CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY

Name(s)
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Project Number
S1213

Project Title
WiSeNet: A Software Simulator for Wireless Sensor Network Applications

Abstract

Objectives/Goals
My project is an investigation of the behavior of wireless sensor network applications. Factors like the spatial distribution of sensors and the wireless transmission range affect the overall behavior of the underlying application and the expected results. I have developed a software simulator that investigates these behaviors.

Methods/Materials
I am building the software simulator called #WiSeNet# that models the behavior of two applications:

1. Battle Field: remotely tracking the movement of enemy troops in a combat situation and
2. Forest Fire: remotely tracking the course of a forest fire.

WiSeNet is developed using the C# programming language and Microsoft .NET platform. The development tool used is the Microsoft Visual Studio .NET Integrated Development Environment (IDE).

Results
The behavior and performance of wireless sensor networks is influenced by many factors. The effectiveness of a wireless sensor network application depends on these factors and their interactions. A software simulator for wireless sensor network applications can be a very useful tool to carefully plan and select the right type of motes and sensors in a cost-effective manner.

Simulation Variables
1. WiSeNet simulates random distribution of sensors. Through repeated experimentation it is possible to arrive at an optimal spatial configuration of the sensors that is most effective for a given application.
2. WiSeNet also allows the wireless range of a sensor to be varied and study the effects on the application.

Conclusions/Discussion
My applications simulate a forest fire and a battle field, and how these wireless sensor networks can be used in tracking. In my other application, one can model a wireless sensor network before implementing one, making it cost efficient.
There are an infinite amount of applications in which wireless sensor networks can be used, but it will be at least five to ten years from now before the benefits are widely recognized, and the full potential discovered.

Summary Statement
The first application, someone is sitting in a control station can monitor what is happening in the area where the network is; in the second application, I see the relationship between different facts, such as distribution and sensor range.

Help Received
Father helped with programming.