

CSC714 Project Proposal
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Power-aware RF Communication with Berkeley Mica2 Motes

Mica2 Mote sensors are potentially useful in many arenas of life, allowing people to consider placement of sensors in locations previously never thought possible. As with devices these days, one of the major shortcomings of the devices is their dependence on batteries, which have a limited lifetime and must be replaced. To maximize battery life and extend the usefulness of the devices (batteries might not be able to be replaced in some instances), proper power-aware use of the devices must be used.

We propose to develop an algorithm or scheme to minimize the power consumption for RF communication on Berkeley Mica2 Motes, most likely through some scheduling arrangement of data transmission. Based on initial research, we do not intend for the RF communication scheduling to take place as part of the task scheduler itself, though perhaps as a scheduled as a task. Research continues to take place, however, and final design decisions will not be made at this time.

If time allows, we will further look at extending our scheme to a larger number of Motes, perhaps incorporating it into an Ad-Hoc scheme of networking.

Timeline/Milestones:

Week 1

1. Acquire all hardware and software and begin testing whether all hardware actually does work.
2. Work with initial hardware and software configuration:
 - a. Develop a dataset or testing algorithm and test simple RF communication between two Motes.
 - b.
 - c. Run tests and record power values for un-minimized RF communication power consumption.

Week 2 & 3

3. Work on making RF communication power-aware:
 - a. Develop algorithm/schedule for RF communication that will minimize power consumption, with emphasis on expandability and robustness.

- b. Run tests and record power values for minimized RF communication power consumption.

Week 4

4. Analyze results and demonstrate power savings as well as propose or work on further possible modifications.

Hardware and Software Requirements:

- 2+ Mica2 Motes (minimum of two, more possibly needed for TDMA algorithm tests if going that way)
- Batteries for all Motes (rechargeable)
- Computer station and associated hardware/software to program the Mica2 Motes
- Possible sensors for Motes so we could actually deal with 'real' data and determine power savings under semi-real situation?

On-line Resource:

<http://www4.ncsu.edu/~macolon/CSC714/>