Research in Computer Science

Reading, Searching and Literature Review

Department of Computer Science, Chiang Mai University

Based on a material by Peter Hancox, BHAM

Take home messages

- Reading is not a start-to-end process, but should be iterative

- Peer-review is a process to give some quality assurance of a paper

- Researchers know the appropriate services and are able to select a range to obtain good coverage of their target literature

How to read a paper

- Surely reading a paper is easy
  - Read the introduction
  - Read the middle
  - Read the conclusion

- No !!
  - Only rarely that you will read a paper from start to finish
  - Practice "iterative reading"
  - Don't read every bits of every paper

Not all papers are good papers

- Don't assume every paper
  - reports good work
  - is well-written
  - is correct
- Papers in good journals and conferences are

  Peer-reviewed

- A kind of quality assurance

What's wrong with some papers

- Describe poor research

- Some contain mistakes, incorrect assumptions

- Some papers are duplicates of other papers – with only minor changes

Peer review

- The idea
  - papers reviewed by community of experts
  - gives quality assurance
- Reviewers look for
  - originality
  - correctness of the idea
  - organisation of the paper/presentation
  - English grammar in general

Peer review: the process

1. You submit a paper

2. The editor allocate the paper to appropriate reviewers

3. Reviewers read, make comments and return to the editor

4. If your paper is accepted, list of modification sent

5. Negotiation about the requested changes

6. Finally – Publication

Back to how to read

1. Read the title and abstract

2. If the paper still seems interesting:

   - read the introduction and conclusion

3. If the paper still seems interesting:

   - quickly read the paper

   - look for difficult sections and knowledge needed to understand the sections

4. Get extra knowledge required

5. Read the paper slowly and thoroughly

Searching for papers

- ## Retrospective searching

  - to find material over a long time span

  - usually done at the beginning of the project

  - can have several purposes

    - discover what topic is about

    - establish key people/institution in the field

    - find all relevant literature

- ## Current awareness searching

  - to find the latest development in the field

Forms of literature – Journal

- Status
  - refereed journal – usually high status
  - unrefereed journal – usually up-market newsletter
  - sometime published by institutions; often for profit
- Currency
  - Often long delay in publishing

Forms of literature – books

- Status
  - depends largely on publisher
  - books usually written for money or promotion rather than *only* for communication
- Currency
  - Quite delay in publishing – a year or more

Forms of literature – conferences

- Status
  - Anyone can run a conference
    - to improve communication in their field
    - to improve visibility of their university
    - to get a free skiing trip
  - Good conferences are rigorously refereed.
- Currency
  - can be very up-to-date
  - the spoken version can be more up-to-date than the preprint version

Forms of literature – reports

- Status
  - anyone can produce a "report" and publish it on the web
  - Good reports usually come from good department
- Currency
  - can be very up-to-date, but could just be and old and often rejected journal article.

Forms of literature – theses

- Status
  - In theory, theses has to pass a rigorous examination process, so should be good
  - good theses usually come from good departments
  - good for getting a survey and interpretation of a field
- Currency
  - at least 6 months old – may be more

Forms of literature – WWW pages

- Status
  - Anyone can publish anything
  - No quality control
- Currency
  - can be very very up-to-date

  The WWW is ideal for the lazy, ill-organised and unsystematic researcher who doesn't care about their work

Forming a search strategy - 1

Systematic search strategy is preferred over an ad-hoc manner

Forming a search strategy – 2

- Decide the purpose of your search
  - Retrospective or current awareness?
  - Finding out everything or just a little?
- Decide the forms of literature
  - books?
  - journal articles?
  - conference papers?
  - theses?
  - ...

Forming a search strategy – 3

- Decide what geographical coverage you want
  - USA?
  - Europe?
- Decide what languages can you cope with
  - English only?
  - Thai ?

Forming searching strategy – 4

- Decide on the "indexing and search services" you are going to use
  - i.e. google, ieee, acm
- To choose a service you need to
  - be able to evaluate strengths and weaknesses of a service
- Other ways of choosing a service include
  - ask a knowledgeable person

Evaluating a service

- Does it include the right form of literature?

- How up-to-date is it?

- Does it include geographical/language spread?

Forming a search – 1

- Write a sentence in English describing what you are searching for

  "I want to find data mining techniques for analysing biomedical data implemented in MATLAB"

Forming a search – 2

- Underline the keywords

    "I want to find <u>data mining</u> techniques for analysing <u>biomedical</u> data implemented in <u>MATLAB</u>"

- Write down the keywords

    – data mining

    – biomedical

    – MATLAB

Forming a search – 3

- Write down any different forms of the keywords, synonyms or related words

  - biomedical: bio-medical, biological, medical

  - data mining: data analysis, machine learning, statistical analysis

  - MATLAB: SciLab, R

Forming a search – 4

- If searching in an American index, translate the words into the more usual forms in American English:

    – Optimisation → optimization

- You may need to convert a keyword into its plural form:

    – optimizer → optimizer**s**

Carrying out the search

- Start from the most important keyword

- Try adding some more keywords and see if the result improves

- Search a service from some start date to now

  - keep track of what keywords and start dates have been used