Multihop Routing Simulation of TinyOS-based Wireless Sensor Networks in Viptos

Heather Taylor, University of Vermont
Graduate Mentor: Elaine Cheong

Abstract:
Wireless Sensor Networks are a burgeoning area of research and application in embedded systems. The purpose of this project is to understand and further develop Viptos, a TinyOS simulator, by adding the capacity to display radio communication links. A key piece of the TinyOS simulator is the ability to simulate a network topology. Viptos extends these capabilities to allow simulation of heterogeneous networks. In addition the ability to analyze routing algorithms is essential for research and the development of wireless sensor networks. Visualization of communication between nodes is fundamental to this goal.

Contributions:
- Addition made to Viptos code to allow visualization of communication between motes.
- Creation of tool for development and research of wireless sensor networks.

Process:
- Explore physical demo of multihop networks
- Explore simulated demo of multihop networks
- Create an entity which analyzes the packets sent between motes & draws a line to represent communication.
- Create a demo in Viptos similar to existing physical and simulated demos.

Discussion:
- Simulation of wireless sensor networks can be easily enhanced by including visual link entity.
- Expands on concept of visual links between communicating nodes with use of Viptos heterogeneous network capability.

For More Information:
- Viptos: http://ptolemy.berkeley.edu/viptos/
- Ptolemy: http://ptolemy.eecs.berkeley.edu/ptolemyII/
- TinyOS: http://www.tinyos.net/

Location senderLocation = (Location)sender.getContainer().getAttribute("_location");
Location destinationLocation = (Location)destination.getContainer().getAttribute("_location");
double y = (destinationLocation.getLocation())[1] – (senderLocation.getLocation())[1];
double x = (destinationLocation.getLocation())[0] – (senderLocation.getLocation())[0];
String moml = "<property name="_senderDestLine" class="ptolemy.vergil.kernel.attributes.LineAttribute">" + senderLocation.exportMoML() + "</property>";
ChangeRequest request = new MoMLChangeRequest(this, getContainer(), moml);