Suez Canal University
Faculty of Computers and Informatics
Computer Science Department

MSc Research Proposal

Cluster size control in wireless sensor networks

Synopsis:

Clustering is one kind of mechanism in Wireless Sensor Networks to reduce network energy consumption, thus prolonging the network life-time. Cluster size plays a significant role in balancing energy consumption and mitigating hot spot problems. If a cluster has a large number of member nodes it will consume a high amount of energy. On the other hand, if it has a small number of member nodes its channel capacity will be underutilized, and the cluster-heads located near to sink will have to perform the additional function of relaying data to other nodes. Both of these extremes create energy holes which in turn affect the network lifetime. Techniques have been developed that will identify the optimal size of a cluster. However, these techniques are largely constrained by distance of a cluster-head from the sink, layered architecture, uniform deployment of nodes, traffic pattern, and prefixed sink location. Therefore, a techniques that do not have these constraints is needed.

Aim:

In this research, the aim is to develop a technique to control the size of a cluster that does away with the above constraints. To this end, utilization of set theoretic and linear algebraic tools will be explored. Once developed, the technique will be validated and verified and its performance will be assessed.

Recent Works (5, published in at most the last 3 years - at least 3 from reputable journals):

- Aarti Jaina, B.V. Ramana Reddyb, “Eigenvector centrality based cluster size control in randomly deployed wireless sensor networks,” Expert Systems with Applications, Volume 42, Issue 5, April 2015, Pages 2657–2669.
- Nikolidakis, S. A., et al. “Energy efficient routing in wireless sensor networks through balanced clustering,” Algorithms, 2013, 6(1), Pages 29-42
- Seyyit Alper Sert, Hakan Bagci, Adnan YaziciMOFCA, “Multi-objective fuzzy clustering algorithm for wireless sensor networks,” Applied Soft Computing, Volume 30, May 2015, Pages 151–165
- Miao Zhao et al, “Mobile Data Gathering with Load Balanced Clustering and Dual Data Uploading in Wireless Sensor Networks,” IEEE Transactions on Mobile Computing, July 2014, Volume:14, Issue: 4, Pages 770 - 785
- Md Azharuddin et al, “Energy efficient fault tolerant clustering and routing algorithms for wireless sensor networks”, Computers & Electrical Engineering, Volume 41, January 2015, Pages 177–190

Student

Name	BSc institution, & Date	Signature & Date

Supervisors

Name	Title	Signature & Date

Approvals

Type	Authority	Council Date	Signature & Date
Department Council	Department Chairman		
Faculty Council	Faculty Dean		