minimizing energy consumption through joint routing and compressed aggregation. They further proposed two solution techniques to obtain both the optimal for small scale problems and the near-optimal for large scale problems aggregation trees.

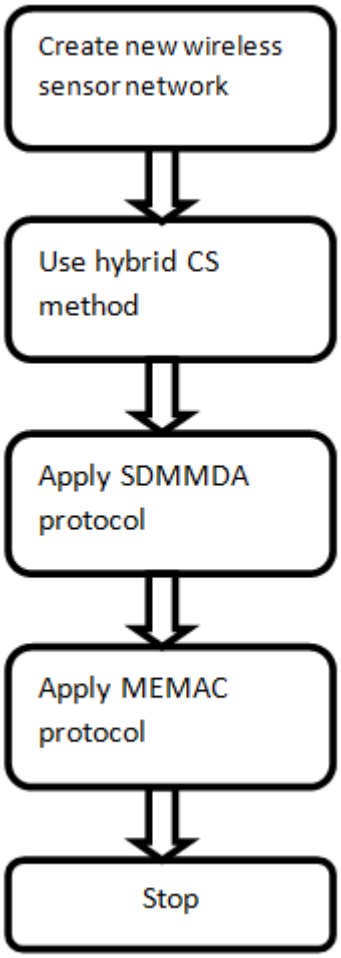
Bashir Yahya, Jalel Ben-Othman [13] in 2009 proposes an energy efficient mobility aware medium access control protocol to reduce energy consumption by sensor nodes. It combines the benefits of contention based and scheduled based protocols for achieving a significant amount of energy savings. It adjusts the frame length according to mobility information of the sensor nodes and the number of nodes that have data to send. this avoids wasting slots by excluding the nodes which are expected to leave or join the cluster and those nodes which have no data to transmit from the Time Division Multiple Access schedule, and to switch nodes to sleep mode when they are not included in the communication process. They studied the performance of our protocol and compared it against MMAC protocol.

3. PROPOSED METHOD

Here we are proposing a method to reduce energy consumption in wireless sensor network. In our proposed method we are using An Adaptive Mobility Aware and Energy Efficient MAC Protocol for Wireless Sensor Networks along with the SDMMDA protocol. MEMAC allows only nodes that have data to send to be included in the schedule which increases the energy efficiency of the protocol.

Now MEMAC protocol consists of following four phases:

1. Network Creation : In network creation a wireless sensor network is created.
2. Cluster Creation : Here clusters in the network are created for communication.
3. Head Calculation : In head calculation the cluster head is calculated for each cluster in network.
4. Leave/Join operation : Here it is checked if any sensor node in a network wants to join or leave the network.



Now using SDMMDA protocol the signal which is gathered at base node in the form of data is reconstructed as the signal used there is compressed.

So by using this method we are trying to reduce the energy consumption and we are trying to get back the original signal at sink node which will be more accurate.

4. CONCLUSIONS

In existing system energy consumption is reduced by reducing number of transmission in wireless sensor network. Though it is comparatively high. So here we are proposing a method in which by combining the mobility aware energy efficient protocol and SDMMDA with existing system we are trying to reduce more energy consumption and reconstructing the accurate signal at sink node in wireless sensor network.

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