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CSC714 - Project Report 1

Project Topic: Power-Aware RF Communication with Berkeley Mica Motes

Solved Issues:

Week 1

1. Hardware acquired.
2. Software installed and properly configured to enable programming of the Mica Motes.
3. Hardware tested, functionality verified with all (currently) available Motes. Includes testing of RF.

Notes: RF communication in the lab setting is only about 3 feet, with currently used test method (using readily available TinyOS program code).

4. Initial code development to acquire voltage readings to perform further test to acquire a baseline power consumption.
5. Discussion regarding potential TDMA networking solution forestalled further code development until greater decisions are made regarding how the TDMA solution will work, which would affect how/when we might be employing some power saving methods. Until the details are further hashed out (including some potentially simplifying assumptions), baseline numbers cannot be collected.

Current thoughts regarding our TDMA schema, with simplifying assumptions:

The network layout will consist of one single master and all other nodes will be slaves which with the master. One way the slaves will save power is that they will increase their transmitting/receiving range from the lowest possible value until they reach a threshold where they are able to transmit/receive to/from the master. If the slaves were to lose this connectivity with the master, they would increase the transmission power until they regain connectivity with the master or the maximum transmission threshold is reached.

The master will decide the details of time slots and inform the nodes who would then communicate accordingly. An initial implementation would focus on power-savings in the slaves only and subsequent modifications would be aimed at power-savings on the master. A necessary property of the network based on these ideas/assumptions would be that all slaves need to be within the range of the master in order to serve a useful purpose.

Next Steps:

Weeks 2-4

1. Final design decisions regarding TDMA
2. Implement TDMA design, disregarding potential points for power savings and record power consumption.
3. Re-implement TDMA design, using power saving techniques as much as possible, run test(s) and record power consumption.
4. Analyze results.
 1. If time permits and it is necessary, make modifications.
 2. Re-run tests.
5. Write final report and propose further exploration/modification.