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MR./MS. FIRSTNAME1 LASTNAME1
MR./MS. FIRSTNAME2 LASTNAME2
MR./MS. FIRSTNAME3 LASTNAME3

A PROJECT SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR
THE DEGREE OF BACHELOR OF ENGINEERING (COMPUTER ENGINEERING)
FACULTY OF ENGINEERING
KING MONGKUT'S UNIVERSITY OF TECHNOLOGY THONBURI
202x

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Project/Indep title line 2 (optional)

Mr./Ms. Firstname1 Lastname1
Mr./Ms. Firstname2 Lastname2
Mr./Ms. Firstname3 Lastname3

A Project Submitted in Partial Fulfillment
of the Requirements for
the Degree of Bachelor of Engineering (Computer Engineering)
Faculty of Engineering
King Mongkut's University of Technology Thonburi
202x

Project Committee

. . . . Project Advisor
(Assoc.Prof. My main advisor name , Ph.D.)

. . . . Project Co-Advisor
(Assoc.Prof. My Co-advisor name, Ph.D.)

. . . . Committee Member
(Asst.Prof. Committee2, Ph.D.)

. . . . Committee Member
(Asst.Prof. Committee3, Ph.D.)

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Credits	3
Member(s)	Mr./Ms. Firstname1 Lastname1 Mr./Ms. Firstname2 Lastname2 Mr./Ms. Firstname3 Lastname3
Project Advisor	Assoc.Prof. My main advisor name , Ph.D.
Co-advisor	Assoc.Prof. My Co-advisor name, Ph.D.
Program	Bachelor of Engineering
Field of Study	Computer Engineering
Department	Computer Engineering
Faculty	Engineering
Academic Year	202x

Abstract

In a multihop ad hoc network, the interference among nodes is reduced to maximize the throughput by using a smallest transmission range that still preserve the network connectivity. However, most existing works on transmission range control focus on the connectivity but lack of results on the throughput performance. This paper analyzes the per-node saturated throughput of an IEEE 802.11b multihop ad hoc network with a uniform transmission range. Compared to simulation, our model can accurately predict the per-node throughput. The results show that the maximum achievable per-node throughput can be as low as 11% of the channel capacity in a normal set of α operating parameters independent of node density. However, if the network connectivity is considered, the obtainable throughput will reduce by as many as 43% of the maximum throughput.

Keywords: Multihop ad hoc networks / Topology control / Single-Hop Throughput

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บทคัดย่อ

การวิจัยครั้งนี้มีวัตถุประสงค์ เพื่อศึกษาความพึงพอใจในการให้บริการงานทั่วไปของสานักวิชา พื้นฐานและภาษา เพื่อเปรียบเทียบระดับความพึงพอใจต่อการให้บริการงาน ทั่วไปของสานักวิชาพื้นฐานและภาษา ของนักศึกษาที่มาใช้บริการสานักวิชาพื้นฐานและภาษา สถาบันเทคโนโลยีไทย-ญี่ปุ่น จาแนกตามเพศ คณะ และชั้นปีที่ศึกษา เพื่อศึกษาปัญหาและข้อเสนอแนะของ นักศึกษามาเป็นแนวทางในการพัฒนาและปรับปรุงการให้บริการของสานักวิชาพื้นฐานและภาษา เนื่องจากในยุคสมัยนี้โลกเราได้เข้าสู่ยุคของข้อมูลมหัต (Big data) ซึ่งบริษัทต่าง ๆก็เริ่มขับเคลื่อนธุรกิจด้วยข้อมูลแล้ว โดยธุรกิจที่มีข้อมูลขนาดใหญ่อย่างที่เห็นง่ายๆเลยก็จะเป็น เว็บไซต์ที่เปิดบริการให้ขายของออนไลน์ ซึ่งในเว็บไซต์นั้นก็จะมีข้อมูลสินค้ามากมายและ สิ่งที่เราได้พบคือรายละเอียดสินค้าหลายๆอย่างไม่มีความสอดคล้องกับรูปภาพสินค้าหรือไม่ชัดเจนพอและ เนื่องด้วยข้อมูลที่มีขนาดใหญ่เกินกว่าที่จะจัดการด้วยแรงงานคนได้และ ยังไม่มีเครื่องมือใด ๆ ในการตรวจจับคำผิดเหล่านี้ได้ เราจึงทำโครงงานนี้ขึ้นมาเพื่อที่จะแก้ไขปัญหาเหล่านี้

ทางเราจึงคิดที่จะทำระบบปัญญาประดิษฐ์หรือ AI มาแก้ไขปัญหาในส่วนนี้ โดยทำ Image captioning ที่ใช้ Convolutional neural network และ Long short-term memory ซึ่งทางคณะผู้จัดทำก็จะมีการเปรียบเทียบกับสถาปัตยกรรมของโมเดลอื่น ๆ เพื่อสร้างโมเดลที่มีประสิทธิภาพมากที่สุด ซึ่งถ้าโครงงานนี้ประสบความสำเร็จจะสามารถตรวจสอบคุณภาพของคำอธิบายสินค้าในเว็บไซต์ขายสินค้าออนไลน์ ทำให้คุณภาพและภาพลักษณ์ต่อสังคมของเว็บไซต์นั้นดูดีขึ้นได้ และนอกจากนี้โครงงานนี้ยังสามารถเป็นพื้นฐานให้แก่ผู้ที่สนใจในการทำ image captioning ที่เป็นภาษาไทยและนำไปประยุกต์ใช้กับงานของตนได้อีกด้วย

คำสำคัญ: การชุบเคลือบด้วยไฟฟ้า / การชุบเคลือบผิวเหล็ก / เคลือบผิวรังสี

ACKNOWLEDGMENTS

Acknowledge your advisors and thanks your friends here..

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LIST OF SYMBOLS

SYMBOL		UNIT
α	Test variable	m^2
λ	Interarival rate	jobs/ second
μ	Service rate	jobs/ second

LIST OF TECHNICAL VOCABULARY AND ABBREVATIONS

ABC	=	Adaptive Bandwidth Control
MANET	=	Mobile Ad Hoc Network

CHAPTER 1 INTRODUCTION

1.1 Background

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Explain the background of your works for readers. You can refer to figure by like this.. Figure 1.1. Get ready, skanks! It's time for the truth train! Fame was like a drug. But what was even more like a drug were the drugs. Attempted murder? Now honestly, what is that? Do they give a Nobel Prize for attempted chemistry?

Figure 1.1 This is the figure x11

Get ready, skanks! It's time for the truth train! Fame was like a drug. But what was even more like a drug were the drugs. Attempted murder? Now honestly, what is that? Do they give a Nobel Prize for attempted chemistry?

”Thank the Lord”? That sounded like a prayer. A prayer in a public school. God has no place within these walls, just like facts don't have a place within an organized religion. Thank you, steal again. I hope this has taught you kids a lesson: kids never learn.

…And the fluffy kitten played with that ball of string all through the night. On a lighter note, a Kwik-E-Mart clerk was brutally murdered last night. Oh, so they have Internet on computers now!

You don't like your job, you don't strike. You go in every day and do it really half-assed. That's the American way. Lisa, vampires are make-believe, like elves, gremlins, and Eskimos. Jesus must be spinning in his grave! I prefer a vehicle that doesn't hurt Mother Earth. It's a go-cart, powered by my own sense of self-satisfaction. Marge, it takes two to lie. One to lie and one to listen. Attempted murder? Now honestly, what is that? Do they give a Nobel Prize for attempted chemistry?

I was saying ”Boo-urns.” Bart, with $10,000 we'd be millionaires! We could buy all kinds of useful things like…love! I'll keep it short and sweet — Family. Religion. Friendship. These are the three demons you must slay if you wish to succeed in business.

How could you?! Haven't you learned anything from that guy who gives those sermons at church? Captain Whatshisname? We live in a society of laws! Why do you think I took you to all those Police Academy movies? For fun? Well, I didn't hear anybody laughing, did you? Except at that guy who made sound effects. Makes sound effects and laughs. Where was I? Oh yeah! Stay out of my booze. I can't go to juvie. They use guys like me as currency.

Oh, loneliness and cheeseburgers are a dangerous mix. ”Thank the Lord”? That sounded like a prayer. A prayer in a public school. God has no place within these walls, just like facts don't have a place within an organized religion.

1.2 Motivations

Explain the motivations of your works.

- What are the problems you are addressing?
- Why they are important?
- What are the limitations of existing approaches?

You may combine this section with the background section.

1.3 Problem Statements

1.4 Objectives

1.5 Scope of Work

Explain the scope of your works.

- What are the problems you are addressing?
- Why they are important?
- What are the limitations of existing approaches?

1.6 Project Schedule

CHAPTER 2 BACKGROUND THEORY AND RELATED WORK

http://www.cpe.kmutt.ac.th Explain theory, algorithms, protocols, or existing research works and tools related to your work. [1] [?, ?]

2.1 Recommender Systems

Table 2.1 test table method1

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Center	Center	left aligned	Right	Right aligned
Center	Center	left aligned	Right	Right aligned
Center	Center	left aligned	Right	Right aligned

2.2 Text Processing Algorithms

2.2.1 Algorithm I

You can place the figure and refer to it as Figure 2.1. The figure and table numbering will be run and updated automatically when you add/remove tables/figures from the document.

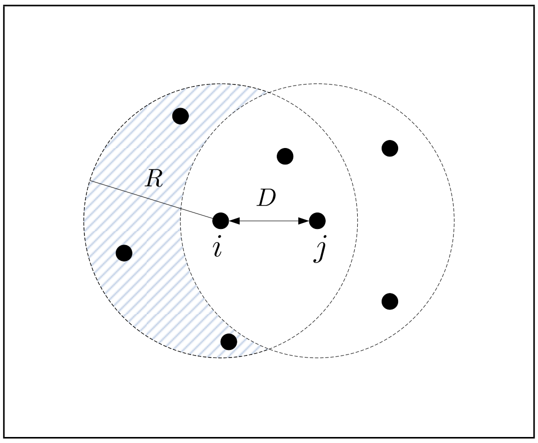

Figure 2.1 The network model

2.2.2 Algorithm II

Add more subsections as you want.

2.3 Development Tools

CHAPTER 3 PROPOSED WORK

Explain the design (how you plan to implement your work) of your project. Adjust the section titles below to suit the types of your work. Detailed physical design like circuits and source codes should be placed in the appendix.

3.1 System Architecture

Table 3.1 test table x1

SYMBOL		UNIT
α	Test variable	m^2
λ	Interarrival rate	jobs/ second
μ	Service rate	jobs/ second

3.2 System Specifications and Requirements

3.3 Hardware Module 1

3.3.1 Component 1

3.3.2 Logical Circuit Diagram

3.4 Hardware Module 2

3.4.1 Component 1

3.4.2 Component 2

3.5 Path Finding Algorithm

3.6 Database Design

3.7 GUI Design

CHAPTER 4 IMPLEMENTATION RESULTS

You can title this chapter as **Preliminary Results** or **Work Progress** for the progress reports. Present implementation or experimental results here and discuss them.

CHAPTER 5 CONCLUSIONS

This chapter is optional for proposal and progress reports but is required for the final report.

5.1 Problems and Solutions

State your problems and how you fixed them.

5.2 Future Works

What could be done in the future to make your projects better.

REFERENCES

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4. D.Y. Eun and N.B. Shroff, 2001, “A Measurement-Analytic Framework for QoS Estimation Based on the Dominant Time Scale,” in **Proc. IEEE INFOCOM’01**, Anchorage, AK, Apr. 2001.

APPENDIX A
FIRST APPENDIX TITLE

Put appropriate topic here

This is where you put hardware circuit diagrams, detailed experimental data in tables or source codes, etc..

This appendix describes two static allocation methods for fGn (or fBm) traffic. Here, λ and C are respectively the traffic arrival rate and the service rate per dimensionless time step. Their unit are converted to a physical time unit by multiplying the step size Δ. For a fBm self-similar traffic source, Norros [2] provides its EB as

$$C = \lambda + (\kappa(H)\sqrt{-2\ln\epsilon})^{1/H} a^{1/(2H)} x^{-(1-H)/H} \lambda^{1/(2H)} \tag{A.1}$$

where $\kappa(H) = H^H(1-H)^{(1-H)}$. Simplicity in the calculation is the attractive feature of (A.1).

The MVA technique developed in [3] so far provides the most accurate estimation of the loss probability compared to previous bandwidth allocation techniques according to simulation results. Consider a discrete-time queueing system with constant service rate C and input process λ_n with $\mathbb{E}\{\lambda_n\} = \lambda$ and $\mathrm{Var}\{\lambda_n\} = \sigma^2$. Define $X_n \equiv \sum_{k=1}^{n} \lambda_k - Cn$. The loss probability due to the MVA approach is given by

$$\varepsilon \approx \alpha e^{-m_x/2} \tag{A.2}$$

where

$$m_x = \min_{n\geq 0} \frac{((C-\lambda)n + B)^2}{\mathrm{Var}\{X_n\}} = \frac{((C-\lambda)n^* + B)^2}{\mathrm{Var}\{X_{n^*}\}} \tag{A.3}$$

and

$$\alpha = \frac{1}{\lambda\sqrt{2\pi\sigma^2}} \exp\left(\frac{(C-\lambda)^2}{2\sigma^2}\right) \int_C^\infty (r-C)\exp\left(\frac{(r-\lambda)^2}{2\sigma^2}\right) dr \tag{A.4}$$

For a given ε, we numerically solve for C that satisfies (A.2). Any search algorithm can be used to do the task. Here, the bisection method is used.

Next, we show how $\mathrm{Var}\{X_n\}$ can be determined. Let $C_\lambda(l)$ be the autocovariance function of λ_n. The MVA technique basically approximates the input process λ_n with a Gaussian process, which allows $\mathrm{Var}\{X_n\}$ to be represented by the autocovariance function. In particular, the variance of X_n can be expressed in terms of $C_\lambda(l)$ as

$$\mathrm{Var}\{X_n\} = nC_\lambda(0) + 2\sum_{l=1}^{n-1}(n-l)C_\lambda(l) \tag{A.5}$$

Therefore, $C_\lambda(l)$ must be known in the MVA technique, either by assuming specific traffic models or by off-line analysis in case of traces. In most practical situations, $C_\lambda(l)$ will not be known in advance, and an on-line measurement algorithm developed in [4] is required to jointly determine both n^* and m_x. For fGn traffic, $\mathrm{Var}\{X_n\}$ is equal to $\sigma^2 n^{2H}$, where $\sigma^2 = \mathrm{Var}\{\lambda_n\}$, and we can find the n^* that minimizes (A.3) directly. Although λ can be easily measured, it is not the case for σ^2 and H. Consequently, the MVA technique suffers from the need of prior knowledge traffic parameters.

APPENDIX B
SECOND APPENDIX TITLE

Put appropriate topic here

Next, we show how $\mathrm{Var}\{X_n\}$ can be determined. Let $C_\lambda(l)$ be the autocovariance function of λ_n. The MVA technique basically approximates the input process λ_n with a Gaussian process, which allows $\mathrm{Var}\{X_n\}$ to be represented by the autocovariance function. In particular, the variance of X_n can be expressed in terms of $C_\lambda(l)$ as

$$\mathrm{Var}\{X_n\} = nC_\lambda(0) + 2\sum_{l=1}^{n-1}(n-l)C_\lambda(l) \tag{B.1}$$

Add more topic as you need

Therefore, $C_\lambda(l)$ must be known in the MVA technique, either by assuming specific traffic models or by off-line analysis in case of traces. In most practical situations, $C_\lambda(l)$ will not be known in advance, and an on-line measurement algorithm developed in [4] is required to jointly determine both n^* and m_x. For fGn traffic, $\mathrm{Var}\{X_n\}$ is equal to $\sigma^2 n^{2H}$, where $\sigma^2 = \mathrm{Var}\{\lambda_n\}$, and we can find the n^* that minimizes (A.3) directly. Although λ can be easily measured, it is not the case for σ^2 and H. Consequently, the MVA technique suffers from the need of prior knowledge traffic parameters.