Sensorsim user guide

Documentation for the wirelessly powered sensor network simulation

**Setup:**

There are three files for input in order to setup the simulation. The NODES.txt, SCHEDULE.txt and SETTINGS.txt in the input folder. The input protocols are as follows.

NODES.txt:

Each node occupies a line, what kind of node it is, is denoted by the leading identifier.

Every node’s maximum battery and starting battery is denoted by the battery input.

SINKS: I id x y

ENERGIZERS: E id x y range battery gather\_rate recharge\_rate

RELAY: R id x y range battery energy\_use\_in energy\_use\_out parent\_id

SENSOR: S id x y range battery energy\_use\_out energy\_use\_generate parent\_id

SCHEDULE.txt:

Each line contains the id’s of all the nodes in that slot of the schedule. Each line is a slot in the schedule. Please ensure that the id’s are of nodes in the system. NOTE: The current system does not check for schedule validity.

SETTINGS.txt:

* X\_SIZE: x size of the grid.
* Y\_SIZE: y size of the grid.
* SEED: seed for the random number generator to base off of.
* REFRESH\_DELAY: delay between firing periods.
* NODES\_TO\_AUDIT: nodes which need to record the state of every slot.
* AUDIT\_PERIOD\_LENGTH: whether or not the simulation will record every state of the simulation
* AUDIT\_MODE: whether or not a simulation log will be generated auditing every transaction in the simulation.
* COLOR\_SINK: the color displayed for the sinks
* COLOR\_RELAY: the color displayed for the relays.
* COLOR\_SENSOR: the color displayed for the sensors.
* COLOR\_ENERGIZER: the color displayed for the energizers.
* COLOR\_LINK\_DEFAULT: the color for a standard link.
* COLOR\_LINK\_SUCCESS: the color for a successful link.
* COLOR\_LINK\_FAIL: the color for a failed link.

**Controls:**

Play:

* Start running through periods with a delay set by REFRESH\_DELAY in SETTINGS.txt.

Step Through:

* Step to the next scheduled slot.

Next Period:

* Go to next period.

File -> Reset:

* Relaunch the simulation. Needed for input updates.

**Export:**

Generated files will be in the generated folder.

Nodes set to audit will export a csv file with <node\_id>\_log.csv. This file will contain every state of the node in the simulation.

There will be a file for the status of all the nodes and packets at time of generation.

The simulation log will be a log of all transactions and actions that takes place in the simulation.

The hierarchical graph will show paths from sensors to sinks. Any nodes shown outside of the tree are nodes that do not participate in transferring packets from sensors to sinks.

The standard graph will show the topology of simulation.

Period\_length\_trend will show a trendline of period lengths in the simulation. Upon generation a window going to a plot.ly graph of the data will also be opened. NOTE: requires internet to function.

**Generation:**

Click edit for generation to input new generation protocol. The protocol is a separate python program that generates notes or schedule input text files. Click run to generate the input files. There is a possibility that the simulation will have to restart for changes to take effect. NOTE: this will overwrite the input files.