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OpSeNet: A Simulator for Optical Sensor Networks

Abstract

OVERVIEW: Wireless sensor networks are an emerging technology with numerous applications in many different fields. A network consists of sensors called motes whose job is to collect requested data and send into the network. Each mote plays the dual role of router and data collector. An ever-changing environment could cause motes to come in any out of contact and the network must be able to reconfigure itself on the fly. The motes though must be small to be cost effective and this requires small power storage. Therefore all processes of the motes must be highly optimize to conserve processor cycles and power.

Any network, especially one that uses wireless channels, must be security conscious. Due to the heavily limited processing and power of the motes, typical security protocols and algorithms simply do not apply; therefore, new strategies and implementations are needed. The wireless sensor network must be able to withstand several types of security attacks. One of the most important is proving that data on the network is actually from a "friendly mote". This is referred to as sensor authentication.

STUDENT PROJECT: We propose using an optical channel for all communications between motes in a wireless sensor network. This point-to-point communication eliminates many of the types of attacks that RF sensor networks are susceptible. Since there are no tools available to simulate the unidirectional nature of optical fibreless communication, a simulator, OpSeNet (Optical Sensor Networks), is under construction to further the pace of research in this field. The simulator will provide a web interface that concentrates on collaboration between researchers.