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Peer Observations of Observation Units

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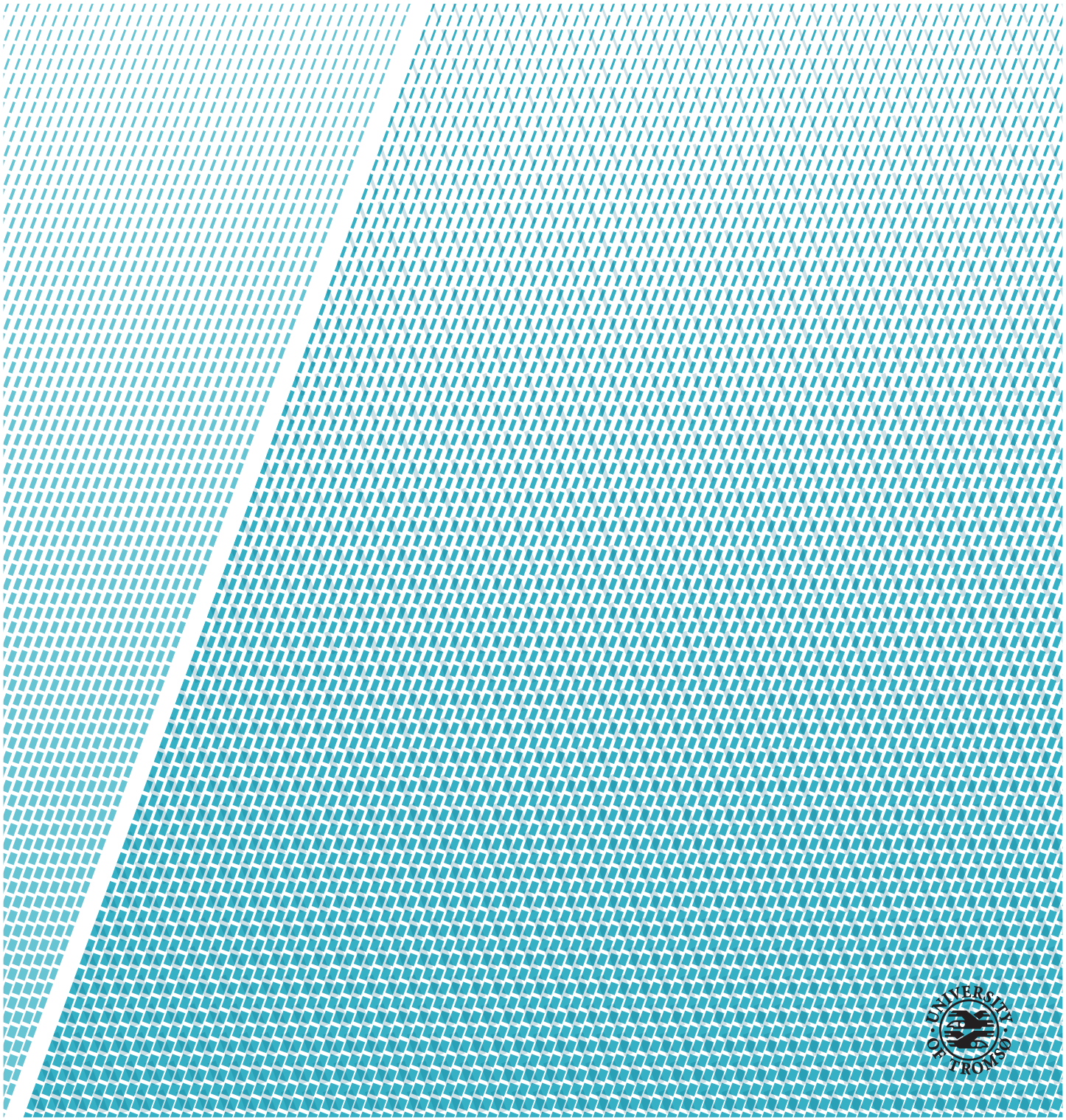

Abstract

What is wrong with the world? Motivation 1-3 sentences, Arch, Des, Imp, Exp 1,2-3 sentences, results and main conclusion.

Acknowledgements

Contents

My list of definitions

List of Listings

1 Introduction

FRA CAPSTONE: The Arctic tundra in the far northern hemisphere is challenged by climate changes in the world today and is one of the ecosystems that are most affected by these changes[10]. The Climate-ecological Observatory for Arctic Tundra (COAT) is a long-term research project developed by five Fram Center[1] institutions. Their goal is to create robust observation systems which enable documentation and understanding of climate change impacts on the Arctic tundra ecosystems. COAT was in autumn 2015 granted substantial funding to establish research infrastructure which allowed them to start up a research infrastructure during 2016-2020[10].

Wireless Sensor Network (WSN) is a system that consists of hundreds or thousands of low-cost micro-sensor nodes. These nodes monitor and collect physical and environmental conditions. The various activities in the sensor nodes consume lots of energy and the battery of the sensor node is difficult to recharge in wireless scenarios and also because the sensor nodes are located at remote areas in the Arctic tundra.

This thesis presents the architecture, design and implementation of a peer observation that can observe and accumulate data from in-situ observation units.

1. http://www.framsenteret.no/english

1.1 Motivation

The motivation behind this project is...

The purpose is to fetch and accumulate data observed by observation units for further use.

The observation units to be used for the prototype comprises Observation Unit Processes executing on PCs and/or Raspberry Pi.

1.2 Contributions

The dissertation makes the following contributions:

- A
- B

1.3 Assumptions

Avgrense viktig!

1.4 Limitations

Avgrense viktig!

1.5 Outline

This thesis is structured into X chapters including the introduction.

Chapter 2 describes ..

Chapter 3

Chapter 4

Chapter 5

Chapter 6

Chapter X

2

Routing Techniques in WSNs?

Som eget kapittel eller ha det under Related Work?

3

Related Work

3.1 Routing Protocols in WSNs

Wireless sensor networks main task is to periodically collect information of the interested area and broadcast the information to a Base Station (BS). An easy approach to achieve this task is to make each sensor node transmit their data directly to the BS. But the problem is that the BS can be far away from the sensor node and the sensor node will die due to energy consumption. Different hierarchical protocols such as LEACH, PEGASIS, TEEN and APTEEN has been proposed as solutions to this problem[3][4].

3.1.1 Hierarchical Routing

Hierarchical routing is a well know technique for network routing with special advantages related to scalability, efficient communication and energy-efficient routing in WSNs [1][2].

Hierarchical routing is an efficient way to lower energy consumption within a cluster, performing data aggregation and fusion in order to decrease the number of transmitted messages to the base station.

- LEACH
- HEED

- PEGASIS
- TEEN/APTEEN

3.1.2 Location-based Routing

In location-based routing are the nodes addressed by means of their locations. The distance between neighboring nodes can for example be estimated on the basis of incoming signal strengths or the location of the nodes can be available by using [5].

- GAF
- GEAR
- MFR, DIR, GEDIR
- SPAN

3.1.3 Flat-based Routing

In flat-based routing

- SPIN
- Direct diffusion
- Rumor routing
- MCFA
- COUGAR
- ACQUIRE
- Energy-Aware routing

4

Architecture

Tell it clean/neat. Abstractions, functionalities

/5 Design

Server, p2p, protocols..

6

Implementation

Threads, data structures, language

This chapter will elaborate on how we implemented the system, general implementation requirements, issues and choices.

The system is implemented in the open source programming language GO 1.9.3[1].

1. https://golang.org/

7 Evaluation

This chapter describes the experimental setup and metrics used to evaluate the implemented system.

7.1 Experimental Setup

All experiments were done on a Lenovo ThinkCenter with the following specifications:

- Intel® CoreTM i5-6400T CPU @ 2.20GHz × 4
- Intel® HD Graphics 530 (Skylake GT2)
- 15,6 GiB memory and 503 GB disk
- Ubuntu 17.04 64-bit with gcc V6.3.0 compiler and GO 1.9.3

7.2 Experimental Design

How did we do the experiments?

7.3 Results

What does the results say?

7.3.1 Result 1

7.3.2 Result 2

7.3.3 Result 3

8

Discussion

Idea, arch, design, resutls, other solutions, "arch has scale issue"..

This chapter discusses our approach, experience, how we solved the problem and why we chose the solution we ended up with...

9

Conclusion

In this thesis, we have implemented a system/prototype...

Our experiments showed that the system ...

10

Future Work

11

Appendix

Bibliography

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