Team 1611: Design and Implementation of an Intelligent Sensor Network

Sponsored by: Laboratory of Intelligent Networks and Knowledge-Perception Systems
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This goal of this project was to design and develop a network of sensors for data collection and algorithm implementation. This consists of creating an array of sensor motes that will report information back to a database. These motes also have the ability to pull and analyze data from the database in order to operate intelligently. The final goal of this project is to create a hardware and software platform for this sensor network so that it may be appropriated by other uses for network algorithm testing and verification. Possible applications for this project include border surveillance, patient monitoring in hospitals, urban environment target tracking, and general situation awareness.

A mote is defined as a single node in a sensor network comprised of multiple different sensors of varying degree of power consumption. These sensors include PIR and US sensors at low power, and a SONY camera, Microsoft Kinect, and a laser range finder for high power sensing. One project goal was to redesign and replicate multiple motes and connect them in a decentralized network. The network of motes is designed to record data to a database for access by lab personnel only. The design also allows for the access of data from one mote by other motes on the network. In order to control how these sensor's work and interact with each other, we designed a software environment to allow for a user to implement their algorithm. Specifically, we designed the software to allow each sensor on a mote to be controlled independently of the other sensor/motes. The network hardware was also designed to be modular (sensors can readily be changed for others) and to be both durable and easily deployed in a lab environment.