

Modeling Wireless Sensor Network for forest temperature and relative humidity monitoring in Usambara mountain - A review

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Outline

Background and Introduction

Introduction

Research problem

Objectives

1. Packet Forwarding Model in a Collaborative WSN
2. Sleeping schedule algorithm that can find appropriate nodes to be awoken so that the paths that are long and heavy can be replaced by the shorter and lighter ones.
3. Central database (backend) and front-end applications for collecting and storing remotely collected data.

Methodology

Tools and Software

Routing Protocols challenges

Conclusion and Expected Outcomes

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Introducing the topic

- ▶ Forest temperature and relative humidity are two important environmental parameters for habitat monitoring, Soil contribution to global cycle and impact of soil animals caused by microclimate effect.
- ▶ Existing monitoring systems for forest environmental parameter lack in supporting real-time capture of every point of a forest at all times and early detection of fire threats.
- ▶ Solutions using wireless sensor networks, on the other hand, can gather sensory data values, such as temperature and humidity, from all points of the forest continuously, day and night, and, provide fresh and accurate data.

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Defining the problem

- ▶ Wireless sensor nodes that are deployed to various locations in a forest can collect temperature, humidity and barometric pressure values and deliver this highly important data to the sink without requiring a manual control at the control center(Aslan, Korpeoglu, and Ulusoy 2012).
- ▶ However, the limited energy resources of the sensor nodes and the though environmental conditions can hinder the success of forest environmental monitoring system that is based on wireless sensor nodes.
- ▶ The sensing quality of environmental monitoring is influenced by number of factors including, the critical issue of the energy efficiency; in fact, proper communication protocols and processing algorithms need to be developed to save the energy of the battery and hence to extend the WSN lifetime.

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- ▶ To calculate throughput

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- ▶ To predict the link failure

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Research Methods

1. Graph theory technique and Network Simulator 3 tool will be used.
2. Tree problem of graph theory will be used to model and solve the problem.
3. MySQL, OpenMap GIS written in Java and PHP will be used.

Tools and software

Knowledge

C++ and Python programming for ns3.

Graph theory techniques.

Tools

ns3 – Unix based network simulator (Linux Operating System)

Eclipse – Text Editor

CLI, GNU C/C++ compiler

Routing Protocols challenges

- ▶ Node deployment
- ▶ Energy Conservation
- ▶ Fault Tolerance
- ▶ Network dynamics
- ▶ Coverage
- ▶ Connectivity
- ▶ Sensor network topology
- ▶ Environment
- ▶ Production Costs
- ▶ Hardware Constraint
- ▶ Transmission Media

Conclusion and Expected Outcomes

- ▶ There are several envisioned outputs and outcomes from this research, which are categorized in terms of expected effects on society and development, on research capacity building, and support to ongoing initiatives for global environmental change and disaster management.
- ▶ Proposed packet forwarding model will expected not only to solve most of the challenges affecting routing process in WSN , but also to have a network with high throughput, minimal delay and able to predict the communication (link) failure between the nodes.
- ▶ The best result for increasing the quality of forest environmental sensing with low power consumption and low cost is what we expect from the proposed model. The proposed model will extend the network lifetime.