Ardhi University

Department of Computer Systems and Mathematics

LITERRATURE REVIEW

How to Read a Paper

- Students/Researchers devote a great deal of time reading journal papers/conference papers etc
- However, this skill is rarely taught, leading to much wasted effort when searching for knowledge
- This seminar will outline a practical and efficient three-pass method for reading journal papers/conference papers etc
- How to apply the method to do a literature review

Why read papers?

- There are several reasons for reading a paper
  - Review them for a conference or a class, to keep current in their field, or for a literature survey of a new field
- Knowledge on how to efficiently read a paper is a critical issue, but rarely taught skill
- Students/researchers use trial and error to grasp the knowledge contained in a paper
- Waste much effort in the process and are frequently driven to **frustration**

Three-Pass Approach

- The important aspect here is that you should read the paper in up to **three passes**, instead of starting at the beginning and blowing your way to the end
- Each pass accomplishes specific goals and builds upon the previous pass:
    - The first pass gives you a general idea about the paper
    - The second pass lets you grasp the paper's content, but not its details
    - The third pass helps you understand the paper in depth

First Pass Approach

- The first pass is a quick scan to get a bird's-eye view of the paper
- You can also decide whether you need to do any more passes
- This pass should take about five to ten minutes and consists of the following steps:
    - Carefully read the title, abstract, and introduction
    - Read the section and sub-section headings, but ignore everything else
    - Read the conclusions
    - Scan over the references, mentally marking off the ones you've already read

What information do you get from first pass?

- By the end of the first pass, you should be able to answer the five Cs:
    - **Category**: What type of paper is this? A measurement paper? An analysis of an existing system? A description of a research prototype?
    - **Context**: Which other papers is it related to? Which theoretical bases were used to analyse the problem?
    - **Correctness**: Do the assumptions appear to be valid?
    - **Contributions**: What are the paper's main contributions?
    - **Clarity**: Is the paper well written?

The Second-Pass approach

- In the second pass, read the paper with greater care, but ignore details such as proofs
- It helps you to note down the key points, or to make comments in the margins, as you read
    - Look carefully at the figures, diagrams and other illustrations in the paper.
        - Pay special attention to graphs.
        - Are the axes properly labelled?
        - Are results shown with error bars, so that conclusions are statistically significant?

    Common mistakes like these will separate rushed, shoddy work from the truly excellent

    - Remember to mark relevant unread references for further reading (this is a good way to learn more about the background of the paper)

The Second-Pass approach

- The second pass should take up to an hour.
- After this pass, you should be able to grasp the content of the paper
- You should be able to summarize the main thrust of the paper, with supporting evidence, to someone else
- This level of detail is appropriate for a paper in which you are interested, but does not lie in your research speciality

The Second-Pass approach

- Sometimes you won’t understand a paper even at the end of the second pass.
- This may be because the subject matter is new to you, with unfamiliar terminology and acronyms or
- The authors may use a proof or experimental technique that you don’t understand, so that the bulk of the paper is incomprehensible

Third-Pass Approach

- To fully understand a paper, particularly if you are reviewer, requires a third pass.
- The key to the third pass is to attempt to virtually re-implement the paper:
    - that is, making the same assumptions as the authors,
    - re-create the work.
- By comparing this re-creation with the actual paper, you can easily identify not only a paper's innovations, but also its hidden failings and assumptions

Third-Pass Approach

- This pass can take about four or five hours for beginners, and about an hour for an experienced reader.
- At the end of this pass, you should be able to reconstruct the entire structure of the paper from memory, as well as be able to identify its strong and weak points.
- In particular, you should be able to pinpoint implicit assumptions, missing citations to relevant work, and potential issues with experimental or analytical techniques.

Literature Survey

- Paper reading skills are put to the test in doing a literature survey.
- This will require you to read tens of papers, perhaps in an unfamiliar field.
- What papers should you read?
- Here is how you can use the three-pass approach to help

Literature Survey

- First, use an academic search engine such as Google Scholar or ACM or IEEE or other search engines
- Choose well **five to ten** recent papers in the area
- Do one pass on each paper to get a sense of the work, then read their related work sections
- You will find a thumbnail summary of the recent work, and perhaps, if you are lucky, a pointer to a recent survey paper
- If you can find such a survey, you are done
- Read the survey, congratulating yourself on your good luck

What are the Important Information Expected from a paper?

- Read at least five papers and grasp the following information:
    - What was about?
    - How they did?
    - What they found?
    - Conclusion
- These information are crucial

Writing academic research

- Reading journals is most important
- Any claim in your work should be justified by literature
- It is important to have a leading sentence
- Other parts should build from the leading sentence
- Lat sentence in the paragraph should link to the first sentence of the next paragraph

Literature Review

- Two important things
  - All information you didn’t cover in the introduction should be covered in the literature review
  - Discuss similar or related works at least 5 papers with each paragraph 1 paper
    - The same paper discussed can be used to justify methodology
  - Why your work is different from others
    - This starts from the introduction of your work

- Reference management
- Mendley software

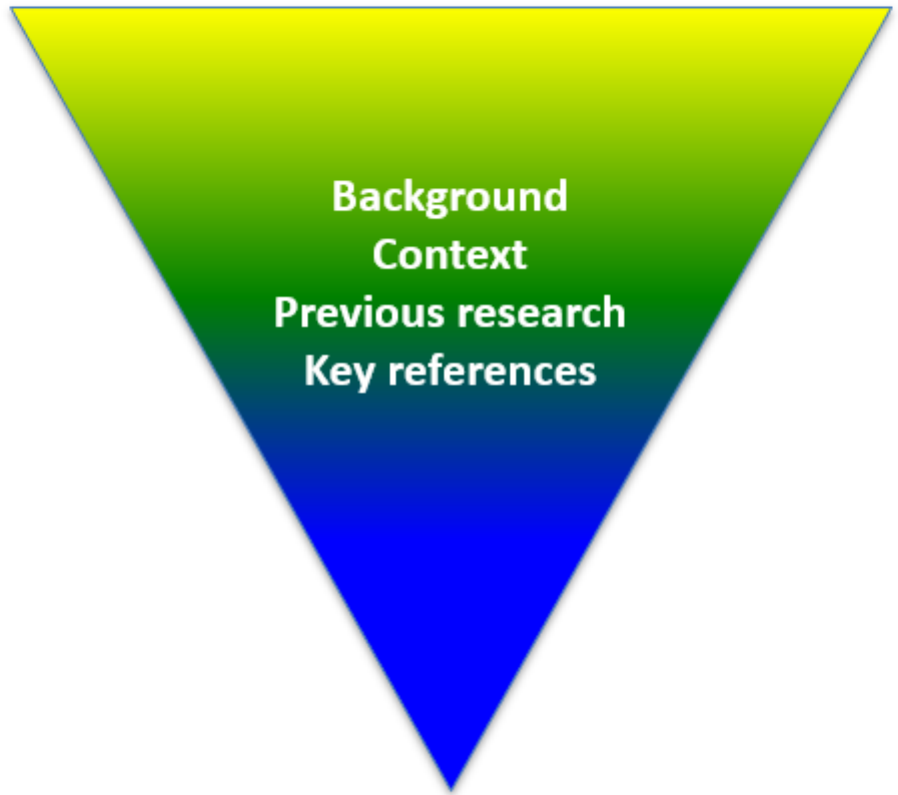
Writing Introduction

Writing an introduction

- **The introduction answers the questions:**
- What am I studying?
- Why is it an important question? Why should the reader read on?
- What do we know already about it?
- What basis do I need to provide (such that the reader can understand my study)?

Introduction as an inverted triangle: moving from very general to very specific:

General: including a “hook” to grab your readers



Specific: what is it you are contributing to the problem

Introduction

- Includes a statement of the goal of the study: why it was undertaken
- Sets the context for your proposed project and must capture the reader's interest
- Explains the background of your study starting from a broad picture narrowing in on your research question
- Give sufficient background information to allow the reader to understand the context and significance of the question you are trying to address
- Reviews what is known about your research topic as far as it is relevant to your dissertation
- Cites relevant references

Introduction

- All cited work should be directly relevant to the goals of the dissertation

- Give enough references such that a reader could, by going to the library or on-line, achieve a sophisticated understanding of the context and significance of the question

- Try to cite those who had the idea or ideas first, but also cite those who have done the most recent and relevant work.
- ***This is not a place to summarize everything you have ever read on a subject***

Introduction

- Explain the scope of **your** work, what will and will not be included (if you are answering only part of the question you are posing)

- *Should be at a level that makes it easy to understand for readers with a general science background, for example your classmates (or your class advisor)*

Some writing tips

- For long introductions give the reader already an indication earlier of what question you'll be addressing.
- Be sure to include a **hook** at the beginning of the introduction.

- This is a statement of something sufficiently interesting to motivate your reader to read the rest of the paper
- It is an important/interesting scientific problem that your paper either solves or addresses.
- You should draw the reader in and make them want to read the rest of the paper.

Some writing tips

- It can be useful to sketch out the introduction backwards, start with the specific focus of your study and work upward to the broader context.

- It is hard to write a good introduction until you know what the body of the paper says.

- Consider making a concept map, it will help to identify the elements you need in the introduction.

Statement of the Problem

- Answer the question:
    - "What is the gap that needs to be filled?" and/or "What is the problem that needs to be solved?"
    - State the problem clearly early in a paragraph.
- Presents the reason behind the proposal i.e. what will change when this research is done or what would happen if the research is not done

- **Problem is an existing negative state not absence of a solution**

Statement of the Problem

- Refers to what has been detected and needs a solution in the practical or theoretical world
- Should clearly state the nature of the problem and its known or estimated magnitude /extent
- Where possible link the problem to the national development priorities/framework

Components of a Problem Statement

- Any problem statement should contain four elements:
- **A lead-in** [narrative hook]
    - eg. Information systems projects fail at a higher rate than projects in other industries…
- **Declaration of originality** (mentioning a knowledge void which would be supported by the literature review
    - Normally starts with the word HOWEVER…

Components of a Problem Statement

- Indication of the central focus of the study (**purpose of the statement**); and
    - Eg. The purpose of the proposed study is to determine what factors are most influential…..

- Explanation of study significance or benefits to be derived from an investigation of the problem (**Rationale or justification of the study**)

- Problem may not be where you think they are…..


FINAL
THOUGHTS
to Communicate Better.

Life Cycle of a Proposal