

Excellent Student Program – Research Project Proposal

Routing Algorithms for Energy Harvesting Tag Networks (*EnHANTs*)

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Recent advances in the design of ultra-low power transceivers and solar cells has made it possible to develop and implement networks with self-sustainable energy harvesting devices (*EnHANTs*) that communicate with neighboring devices over wireless links. In such networks, node energy increases via harvesting, in addition to its being spent by data transmission and reception. As a result, algorithms in *EnHANTs* networks differ considerably from the ones in legacy sensor and ad-hoc networks. Moreover, with the devices we are considering, the available energy for control and processing is extremely low and thus the employed algorithms must be simple and the amount of transmitted control data must be minimized.

Routing in *EnHANTs* networks has not been researched before, and as such the present research project opens a new and exciting area. Initial work appears in [1], where we have proposed HDR - a Hysteresis Based Routing Algorithm. In that work, HDR is analyzed in a simple diamond network.

The present research project will be performed in collaboration with Prof. Gil Zussman, Columbia University. Its purpose is to further investigate HDR and evaluate its performance. Our goal here is to extend and adapt the algorithm to larger topologies and configurations and to investigate its performance via a comprehensive simulation program.

Prerequisite:

- Computer Networks and Internet 1
- Familiarity with or willingness to learn MATLAB

Suggested:

- Previous or in parallel: Computer Networks and Internet 2

[1] A. Segall, HDR - A Hysteresis-Driven Routing Algorithm for Energy Harvesting Tag Networks, MEDHOCNET 2015, Algrave, Portugal, June 2015