Joint Localization and Data Gathering over Small World WSN with Optimal Data MULE Allocation

ABSTRACT

- In this paper, we utilize a recent development in social networks called small world characteristics for proposing a novel method of joint localization and data gathering over WSN.
- A small world WSN is developed by introducing data MULEs into a conventional WSN.
- Small world WSN exhibits low average path length and high average clustering coefficient. Such a small world WSN when designed with novel routing strategies leads to reduced hop counts in sensor data transmission.

EXISTING SYSTEM

- Localization of sensor nodes and efficient data gathering over a wireless sensor network is vital in applications like cyber-physical systems, Internet of things, and context-aware pervasive systems.
- In WSNs, sensor nodes transfer the data cooperatively using multiple hops over a network.
- The large number of hops required for data transmission leads to erroneous distance estimation between node pairs, resulting in large localization error.

PROPOSED SYSTEM

- Additionally, a method for optimal data MULE allocation is also developed.
- This method minimizes an objective function which is a normalized weighted sum of network parameters like bandwidth requirement and localization error.
- The optimal data MULE allocation method computes both the optimal number of data MULEs and their placement in the network.
- On the other hand, the joint localization and data gathering method which utilizes a multidimensional scaling based cooperative localization method is also developed for this purpose.

HARDWARE REQUIREMENTS

- Processor - Intel core i3
- RAM - 2B
- Hard Disk - 20 GB

SOFTWARE REQUIREMENTS

- Operating System : LINUX
- Tool : Network Simulator-2
- Front End : OTCL (Object Oriented Tool Command Language)

REFERENCE

[1] G. Mao, B. Fidan, and B. D. Anderson, "Wireless sensor network localization techniques," 2007.

[2] S. Tomic, M. Beko, and R. Dinis, "3-d target localization in wireless sensor networks using rss and aoa measurements,", 2017.

[3] S. B. Cruz, T. E. Abrudan, Z. Xiao, N. Trigoni, and J. Barros, "Neighbor-aided localization in vehicular networks," 2017.

[4] J. Yick, B. Mukherjee, and D. Ghosal, "Wireless sensor network survey," 2008.

[5] P. Rawat, K. D. Singh, H. Chaouchi, and J. M. Bonnin, "Wireless sensor networks: a survey on recent developments and potential synergies," 2014.