บันทึกข้อความ

ส่วนราชการ คณะเทคโนโลยีอุตสาหกรรม

ที่..**วันที่**.....8 สิงหาคม 2561...

เรื่อง รายงานผลการไปประชุม/การอบรม/การสัมมนา/การศึกษาดูงาน

เรียน คณบดี

ตามคำสั่ง/หนังสือ/บันทึกข้อความ ที่...105/2561..... ลงวันที่.....20 กรกฎาคม 2561......ให้
ข้าพเจ้า.......นางสาวนุชรัตน์ นุชประยูร.......................... เดินทางไปประชุม/การอบรม/การสัมมนา/
การศึกษาดูงานที่....ห้องอบรม AIAT Academy ชั้น 7 อาคารนาริตะ เมืองทองธานี จ.นนทบุรี.........
เรื่อง.......Research Methodology in AI....ระหว่างวันที่....4.......เดือน....สิงหาคม.......พ.ศ. ...2561.......
ถึงวันที่.....4......เดือน...สิงหาคม.......พ.ศ. ...2561..จัดโดย.........สมาคมปัญญาประดิษฐ์ประเทศไทย.........
รวมเป็นเวลา........1..... วัน

☐ อนุมัติให้ใช้งบประมาณ เป็นค่าใช้จ่ายในการเดินทางไปราชการครั้งนี้ จำนวน...................บาท

(...)

☑ ไม่ใช้งบประมาณ

☒ ใช้งบประมาณส่วนตัว

บัดนี้ การปฏิบัติหน้าที่ราชการที่ได้รับมอบหมายได้เสร็จเรียบร้อยแล้ว ข้าพเจ้าขอรายงานผล
การไปประชุม/การอบรม/การสัมมนา/การศึกษาดูงาน ดังต่อไปนี้

การเข้าร่วมงานอบรมสัมมนาในครั้งนี้ทำให้ข้าพเจ้าเข้าใจถึงแนวทางในการทำวิจัยทางด้าน
ปัญญาประดิษฐ์ ประเภทของงานวิจัยทางด้านปัญญาประดิษฐ์ที่ได้รับความนิยมในปัจจุบัน ทราบถึง
เทคโนโลยี ความก้าวหน้าของปัญญาประดิษฐ์ในประเทศไทย แหล่งสืบค้นงานวิจัยทางด้าน
ปัญญาประดิษฐ์ เครื่องมือและเทคนิคต่างๆ ที่ใช้ในการทำวิจัยทางด้านนี้ รวมทั้งทราบถึงแนวทางการ
วิเคราะห์สังเคราะห์งานวิจัยที่จะนำมาต่อยอดหรือใช้อ้างอิงในงานวิจัย

ข้าพเจ้า จะนำความรู้ ความสามารถ ประสบการณ์ ทักษะ หรืออื่นๆ ที่ได้รับในการไปประชุม
การอบรม/การสัมมนา/การศึกษาดูงานในครั้งนี้ มาเพื่อพัฒนางานของหน่วยงาน ดังนี้

บรรยายเพื่อถ่ายทอดองค์ความรู้ที่ได้จากการอบรมสัมมนานี้ให้แก่ผู้สนใจ นักศึกษา ซึ่งเป็นการ
สร้างแรงบรรดาลใจให้แก่ผู้สนใจในศาสตร์ของปัญญาประดิษฐ์ เนื่องจากปัญญาประดิษฐ์แบ่งออกได้เป็น
หลายประเภท ซึ่งแต่ละประเภทก็มีความน่าใจ จุดเด่น ที่แตกต่างกัน สามารถนำมาประยุกต์ใช้ในการงานได้
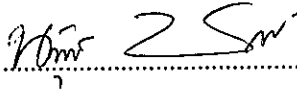หลากหลาย

ฝ่ายธุรการ สำนักงานคณบดี คณะเทคโนโลยีอุตสาหกรรม

เอกสารที่ได้รับจากการไปราชการ/การอบรมสัมมนา/การศึกษาดูงาน มีดังต่อไปนี้ คือ

.................................รายละเอียดตามเอกสารแนบ.................................

การเผยแพร่ความรู้ ประสบการณ์ ทักษะ และอื่นๆ แก่ผู้ที่เกี่ยวข้อง คือ

อธิบายถึงแนวทางในการทำงานวิจัยด้านปัญญาประดิษฐ์ ความก้าวหน้าของปัญญาประดิษฐ์ใน
ประเทศไทย ให้แก่เพื่อนร่วมงานที่มีความสนใจงานวิจัยทางด้านนี้ ซึ่งสามารถใช้เป็นแนวทางในการทำวิจัย
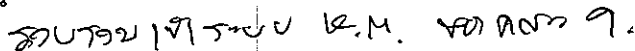ต่อไปในอนาคต

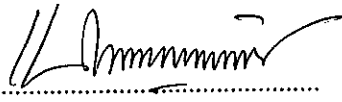จึงเรียนมาเพื่อโปรดทราบและพิจารณาดำเนินการต่อไป

ลงชื่อ.................................ผู้รายงาน
(อาจารย์ ดร.นุชรัตน์ นุชประยูร)
ตำแหน่ง อาจารย์สาขาวิชาการจัดการเทคโนโลยี

ความคิดเห็นของหัวหน้าหน่วยงาน

.................ชอบชอบ เห็นชอบ ๒.ค. ตาคม ๆ.................

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ลงชื่อ.................................
(รองศาสตราจารย์ ดร.เบญจลักษณ์ เมืองมีศรี)
ตำแหน่ง คณบดีคณะเทคโนโลยีอุตสาหกรรม

หมายเหตุ   1. แนบสำเนาประกาศนียบัตร หนังสือสำคัญ หรือหนังสือรับรองการเข้ารับการฝึกอบรม
สัมมนา/ประชุมทางวิชาการและเอกสารที่เกี่ยวข้องกับการฝึกอบรม/สัมมนา/ประชุมทาง
วิชาการ ไปกับรายงานฉบับนี้ด้วย

2. ส่งรายงานพร้อมทั้งเอกสารที่เกี่ยวข้องให้คณบดี __ภายใน 7 วัน__ หลังสิ้นสุดการฝึกอบรม,
ศึกษาหรือดูงาน, ประชุมเชิงปฏิบัติการหรือการสัมมนา

3. กรณีไปนำเสนอผลงานวิจัย/ผลงานวิชาการ หรือการได้รับการตีพิมพ์ในวารสารต่างๆ
ขอให้จัดส่งไฟล์งาน (Proceeding จากการตีพิมพ์, วารสาร/ปก, เนื้อหาในส่วนตีพิมพ์
มายัง e-mail: kannika.sroy@vru.ac.th)

ฝ่ายธุรการ สำนักงานคณบดี คณะเทคโนโลยีอุตสาหกรรม

Research Methodology in AI

Research Skill Development Series

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1

Areas in Artificial Intelligence

- AI and the Web (AIW)
- Applications (APP)
- Cognitive Modeling (CM)
- Cognitive Systems (CS)
- Computational Sustainability and AI (CSAI)
- Game Theory and Economic Paradigms (GTEP)
- Game Playing and Interactive Entertainment (GPIE)
- Heuristic Search and Optimization (HSO)
- Human-AI Collaboration (HAC)
- Human-Computation and Crowd Sourcing (HCC)
- Humans and AI (HAI)
- Knowledge Representation and Reasoning (KRR)

https://aaai.org/Conferences/AAAI-18/aaai18keywords/

2

Areas in Artificial Intelligence

- Machine Learning Applications (MLA)
- Machine Learning Methods (ML)
- Multiagent Systems (MAS)
- NLP and Knowledge Representation (NLPKR)
- NLP and Machine Learning (NLPML)
- NLP and Text Mining (NLPTM)
- Planning and Scheduling (PS)
- Reasoning under Uncertainty (RU)
- Robotics (ROB)
- Search and Constraint Satisfaction (SCS)
- Vision (VIS)

https://aaai.org/Conferences/AAAI-18/aaai18keywords/

3

Hot Areas in Artificial Intelligence

- Reinforcement learning (RL)
- Generative models (e.g. GAN)
- Networks with memory
- Learning from less data and building smaller models
- Hardware for training and inference
- Simulation environments

4

Most Active Investors in AI (2011-2016)

Artificial Intelligence: Most Active Corporate Investors

2011-2016 YTD (as of 6/15/2016)

Investor	Rank	Select Investments
Intel Capital	1	DataRobot, PERFANT, Mobileye, Mighty AI, ...
Google Ventures	2	clara, KENSHO, FRAMED, ...
GE Ventures	3	clarifai, ...
Samsung Ventures	4	sentience, ... jibo
Bloomberg Beta	4	howdy, ...
In-Q-Tel	6	CYLANCE, DIFFBOT, ANTSET
Tencent	7	DIFFBOT, ...
Nokia Growth Partners	8	rocketfuel, WorkFusion, apiphany, Indix, ...
Microsoft Ventures	8	NEURA, insidesales, CrowdFlower
Qualcomm Ventures	8	clarifai, Welltok, tempo
Salesforce Ventures	8	insidesales, sense
AXA Strategic Ventures	8	NEURA, medianes

https://www.cbinsights.com/research/most-active-corporate-investors-artificial-intelligence/

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6 skills in Technical Development

- Research
  - Analytic skill, synthesis skill, decision making skill
- Reading
  - Skimming and scanning skill, English skill, Relationship finding skill
- Writing
  - Story making skill, Grammar skill, Conclusion skill
- Presenting
  - Slide making skill, English Speaking, Convincing skill
- Teaching and Collaborating
  - Personal handling skill, Explanation skill, Patient skill
- Knowledge Management
  - Continuing skill, Collecting skill, Documentation skill

Good Quotes (Think during Learn)

"Education is not the learning of facts, but the training of the mind to think."
-Albert Einstein

He who learns but does not think, is lost! He who thinks but does not learn is in great danger.

(confucius)

iz.quotes.com

Imagination Is More Important Than Knowledge.
-Albert Einstein

I think that ......
NOT
I was told that ......

Steps in Research (Technical Study)

- Research Planning
- Area selection
- Information Collection
- Topic Selection
- Literature Review
- Problem Statement
- Assumption (Hypothesis) & Scope
- Experiments
- Motivation and Sustainability
- Roles of Students and Advisors

Research Planning (I)

- Figure out title, boundary, objective of the work
- What do you intend to do in this paper?
  - Narrower purpose vs. broader purpose
  - What is the subject or thrust of your research?
  - How many elements are there in this topic?
  - Can you make it more focused, more specific?
- What do you NOT want to investigate?
  - What are the boundaries of the topic?
  - How do you decide to include and exclude certain aspects?
- Why do you do this research?
  - Scientific reason vs. personal reason

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Research Planning (II)

- Time usage
  - Half the time is for research.
  - The other half is for writing/rewriting.
- How you manage the time
  - Frequency: everyday, a few days in a week, once a week, once two weeks.
  - Duration: whole day, half day, a few hours.
- Deadline setting
  - If you do not set a time frame for research and writing, you will read and write endlessly.

10

Skills in Doing Research

- Analytical skills
- Synthesis/Integration skills
- Reading skills
- Writing skills
- Listening skills
- Presentation skills

11

Area Selection

- Area or field selection is really the first starting point to conduct research.
- Our rough future in research career is determined here.
- This process occurs when we select our advisor.
- Even it is possible to change the area of research later when the time passes but very few researchers is willing to change.
- You have to find out yourself which area you like the most.
- Some tips are
  - Select a helpful/kind advisor with strong background.
  - Select a tough/strict advisor with strong background.
  - Select an interesting topic that you would like to be the best one.
  - Select a good research environment
  - Select a potential area

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Area Selection - Types

- Some typical areas in computer science/engineering are
  - Programming Language / Compiler Design
  - Computer System / Network
  - Artificial Intelligence: NLP, Speech, Image, Machine Learning
  - Computer Graphic / Computer Simulation
  - Embedded System / Microprocessor
  - Real-time system
  - Software Engineering
  - Ubiquitous Computing / Ambient Intelligence
  - Semantic Web / Web Service
  - Knowledge Representation / Knowledge Management / Discovery
  - Creativity Support System
  - Multidisciplinary: Medical Information System, Bioinformatics

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Information Collection

- To select a good topic for research, we have to collect information .
  - Ask yourself what is your interest.
  - Read several literatures to find out which topics exist.
  - Discuss with people around on the current status of the interested topic/area in general.
  - If you plan to be in the area even after your graduation, you have to find the topics that you think you can do after the graduation. This is not a MUST but it will be helpful.

Topic Selection

- Topic selection is a process to select research topic we will conduct.
- This process is very important. Sometimes we have to repeat.
- We need to stay aware of directly related research. If you see new work that seems to be doing exactly what you're working on, don't panic.
- Good researchers welcome the opportunity to interact and collaborate with someone who's interested in the same problems they are.
- We need to consider the following questions in topic selection.
  - Is it interesting?
  - Is it worth?
  - Is it new/original?
  - Is it possible to achieve?
- We may need position your work in the following category.
  - A new field / A new framework
  - A new problem
  - A new method
  - A new data set

Topic Positioning

Framework

Data/Material

Method
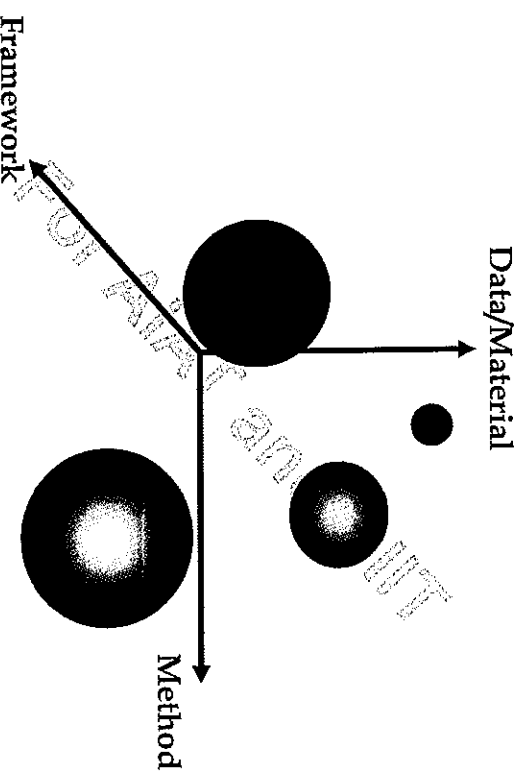
How to develop an idea/good topic

- It is not necessary to be too difficult topics.
- Do not be trapped by small things or too details
- To invent an idea, we can select the following approaches
  □ Inductive (fact → rule)   A, B → C
  □ Deductive (rule → fact)
  □ Abductive (rule + partial fact → fact)
  □ Mixed
- To analyze discussion or debate
- To develop problem statement, assessment and recommendation.
  □ Write down as much as possible and then grouping them (divergence → convergence)

Literature Review (I)

- Before conducting research, we have to read a lot of technical papers.
- We may need to practice reading papers from several areas in order to become familiar with any field.
- We may point down to read papers in the areas you select in order to catch up current the state of the art of the current research
- You may find yourself spending over half of your time reading, especially at the beginning.
- Survey-type papers usually summarize all current status of research.
- You have to remember that it is impossible to read everything that might be relevant; instead, read selectively.

Literature Review (II)

- For reading papers at the first time, ask your advisor or a senior student which the journals and conference proceedings are useful in your field, and ask for a list of classical papers that you should definitely read.
- Before bothering to read *any* paper, make sure it's worth it.
- Scan the title, then the abstract, then -- if you haven't completely lost interest already -- glance at the introduction and conclusions.
- Before you try to get the details of the paper, skim the whole thing, and try to get a feel for the most important points.
- If it still seems worthwhile and relevant, go back and read the whole thing.

Literature Review (III)

- Making a note on what you read is also useful.
- Even if you don't go back later and reread them, it helps to focus your attention and forces you to summarize as you read.
- And if you do need to refresh your memory later, rereading your notes is much easier and faster than reading the whole paper.
- Being a good researcher involves more than ``merely'' coming up with brilliant ideas and implementing them.
- At the beginning, we should spend the majority of our time on reading papers.

General Structure of Technical Papers

- Title
- Abstract
- Introduction
- Literature Review/Previous works
- Proposal
- Material /Evaluation/Comparison
- Discussion
- Conclusion

What we get from each component

- From 'Title', we know the assertion and the direction.
- From 'Abstract', we know a brief background, which problem the authors cope with, which approach the authors use to solve the problem, and the brief conclusion.
- From 'Introduction', we know the brief background, motivation and a proposal.
- From 'Literature Review/Previous Works', we know how previous works solve the problem

What we get from each component

- From 'Proposal', we know the overall of the proposed method to solve the problem.
- From 'Material/Experiment/ Evaluation/Comparison', we know what the authors use for experiments, which criteria they use to evaluate and what they find in experiments.
- From 'Discussion', we know what are the good and bad aspects of the results and how well the proposed method comparing to the other works.
- From 'Conclusion', we confirm the total story and its concluding remark.

Reading Tips (I)

- From the title, we have to know whether we will read this paper or not.
- From the abstract, we need to know all of the story.
- Determine the following 5W1H
  - What
  - Why
  - How
  - When
  - Where
  - Who

  More important ⟶ Less important

Reading Tips (II)

- To develop an effective reading style for research papers, it can help to know what you should get out of the paper, and where that information is located in the paper.
- Typically, the introduction will state not only the motivations behind the work, but also outline the solution.
- Often this may be all the expert requires from the paper.
- The body of the paper states the authors' solution to the problem in detail, and should also describe a detailed evaluation of the solution in terms of arguments or an empirical evaluation (case study, experiment, etc.).
- Finally, the paper will conclude with a recap, including a discussion of the primary contributions.

Reading Tips (III)

- A paper will also discuss related work to some degree.
- Related work sections put the paper in perspective with other research being conducted in the area.
- Papers are often repetitive because they present information at different levels of detail and from different perspectives.
- As a result, it may be desirable to read the paper out-of-order or to skip certain sections.
- We should perform three-phase reading.

Phase	
Phase I	Determine if there is anything interesting at all in the paper.
Phase II	Determine which portion of the paper contains interesting stuffs
Phase III	Read the interesting portion of the paper

Problem Statement (Objective)

- In any type of research, we need to state problem or necessity of why we conduct our research.
- We need to focus on problem sharply without subjective feelings.
- Sometimes, new researchers may pick research goals which are far too ambitious. They may underestimate hardness of the problem.
- Sometimes, we solve too easy problem. In such area, it may be a very well-known problem and somebody has solved it.
- We should practice our ability to analyze the problem.
- Good analysis of the problem will make us set of correct direction of research.
- Also when we write a paper, we can use this analysis as one section.
- It is good to formulate the problem in language of mathematic as well as in human language.

Proposal and Assumption

- To conduct research, the proposal is very important since it is what we create or invent.
- Sometimes, our proposal (idea) come from
  - Our intuition
  - Reading plentiful of papers
  - Your friend/colleague/senior/teacher/family
- Tips towards good proposal
  - Talk to people. Do not go away/hide. Do not be ashamed of your ideas.
  - Tackle a simplified version of your problem. Ask your supervisor for exercises, mini-projects, etc.
  - Write down your ideas in a working paper. Imagine yourself explaining your ideas to someone. You will be amazed at how half-baked ideas take shape and errors are exposed or solved.
- In several cases, ideas will have a set of assumptions. That is this idea may not solve all the cases.

Experiments (I)

- For a good research, it is necessary to give some proofs to state that the proposal is correct, efficient or effective.
- Some research work may not be possible to have experiments, such as proposing a theory, a formalism, a new language.
- We should have a plan for doing experiments.
- In order to perform experiments, we need to have a plan that includes the following items.
  - What is the assumption of our experiment?
  - What do data sets come from?
  - Is the experiment objective (fair)?
  - Which conditions do we need to consider?
  - How can we present the results in a comprehensive way?
  - How can we interpret the results?
  - Can our experiment extend for more general cases?

Experiments (II)

- Clarify assumptions, scope and limitation
- Set up a good setting or environment for experiments
- Select good tools to present the experiment results
- Be honest with the results
- Discuss the results intensively to obtain the final conclusion and clarify what is lacked.
- Perform discussion
  - Error analysis
  - Related works
  - Generalization/Extensibility
  - Future works

Motivation and Sustainability

- At times, particularly in the "middle years," it can be very hard to maintain a positive attitude and stay motivated.
- Many graduate students suffer from insecurity, anxiety, and even boredom. First of all, realize that these are normal feelings.
- Try to find a sympathetic ear -- another graduate student, your advisor, or a friend outside of school.
- Next, try to identify why you're having trouble and identify concrete steps that you can take to improve the situation.
- To stay focused and motivated, it often helps to have organized activities to force you to manage your time and to do something every day.
- Setting up regular meetings with your advisor, attending seminars, or even extracurricular activities such as sports or music can help you to maintain a regular schedule.

Good Quotes (Effort is important)

The most important thing in the Olympic Games is not winning but taking part; the essential thing in life is not conquering but fighting well

(Pierre de Coubertin)

arcquotes.com
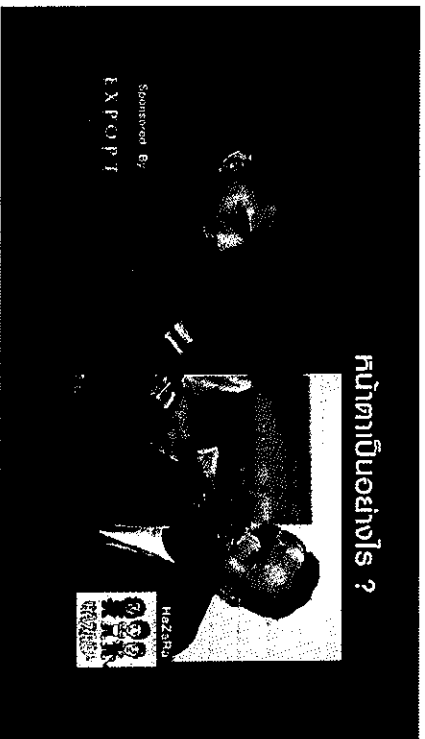

It does not matter how slowly you go as long as you do not stop.

(Confucius)

Great things come from small beginnings
A gentle ripple starts from but a single drop;
That wave ever expanding, with no end in sight
Begins from one small point, our own self ....
Her Royal Highness Princess Srinagarindra
From Hall of Inspiration, Dong Tung (1987)

Good Quotes (Effort is important)

ความสำเร็จ...หน้าตาเป็นอย่างไร ?
What success looks like
Published on Jul 13, 2018
Sean's Podcast with DJ Phom (หมอนนะภูมิ)
www.youtube.com/watch?v=VDntXn2_x6M

Organization of a paper

- Title of the paper
- Authors, designations, and addresses
- Abstract (100 to 150 words)
- Keywords
- Sections describing the work
  - Introduction (Background)
  - Previous Work (Literature Survey)
  - Proposed Work (Algorithm, Design, Methodology)
  - Analysis (Complexity Analysis, Quantitative Analysis, Statistical Analysis, ...)
  - Implementation and Results
  - Conclusions

What is a technical paper?

- Writing a technical paper looks like telling a story with a well-formed structure.
- You need to clarify the following point.
  - What type of paper am I writing?
    - Journal/Conference/Workshop Papers
    - Original Research/Survey Papers/Letters
    - New Framework/New Method/New Data
  - What do we wish to state/convey?
  - Have I got all the background work with me?
  - Have I organized the paper?
  - What electronic format will I use?
    - LaTeX, Open Office, MS Word

Abstract & Introduction

- Abstract
  - Summary of your work
  - Entices the reader to read on
    - Must bring out the novelty of your work
  - Must be brief (100 to 150 words)
- Introduction
  - Introduction to the problem
    - Why is it worth solving? What did others do? Why did they not succeed? Why do I believe I did better?
  - Contribution of the paper
    - Is there anything new in the paper?
    - How good are your results?
    - Is your survey different from other available surveys?
  - Introduction to the paper itself

Literature Survey (Review)

- Brief description of the existing body of work
- Citations to published work
  - *In [2], Rosetti and Longfellow described the meaning of life. Wordsworth presented a different view point in [3]*
- Bring out the specific advantage of your work w.r.t. published work.
  - *However, the Rosetti-Longfellow formula [2] fails for technologies below 0.2 micron. In this paper, we extend their formula to the deep submicron domain.*

Sections and Subsections

- Organize each section into subsections and (possibly) sub-subsections
  - 1. Introduction
    - 1.1 Problem Description
      - 1.1.1 Combinatorial Explosion
      - 1.1.2 Dynamic Programming
    - 1.2 Organization of the paper
      - In Section 2 we summarize the previous work in this area. In Section 3, we present a new algorithm for ...

Main body of work

- Organize your work into sections and sub-sections.
- For example,
  - 3. New Algorithm for Graph Partitioning
    - 3.1 Genetic Algorithm
    - 3.2 Data Structures
    - 3.2 Crossover Operator
    - 3.3 Mutation Operator
    - 3.4 Convergence Criterion

Experiments: Quantitative Analysis

- Quantitative Analysis
  - Present numerical results: memory consumption, time consumption, size of the chip, clock rating, power dissipation, ...
  - Present tables: Run-time of your algorithm for several benchmark examples
  - Present graphs: Data size vs. Time Complexity, Chip Area vs. Clock Frequency
  - Present improvement figures: Our proposed algorithm can improve time complexity up to 30-40% reduction; our optimization algorithm resulted in a 20% reduction in chip area for the sp292 benchmark circuit ...

Experiments: Comparative Analysis

- Compare two different approaches to the same problem
  - Tabulate results for two different heuristics
- Compare the performance for two different parameters
  - Tabulate results for two different settings, two different datasets and so on.
- Graphic Items should be as clear as possible.
  - Figures include Pictures, Photographs, Graphs, Plots ...

About Figures/Tables

- Number all the figures and tables
- Provide captions for all figures and tables
  - Figure 3. The proposed algorithm
- Refer to each figure and table.
  - In Figure 3, we show the proposed algorithm for fast finding of association rules based on the scoring function in [4].
- Make a clear illustration
- Define symbols/abbreviations in legends
- Clarify label axes
- Use same units as in text
- Photo authenticity or obtain permission to use previously published material

About the 'Conclusions'

- State what was achieved in the paper
- If possible, we should state some definite conclusions
  - We presented two algorithms, A1 and A2, for the association rule mining problem. Our experimental results indicate that A1 outperforms A2 in terms of rule quality, but requires about 80% more time than A2 in most cases.
- We should be straightforward about the limitations of your work
- Based on the limitation, we should point out directions for further work

References

[1] T. Theeramunkong, Applying passage in web text mining., Int. J. Intell. Syst. 19 (1-2) (2004) 149–158.

[2] K. Sriphaew, T. Theeramunkong, Revealing topic-based relationship among documents using association rule mining., in Proceedings of the International Conference on Artificial Intelligence and Applications, IASTED/ACTA Press, 2005, pp. 112–117.

[3] R. Agrawal, H. Mannila, R. Srikant, H. Toivonen, A. I. Verkamo, Fast discovery of association rules., in Proceedings of Advances in Knowledge Discovery and Data Mining, AAAI/MIT Press, 1996, pp. 307–328.

Good Quotes (Simple Explanation)

If you can't explain it , you don't understand it well enough.

-Albert Einstein

Small tips in writing

- We should use simple sentences if you are not good at writing complex and compound sentences
- We should avoid repetition, such as name entities Here, we can use pronoun (pronominalization).
- We can make use of the grammar and spelling checker, but we should be careful some detailed points.
- We can use a figure or table to communicate the same thing more effectively than words?
- We should be aware of the stream of the story.
- The following are some addition tips.

Every paper is telling a story

- What is the "climax" of your story?
  - The climax is a summary that is short enough to give during an elevator ride.
- The story is not what you did, but rather
  - what you show, new ideas, new insights
  - why interesting, important?
  - why is the story of interest to others?
  - universal truths, hot topic, surprises or unexpected results?
  - know your story!

Write the paper in top-down style

- Computer scientists (and most human beings) think this way (top-down).
- They state broad themes/ideas first, then go into detail
  - context, context, context
- Even when going into detail, we should write all in the top-down style.

Write a good Introduction

- If a reader is not excited by introduction, the paper fails.
- Therefore, the writer should take the following steps.
  - Paragraph 1: motivation: broadly, what is problem area, why important?
  - Paragraph 2: narrow down: what is problem specifically consider
  - Paragraph 3: "In the paper, we ....": most crucial paragraph, tell your elevator pitch (climax)
  - Paragraph 4: how different/better/relates to other work
  - Paragraph 5: "The remainder of this paper is structured as follows"

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Master basics of well-organized writing

- A paragraph is an ordered set of topically-related sentences
- The lead sentence
  - sets context for paragraph
  - might tie to previous paragraph
- The sentences in paragraph should have logical narrative flow, relating to theme/topic
- We must not mix tenses in descriptive text
- It is impossible to have one sentence paragraph.

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Think as a reader (I)

- The readers should not have to work
  - They will not "dig" to get story or to understand context and results.
  - They need textual signposts to know where the story is going, context to know where they are.
- We have to imagine what does reader know/not know, want/not want?

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Think as a reader (II)

- We have to write a paper for reader, not for yourself
- A very long series of dense text is hard to read
  - We should avoid cramped feeling of tiny fonts, small margins
  - We should provide some white spaces before/after figures, lists, etc.
- We should provide enough context/information for reader to understand what you write?
  - no one has as much background/content as you
  - no one can read your mind
  - all terms/notation defined?

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Make readers feel interested in your paper

- You have to tell readers why they should be interested in your "story"
- You should not confuse the reader with too many graphs or tables.
  - You have to think about main points you want to convey with graphs
  - You should not explore entire parameter space
- You should not overload reader with too many equations
  - put long derivations/proofs in appendix, provide sketch in body of paper

State the results carefully (I)

- We should clearly state assumptions and be careful on overstating/understating your results.
- We should have enough description for experiment and/or simulation.
- We should have statistical properties of your results (e.g., confidence intervals)
- That is, we have to show that the results are good representative.
- They are just corner cases that meet your point.
- List down the strengths and weaknesses of your proposed technique

State the results carefully (II)

- If your proposed technique can only be applied to a certain class of problems, then try to be 'creative' and write to focus only towards these problems
- Do not allow reviewers to attack your weaknesses, it would be good to mention the weaknesses of your proposed technique, but creatively stating "perhaps this is to demonstrate on certain applications…"
- Provide a good analysis on the research results
- Do not just write down what has been observed
- Explain why these observations are 'so and so'
- Provide a summary of results and how it leads to conclusion

Do not overstate or understate the results

- A overstatement mistake:
  - When we have only actually shown one or small or limited cases, we should not use the following statement.
    - "We show that X is prevalent in the Internet"
    - "We show that X is better than Y"
- A understatement mistake:
  - You fail to consider broader implications of your work
  - If your result is small, interest will be small.

Learn the art of writing

- Writing well gives you an "unfair advantage"
- Writing well matters in getting your work published in top venues
- Some books that may help
  - *The Elements of Style*, W. Strunk, E.B. White, Macmillan Publishing, 1979
  - *Writing for Computer Science: The Art of Effective Communication*, Justin Sobel, Springer 1997.
- We can study the writing style of the ones who you think are the best writers in your area.

Spend time to write a paper

- We have to give ourselves time to reflect, write, review, refine the paper
- We have to give others a chance to read/review and provide feedback.
  - We should get a reader's point of view
  - We should find a good writer/editor to critique your writing
- We should not start a paper three days before the deadline or while results are still being generated.

Why we have to publish a paper?

- Research is not completed if the results are shared with the scientific community.
- Scientific journals/proceedings are the repository of the accumulated knowledge in a field. Therefore, if we do not show out, no one will notice.
- To revise/improve our internal reports and theses, make them peer-reviewed and widely distributed publications
- To contribute papers to foster the growth of a field.
- To get views for improvement of our research.
- To get recognition and promotion.

Where to publish a paper

- Conference proceedings
  - Somewhat reviewed, progress reports
  - These are not all in the citation index. Why is this important?
  - ASME conferences (Are the proceedings reviewed?)
  - Special topical conferences (good for visibility)
- Journals (better reviewing, archival results)
  - Engineering/Science/Social journals
  - National/Regional/International journals
- How to choose the right journal for your work?
  - Journal ranking (impact factor*)
  - Journal exposure to the interested community

Writing your manuscript

- Find your time to write with few interruptions.
- Continue writing every day (if possible).
- Make an outline: with annotations and references.
- Set a goal for each time period. e.g. finish a section.
- Keep your effort up until you produce a draft.
- Write a conference paper first
- Proof read often
- Have a colleague proof read
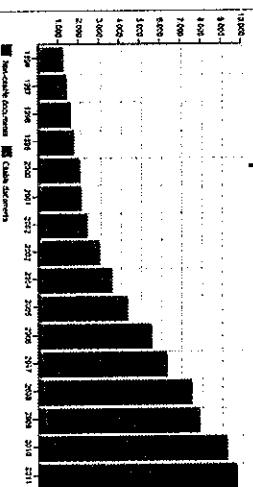- If English is not your native language, let a native speaker do it.
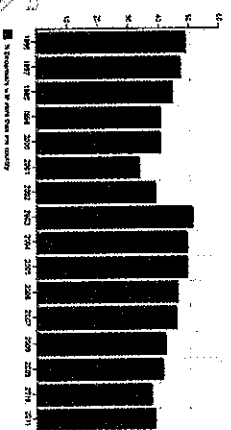

Breakdown of subject areas (Thailand)
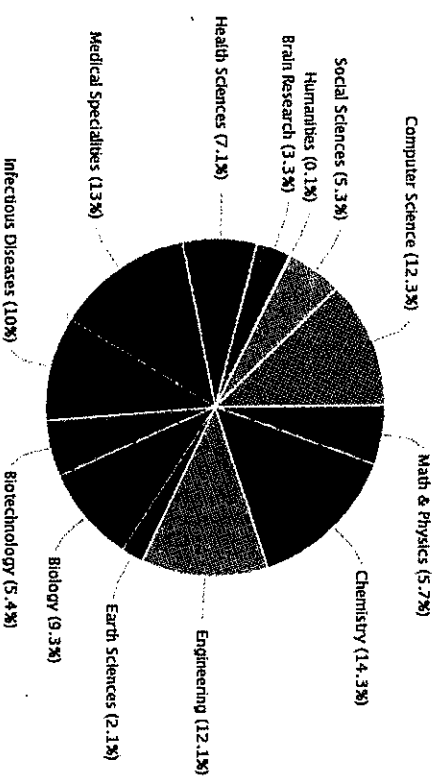
Computer Science (12.3%)
Math & Physics (5.7%)
Chemistry (14.3%)
Engineering (12.1%)
Earth Sciences (2.1%)
Biology (9.3%)
Biotechnology (5.4%)
Infectious Diseases (10%)
Medical Specialties (13%)
Health Sciences (7.1%)
Brain Research (3.3%)
Humanities (0.1%)
Social Sciences (5.3%)

Articles published in Thailand

Article published   International Collaboration

Cited and Uncited Documents   Citations and Self-Citations
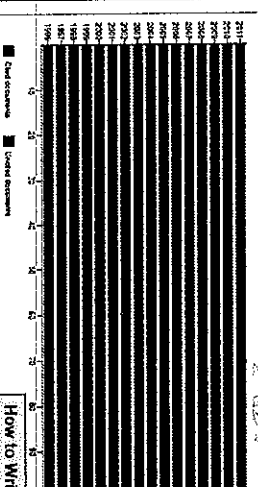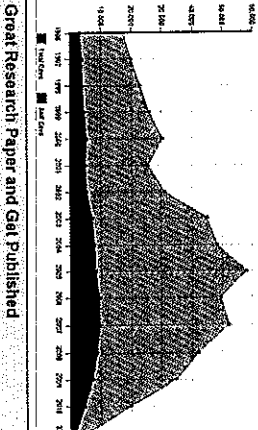
What is the Impact Factor (IF)?

- The average annual number of citations per article published

- For example, the 2011 impact factor for a journal is calculated as follows:

  - A = the number of times articles published in 2009 and 2010 were cited in indexed journals during 2011

  - B = the number of "citable items" (usually articles, reviews, proceedings or notes; not editorials and letters-to-the-Editor) published in 2009 and 2010

  - 2011 impact factor = A/B

  - e.g.
    - (600 citations) / (150+150 articles) = 2.000
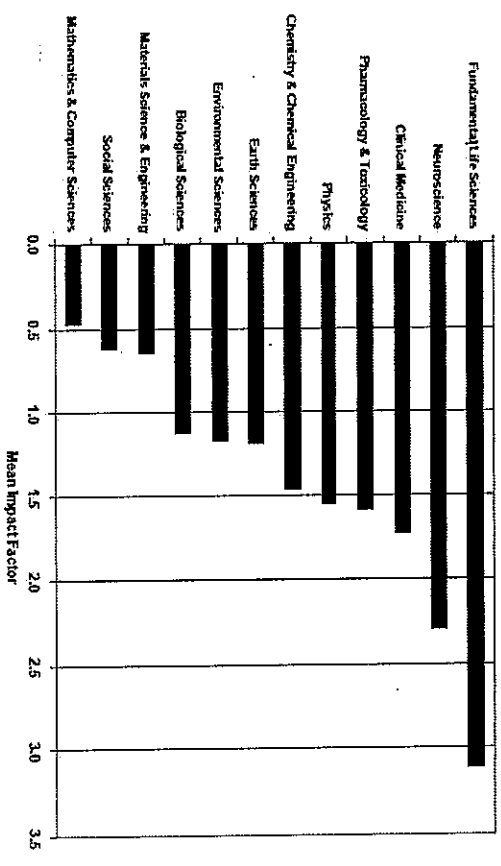
H-index

number of citations
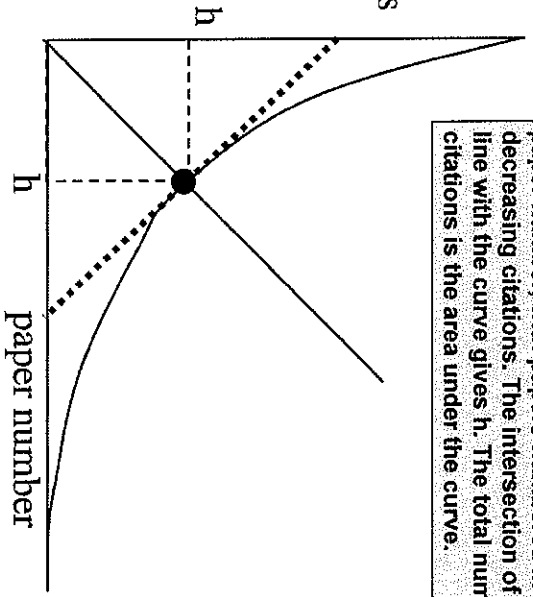
Schematic curve of number of citations versus paper number, with papers numbered in order of decreasing citations. The intersection of the 45° line with the curve gives h. The total number of citations is the area under the curve.

Influences on Impact Factors: Subject Area

Mean Impact Factor

- Fundamental Life Sciences
- Neuroscience
- Clinical Medicine
- Pharmacology & Toxicology
- Physics
- Chemistry & Chemical Engineering
- Earth Sciences
- Environmental Sciences
- Biological Sciences
- Materials Science & Engineering
- Social Sciences
- Mathematics & Computer Sciences

Authorship – Order & Abuses

Authorship - Order & Abuses

- General principles for who is listed first
  - ➤ First Author
    - – Conducts and/or supervises the data generation and analysis and the proper presentation and interpretation of the results
    - – Puts paper together and submits the paper to journal
  - ➤ Corresponding author
    - – The first author or a senior author from the institution
      - ✓ Particularly when the first author is a PhD student or postdoc, and may move to another institution soon.

- Abuses to be avoided
  - ➤ Ghost Authors: leaving out authors who should be included
  - ➤ Gift Authors: including authors who did not contribute significantly

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Roles of Good Research Students

- Construct a research framework and proposal
- Read and understand a lot of research papers
- Make a survey of the research on focus
- Try to have original idea
- Consult periodically with the advisor
- Present a progress work internally
- Conclude our work and discuss with the advisor
- Perform experiments objectively without bias
- Publish original works in conferences and journals
- Make a network with colleagues/seniors/professors
- Help advising juniors or new comers
- Help some administration jobs in the laboratory, such as taking care web site, network, social activities
- Help some common tasks in the laboratory/school/institute/university.

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Dealing with Criticism (I)

- Often it is hard for one to accept criticism, but we usually try to avoid it.
- To make a significant research progress, we need to face bravely on criticism and take it into account.
- It is important to differentiate between valid and invalid criticism.
- If we feel confusing due to subjectivity on decision, we can ask our friends for their opinions.
- If the criticism is invalid (maybe the critic has misunderstood), we have to improve our explanation.

Dealing with Criticism (II)

- We need to get used to take some disappointments from rejections from journals.
- If we get rough rides in question time, we can take it with a smile, learn what you can and do not be tempted to give up.
- In the lives of famous scientists, many of them had to endure very heavy criticism.
- In real situation, some best works are the products of personal criticisms.
- We are tested to prove ourselves among several different opinions.

Plagiarism

- It is not good to use the ideas, words or data of others as if it is your own
- *Don't do it!!!*
- It is lying, cheating, stealing and conduct unbecoming an officer
- You have to rewrite or cite properly in your paper.
- It is good to review several papers but do not copy them but use them to create your own new idea.

What are the concerns?

- Types of Journals (Tier-1, Tier-2, etc...?)
- How review is being done?
- What reviewers look for in a paper?
- How selection of reviewers are done?
- Acceptance and Revision.
- How to answer reviewer's questions?
- Format of a Journal?

Presenting your work

- Who is your audience?
- What is the purpose of your presentation?
- What should you talk about?
- How much time do you have?
- How many slides should you make?
- How should you handle questions?
- Rehearsals

High Quality Research

- It should involve an interesting topic.
- It can be replicated (reproduction).
- It can be generalized to other settings.
- It involves some logical rationale and/or theory.
- It is actionable.
- It generates new questions in nature.
- It is incremental and evolved.
- It is developed from or can be related to the work of the others.

Bad Research

- There exist obviously some other ways to solve the same problem.
- A work that plagiarizes or copies other people's work.
- A work that falsify/fake data to prove a point.
- A work that misrepresent information and mislead readers or audiences.
- A work that has too limited settings.
- A work that has nothing new.

Ethics in Research

- Citing your work
- Citing other researchers' work
- Acknowledging research fund
- No copying your own work for several publications
- No copying other researchers' ideas
- No Faking experimental results
- No Faking the entire research work
- No Automatic generation of research work

Authoring and Sharing Tools

- **Google Documents / Google Drive**
  - https://drive.google.com/
- **Dropbox**
  - https://www.dropbox.com/
- **Latex**
  - http://www.latex-project.org/
- **Endnote**
  - http://endnote.com/
- **Online Dictionary**
  - http://dictionary.cambridge.org/
  - http://dict.longdo.com/
  - http://lexitron.nectec.or.th/

Reference

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- Top-10 tips for writing a paper, Jim Kurose, Department of Computer Science, University of Massachusetts, at 2006 CoNEXT student workshop panel
- How to write a technical paper, Steven W. Van Sciver, Mechanical Engineering Department, the FAMU-FSU College of Engineering
- Writing Technical Research Papers, Marzuki Khalid, Malaysia-Japan University Center, Ministry of Higher Education
- Marie desJardins, How to Be a Good Graduate Student, March 1994, http://www.cs.indiana.edu/how.2b/how.2b.html
- Alan Bundy, Ben du Boulay, Jim Howe and Gordon Plotkin, The Researcher's Bible, 9 November 2004: http://homepages.inf.ed.ac.uk/bundy/how-tos/resbible.html

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Wish your success

Research Stage

Shu: Follow (Learn a technique)

Ha: Break away (Collect techniques)

Ri: Fluent (Blend techniques)
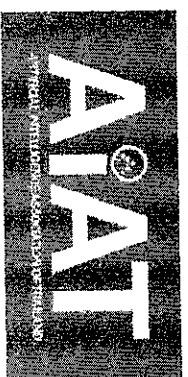
Five Sprits

1) "I am sorry" sprit
   (Regret/Reflection)
2) "Hai" sprit
   (Obedience)
3) "With your help" sprit
   (Modesty)
4) "I will do it" sprit
   (Service Mind)
5) "Thank you" sprit
   (Appreciation)

日本の五つの心

一、はんせいの心
　「すみません」
一、ふくじゅうの心
　「はい」
一、けんきょの心
　「おかげさまで」
一、ほうしの心
　「私がします」
一、かんしゃの心
　「ありがとう」

สมาคมปัญญาประดิษฐ์ประเทศไทย

ประกาศเกียรติคุณ

ขอมอบเกียรติบัตรฉบับนี้ให้ไว้เพื่อแสดงว่า

นายรัชชานนท์ พูนปัญญา

โครงการอบรมเชิงปฏิบัติการ
(RM141) ระบบปัญญาประดิษฐ์

๑๑ สิงหาคม ๒๕๖๑

ศ. ดร. ธนารักษ์ ธีระมั่นคง
(นายกสมาคมปัญญาประดิษฐ์ประเทศไทย)

20180804-RM141-035