

CSU647 – CSG258: SWARM

Assignment 7

Due date: Friday 3/13.

1. Implement a system that allows you to send commands from your cell phone to a specific robot to execute the following tasks:
 - a. *Motion Control*: move forward, backward, turn left and right. Note that this has already been implemented in earlier assignments.
 - b. *Beacon Signal Sensing*: listen on the beacon channel, collect beacon messages received signal strength (RSSI), and then relay the sensed information back to your laptop and cell phone. See below for some sample code and information on how to obtain RSSI information.
 - c. *Display*: display the sensed information on your laptop to allow you to easily (e.g., graph) make motion decisions and find the location of the Beacon.
2. Submit a report documenting your design, code, testing, problems, and solutions. Submit the report (email) by Friday 3/13, 11:59pm. Make sure to clearly indicate the contribution of each team member.
3. Prepare a presentation and demonstration to be given in class (10-15 minutes) to describe your system and progress.
4. *Bonus points* [optional]: Add a command that requests a robot to move autonomously to a specific Beacon.

Supplementary material:

On the CD, which was given to you on the first week of class, you will find sample code for:

Beacon: under directory “Tmote Examples/Beacon/Beacon Node” you will find the code that the beacon node will run.

- Carefully read the “main.c” file. It provides information on the PAN ID used by the Beacon to transmit, and the packet format. Each transmitted packet contains a sequence number, and information identifying the beacon (i.e., OBJ_ID variable).
- The beacon node will send beacon messages using several (usually three) power levels. The information about the used power level for transmission is contained in the transmitted packet. Multiple transmission power levels are used to make it easier for you to localize the beacon.

Sample Receiver: under directory “Tmote Examples/Beacon/Receive Test” you will find sample code for receiving the beacon packets and obtaining the signal strength of the received packet (i.e., stored in variable `rf_rx_pwrlv`).

- Carefully go through the code to see how to obtain received packet signal strength, sequence number, and beacon id.
- Note that even if you don't move the sending beacon node and receiving node, the received signal strength will be fluctuating and has to be averaged to obtain a reliable value.

You should be able to run the beacon code on one mote and the beacon receiver on another mote and see all the information mentioned above printed on the serial link.

Note: your grades will be based on your individual contributions, your team performance, your code, reports, slides, system reliability, and design creativity.