**Re-tasking Wireless Sensor Networks**  
**Fall 2012**

**Background**

Wireless sensor networks have evolved from a theoretical concept to an industry standard. As technology has advanced and hardware costs have fallen wireless senor networks have become economically beneficial and widespread. Wireless sensor networks are used in many applications which include surveillance, environmental, industrial, agricultural, and structural monitoring. Most applications of wireless sensor networks are considered static deployments, where the sensors are configured for a specific task and never change. For example a network of temperature sensors used to monitor the efficiency and status of a heating and cooling system. In contrast a re-taskable wireless sensor network can reconfigure itself to dynamically address the ever changing constraints of its environment. For example a building containing a network of cameras originally designed for security related monitoring could be re-tasked during a fire evacuation to assist first responders to people left in the building.

The focus of this project is to develop and implement a re-tasking architecture for wireless sensor networks using the TinyOS operating system. TinyOS is an open source event based operating system designed specifically for low-power embedded wireless devices. Applications are written in NesC, a component based, even-driven language that is an extension of the C programming language. TinyOS also includes Deluge, a reliable data dissemination protocol for large objects, such as program binaries. The goal of this project is to extend the Deluge framework to implement a reliable re-tasking architecture for wireless sensor networks.

**Project Objectives**

* Evaluate Deluge 2.0 for retasking capabilities
* Develop distributed retasking architecture using Deluge 2.0
  + Network-wide - disseminate new task to entire network of sensors
  + Selective - disseminate new task to a select group of sensors
* Develop monitoring framework and application
  + Displays real-time information including sensor states and running tasks (versions)
  + Allows end-user to initiate network wide and selective re-tasking

**Grade Evaluation**

* Oral Defense/Demonstration – 50%
* Technical Report – 50%

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