How to Write Good Research Articles

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Publication Requirement

- MPhil Degree
- PhD Degree
- Full time researcher

Types of Scientific Publications

- PhD/MPhil Thesis

  Aspects to be assessed for a Thesis:

  - background knowledge
  - original contributions (must be clearly stated in the thesis)
  - methodology
  - presentation (writing)

- Conference Publications

  Focus on a piece of work with limited discussion

- Journal Publications

  More complete (extensive) discussion

- Monographs / Book chapters / Text books

Where to publish your work

- Journals
  - Ranking of journals
  - Review process of journals
  - Publication cycle
- Conferences
  - Ranking of conferences
  - Review process of conferences

N.B. a good journal / conference tends to have rigorous review process and long review time

SCI Journal Citation

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2001 JCR Science Edition

MARKED JOURNAL LIST

Sorted by: Impact Factor

Abbreviated Journal Title	ISSN	2001 Total Cites	Impact Factor	Immediacy Index	2001 Articles	Cited Half-life
IEEE T VIS COMPUT GR	1077-2626	425	2.417	0.207	29	4.4
COMMUN ACM	0001-0782	5974	2.238	0.102	215	>10.0
IEEE T IMAGE PROCESS	1057-7149	3122	2.185	0.172	157	4.9
HUM-COMPUT INTERACT	0737-0024	427	1.950	0.500	2	8.4
ACM T GRAPHIC	0730-0301	526	1.880	0.100	10	9.2
IEEE T EVOLUT COMPUT	1089-778X	245	1.708	0.022	46	4.1
PRESENCE-TELEOP VIRT	1054-7460	513	1.544	0.085	47	4.3
J CRYPTOL	0933-2790	351	1.486	0.133	15	9.1
IEEE T NEURAL NETWOR	1045-9227	3146	1.479	0.156	147	6.6
IEEE T SOFTWARE ENG	0098-5589	2709	1.398	0.292	65	9.8
	1064-					

Important journals & conferences

http://citeseer.ist.psu.edu/impact.html

- Database

  IEEE Trans on Knowledge and Data Engineering
  ACM Trans on Database Systems
  Int'l Conf on VLDB

- Software Engineering

  IEEE Trans on Software Engineering
  ACM Trans on Software Eng. and Methodology
  IEEE Int'l Conf on Software Engineering

- Distributed Systems

  IEEE Trans on Parallel and Distributed Systems
  ACM Trans on Computer Systems
  IEEE Int'l Conf on Distributed Computing Systems

- Computer Networks

  IEEE/ACM Trans on Networking
  IEEE INFOCOM
  ACM SIGCOMM, ACM Mobicom, etc.

  …….

Plan your writing

- Ask two questions before starting:
  1) What is new in your work?
  2) What are you going to write?
- Organize your thinking and decide the structure (outlines) of your paper.
- Emphasize on the originality and significance of your work, and stick on your central points throughout the whole paper.
- Remove all unnecessary discussions that don’t contribute to your central points.

Simplicity is the key

Purpose of writing: disseminating your research results

- Don’t write if there is nothing to write
- Don’t hide technical details
- Don’t make a simple problem complicated

Reader-oriented Writing

Reader-oriented writing: to think from readers perspective, not simply throw out whatever you think.

- Always think how readers will interpret your writing (assume you’re the reader)
- Give enough and clear explanation (never leave readers to guess)
- Try to present your idea **accurately** (no ambiguous)

Use Simple English

Purpose of technical writing: express your idea correctly & clearly

- Use plain explanations
- Use short sentences
- Use simple expressions and words
- Avoid excessive use of notations and definitions

A Typical Review Form of a Journal

From TKDE@computer.org Fri Mar 9 01:42 HKT 2001

Section I. Overview

A. Reader Interest

1. Which category describes this manuscript?
   ___Practice/Application/Case Study/Experience Report
   _X_Research/Technology
   ___Survey/Tutorial/How-To
2. How relevant is this manuscript to the readers of this periodical?

Please explain your rating.

   ___Very Relevant
   _X_Relevant
   ___Interesting - but not very relevant
   ___Irrelevant

B. Content

1. Please explain how this manuscript advances this field of research and/or contributes something new to the literature.

   ……

2. Is the manuscript technically sound? Please explain your answer.
   ___Yes
   ___Appears to be - but didn't check completely
   _X_Partially
   ___No

A Typical Review Form of a Journal (cont'd)

C. Presentation

1. Are the title, abstract, and keywords appropriate? Please comment.
   _X_Yes
   ___No
2. Does the manuscript contain sufficient and appropriate references? Please comment.
   ___References are sufficient and appropriate
   _X_Important references are missing; more references are needed
   ___Number of references are excessive
   ……..
3. Does the introduction state the objectives of the manuscript in terms that encourage the reader to read on? Please explain your answer.
   _X_Yes
   ___Could be improved
   ___No
4. How would you rate the organization of the manuscript? Is it focused? Is the length appropriate for the topic? Please comment.
   _X_Satisfactory
   ___Could be improved
   ___Poor
   ……..
5. Please rate and comment on the readability of this manuscript.
   ___Easy to read
   _X_Readable - but requires some effort to understand
   ___Difficult to read and understand
   ___Unreadable

A Typical Review Form of a Journal (cont'd)

Section II. Summary and Recommendation

A. Evaluation

Please rate the manuscript. Explain your choice.

___Award Quality
___Excellent
___Good
_X_Fair
___Poor

B. Recommendation

Please make your recommendation and explain your decision.

___Accept with no changes as a short paper
___Accept with no changes as a regular paper
___Accept if certain minor revisions are made
_X_Author should prepare a major revision for a second review
___Revise as a short paper
_X_Revise as a regular paper
___Reject

Section III. Detailed Comments

A. Public Comments (these will be made available to authors)

B. Comments to editors (these will not be available to authors)

Structure of a Paper

- Title
- Abstract
- Key words
- Introduction
- Related Work
- System Model & Problem Statement
- Methods / Solutions
- Simulations / Experiments
- Conclusion
- Acknowledgement
- References

Average number of pages of a journal paper
Average number of pages of a conference paper

Choose a Right Title

- The title should be very specific, not too broad.
- The title should be substantially different from others.

"Topology control for multihop wireless networks", *IEEE Trans. on Comm*, 93.

"Topology control of multihop wireless networks using transmit power adjustment", *infocom'00*.

"Distributed topology control for power efficient operation in multihop wireless networks", *infocom'01*.

- Avoid general / big titles, e.g.,

"Research on data mining",

"Some research on job assignment in cluster computing",

"A new framework for distributed computing",

……

Write a concise Abstract

The use of an abstract:

- Searching papers from database.
- Giving readers a paper-summary before going into details.

An abstract should tell:

- What is the problem the paper discusses.
- What is the method used (or what work was done).
- What are original findings / achievements / advantages.

An abstract usually does NOT have:

- Reference numbers
- Multiple paragraphs

Choose a right set of keywords

- The use of keywords:

  database search,

  categorizing your work (for editors to choose reviewers).
- The keywords must be specific and, as a whole, represent the main topic of the paper.
- Avoid using the words that are not the main topic or too general, such as “calculus”, “simulations”, etc.

Examples of an abstract / keywords

Joint Access Point Placement and Channel Assignment for 802.11 Wireless LANs

Abstract—To deploy a multi-cell 802.11 wireless local area network (WLAN), access point (AP) placement and channel assignment are two primary design issues. For a given pattern of traffic demands, we aim at maximizing not only the overall system throughput, but also the fairness in resource sharing among mobile terminals. A novel method for estimating the system throughput of multi-cell WLAN is proposed. An important feature of this method is that co-channel overlapping is allowed. Unlike conventional approaches that decouple AP placement and channel assignment into two phases, we propose to jointly solve the two problems for better performance. Due to the high computational complexity involved in exhaustive searching, an efficient local searching algorithm, called patching algorithm, is also designed. Numerical results show that for a typical indoor environment, patching algorithm can provide a close-to-optimal performance with much lower time complexity.

Keywords-wireless local area networks; 802.11; access point placement; channel assignment

Optimal Routing, Link Scheduling and Power Control in Multi-hop Wireless Networks

***Abstract*— In this paper, we study the problem of joint routing, link scheduling and power control to support high data rates for broadband wireless multi-hop networks. We first address the problem of finding an optimal link scheduling and power control policy that minimizes the total average transmission power in the wireless multi-hop network, subject to given constraints regarding the minimum average data rate per link, as well as peak transmission power constraints per node. Multi-access signal interference is explicitly modeled. We use a duality approach whereby, as a byproduct of finding the optimal policy, we find the sensitivity of the minimal total average power with respect to the average data rate for each link. Since the minimal total average power is a convex function of the required minimum average data rates, shortest path algorithms with the link weights set to the link sensitivities can be used to guide the search for a globally optimum routing. We present a few simple examples that show our algorithm can find policies that support data rates that are not possible with conventional approaches. Moreover, we find that optimum allocations do not necessarily route traffic over minimum energy paths.**

***Index Terms*— Wireless Networks, Multi-hop Networks, Routing, Scheduling, Power Control.**

Organization of your Paper

- Top-down writing method
- Planning sections and subsections
- Sketching: use a sentence to represent the points (paragraphs) in each subsections
- Writing details: expend a sentence in the sketch into a paragraph
- Adjustment: break-down / merge paragraphs, add / merge sections

N.B. keep a *logical flow* from section to section, paragraph to paragraph, and sentence to sentence.

Introduction: the most difficult part

Purpose of introduction:

Introducing readers to your problem / work.

An introduction usually contains:

- Brief background of the topic-area
- Existing work, which would lead to the importance / objective of your work
- Description of your problem
- Achievement / significance / brief-methodology of work

Related work and Reference list

Proper selection of references:

- Show your knowledge in the related area,
- Give credit to other researchers (reviewers are usually chosen from the references),
- Cite good quality work (particularly when citing your own work) and up to date work.

Related work should:

- Be organized to serve your topic,
- Emphasize on the significance / originality of your work.

Format of references:

- Consistent with the format, ordering, etc.
- Standard format of books / journal papers / conference papers, e.g,

  X. Jia, X.D. Hu and D.Z. Du, *Multiwavelength Optical Networks*, Kluwer Academic, 2002.

  J. Li, Yi Pan, and X. Jia, "Analysis of Dynamic Location Management for PCS Networks", *IEEE Trans on Vehicular Technology*, Vol. 51, No. 5, Sep 2002, pp.1109-1119.

  X. Jia, D. Li, X.Hu and D. Du, "Placement of Read-Write Web Proxies in the Internet", *IEEE Int'l. Conf. on Distributed Computing Systems*, Phoenix, USA, Apr 2001, pp.687-690.
- Do NOT use non-standard abbrev.

Examples of reference lists

[3] J. L. Carter and M. N. Wegman, "Universal classes of hash functions," *J. Comput. Syst. Sci.*, vol. 18, no. 2, pp. 143–154, 1979.

[4] Y. Chen, J. Edler, A. Goldberg, A. Gottlieb, S. Sobti, and P. Yianilos, "A prototype implementation of archival intermemory," in *Proc. 4th ACM Conf. Digital Libraries*, Berkeley, CA, Aug. 1999, pp. 28–37.

[5] I. Clarke, "A distributed decentralised information storage and retrieval system," Master's thesis, Univ. Edinburgh, Edinburgh, U.K., 1999.

[6] I. Clarke, O. Sandberg, B. Wiley, and T. W. Hong, "Freenet: A distributed anonymous information storage and retrieval system," in *Proc. ICSI Workshop Design Issues in Anonymity and Unobservability*, Berkeley, CA, June 2000, [Online]. Available: http://freenet.sourceforge.net.

[7] R. Cox, A. Muthitacharoen, and R. Morris, "Serving DNS using Chord," in *Proc. 1st Int. Workshop Peer-to-Peer Systems* , Cambridge, MA, Mar. 2002.

[8] F. Dabek, "A cooperative file system," Master's thesis, Massachusetts Inst. Technol., Cambridge, 2001.

[9] F. Dabek, F. Kaashoek, D. R. Karger, R. Morris, and I. Stoica, "Wide-area cooperative storage with CFS," in *Proc. ACM Symp. Operating Systems Principles*, Banff, Canada, 2001, pp. 202–215.

10] "Secure Hash Standard," U.S. Dept. Commerce/NIST, National Technical Information Service, Springfield, VA, FIPS 180-1, Apr. 1995.

11] Gnutella. [Online]. Available: http://gnutella.wego.com/

[4] J. Hagenauer, "Rate compatible punctured convolutional codes (RCPC) and their applications," *IEEE Trans. Commun.*, vol. 36, pp. 389–400, Apr. 1988.

[5] L. Qian, D. L. Jones, K. Ramchandran, and S. Appadwedula, "A general joint source-channel matching method for wireless video transmission," in *Proc. Data Compression Conf.*, Snowbird, UT, 1999, pp. 414–423.

[6] V. Chande and N. Farvardin, "Progressive transmission of images over memoryless noisy channels," *IEEE J. Select. Areas Commun.*, vol. 18, pp. 850–860, June 2000.

[7] P. G. Sherwood, X. Tian, and K. Zeger, "Channel code block length and rate optimization for progressive image transmission," in *Proc. Wireless Communications and Networking Conf.*, New Orleans, LA, 1999, pp. 978–982.

[8] S. B. Wicker, *Error Control Systems*. Englewood Cliffs, NJ: Prentice-Hall, 1995.

[9] N. Seshadri and C.-E. W. Sundberg, "List Viterbi decoding algorithms with applications," *IEEE Trans. Commun.*, vol. 42, pp. 313–323, Feb.–Apr. 1994.

Writing Tips: carry you to a long way

- Reader-oriented writing (good organization, logical flow, etc).
- Standard and consistent formatting (professional and neat looking).
- Learning from other people's writing.