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RemoteReprogramming and Maintainability of Sensor Nodes.

ABSTRACT

WSN applications include geophysical/structural/habitat monitoring, security, surveillance, disaster area or battlefield information collection, and pervasive computing. In most applications sensor networks are deployed once and intended to operate unattended for a long period of time. Management and maintenance tasks of WSN's are challenging. Manually reprogramming every node by physically reaching it is a very cumbersome task, and may be infeasible if nodes of the network are unreachable. Therefore, a wireless update mechanism is needed. Enabling sensor networks to be reprogrammable is a way to address such challenges.

My research focus is remote reprogramming, which is to remotely reprogram the sensor nodes over the air. This ability to remotely upgrade software in deployed sensor nodes via the wireless network becomes complicated as the network size grows. In this thesis we propose some methodologies for efficient software management in Wireless Sensor Networks (WSN). We efficiently maintain the network by monitoring the remote node's health (i.e. battery voltage, receiving signal strength…etc). The proposed update techniques have been implemented for the Mica2 Motes, which run TinyOS, a component-based operating system for highly constraint embedded platforms.