Title Line 1
Title Line 2

by

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Abstract

ABSTRACT

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Chapter 1

Introduction

1.1 Motivation

Networks are expensive to deploy and test, especially in rural conditions and when using special networks (MANET) Solution: Use network simulation and emulation!

1.2 State of the Art

Many different software and combination software-hardware platforms exist for testing networks. ns-3, What do these tools excel at?

1.3 Current Issues

Why are these simulators not as good?

- Many are not free or open-source (expensive to use and possibly not as customizable)
- Complicated to set up
- Do not allow for direct control over an individual network node
- Often only focus on network layer and abstract MAC/PHY layer, OR model the MAC/PHY layer but does not allow for integration with network software and protocols

1.4 Thesis Contribution

- Explain why EMANE is a valuable tool, explain how to install it, and explain how it works
-
- Basic integration between the robot swarm simulator, ARGoS, and EMANE allowing for more complicated and complete communications simulation

1.5 Thesis Organization

The remainder of this thesis is organized as follows: In Chapter 2, an overview of the network emulator EMANE is presented and the motivation for why this tool was selected is explained. An overview of the subsystems used in EMANE and how to use them is included. Chapter 3 proposes the first use case for testing with EMANE, testing rural broadband deployments. Two similar network topologies are proposed and tested with the help of EMANE. Chapter 4 explores a second use case for utilizing EMANE, development of networking technologies and systems. In this case a program for more intelligent allocated limited bandwidth is developed. Chapter 5 finally details a third use case for EMANE, integrating with other simulation tools to provide more accurate communication models. The paper is concluded with a summary of work completed and recommendations for future work in Chapter 6.

Chapter 2

Overview on Network Emulation and Simulation

Chapter 3

Rural Broadband

3.1 What was implemented?

3.1.1 OVERCOME Test-bed

3.1.2 ZoomTEL Test-bed

3.2 How was it implemented?

3.3 Why was it implemented this way?

3.4 Compare EMANE results to real test-bed?

3.5 Chapter Summary

Chapter 4

Intelligent Router

4.1 What was implemented?

4.2 How was it implemented?

4.3 Why was it implemented this way?

4.4 Experimentation Results

4.5 Chapter Summary

Chapter 5

Robot Swarm Networks

5.1 What was implemented?

5.2 How was it implemented?

5.3 Why was it implemented this way?

5.4 Chapter Summary

Chapter 6

Conclusion

6.1 Research Outcomes

6.2 Future Work

Appendix A

Installation of EMANE