

**AN APPROXIMATION ALGORITHM FOR THE
MAXIMUM-LIFETIME DATA AGGREGATION TREE PROBLEM
IN WIRELESS SENSOR NETWORKS**

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ABSTRACT

- This paper studies the problem of constructing maximum-lifetime data aggregation trees in wireless sensor networks for collecting sensor readings. This problem is known to be NP-hard. Wireless sensor networks in which transmission power levels of sensors are adjustable and heterogeneous are considered.
- An approximation algorithm is developed to construct a data aggregation tree whose inverse lifetime is guaranteed to be within a bound from the optimal one. Adjustable transmission power levels of the sensors introduces an additional term in the bound compared with the bound for networks in which transmission power levels of all sensors are fixed.



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- The additional term is proportional to the difference between the maximum and minimum amounts of energy for a sensor to transmit a message using respectively its maximum and minimum transmission power levels.
- The proposed algorithm is further enhanced to obtain an improved version. Simulation results show that properly adjusting transmission power levels of the sensors yields higher lifetime of the network than keeping their transmission power levels at the maximum level.

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EXISTING SYSTEM

Data being forwarded from sensors to the base station as integral or non-integral traffic flows. The maximum-lifetime data aggregation tree problem is formulated as a network flow problem. Previous works that employ this approach can be found.

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PROPOSED SYSTEM

- In this paper, the lifetime of a sensor network is defined as the time (or number of data gathering rounds) until the energy of one of the sensors is completely depleted.
- During the lifetime of the sensor network, sensor readings of all sensors can be delivered to the base station.

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HARDWARE REQUIREMENTS

- Processor - Pentium-IV
- Speed - 1.1 Ghz
- RAM - 256MB(min)
- Hard Disk - 20 GB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

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SOFTWARE REQUIREMENTS

- Tool - Network Simulator-2
- Operating system - LINUX
- Front end - OTCL (Object Oriented Tool Command Language)

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REFERENCES

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