COMPSCI-773
Literature review/Experimental protocol design

Slides:
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Literature review

1. Decide on a topic
2. Identify the literature to review
3. Analyse the literature
4. Use maps/tables to roughly summarize the literature
5. Synthetize your notes along the nodes created in item 4.
6. Write the review
Anatomy of a Journal Article

Title

Authors and Affiliations

Abstract

Key Words/Descriptors

Introduction/Literature Review

Citation and DOI
Introduction/Literature Review

Method

17 March 2017

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Results

Figures

Analysis
Literature Review

• What is it? Why do you need it?
• How to do it:
  – Identify the topic & relevant literature
    • Google Scholar
    • Library resources
    • Subject-specific databases/search engines
  – Summarise and map the literature
    • Summary of articles
      – Tables
      – Concept map
      – Paper!
  – Synthesise in outline form
  – Write the review
• http://www.duluth.umn.edu/~hrallis/guides/researching/litreview.html
Analyze the literature (1)

• Group level:
  1. Decide on the scope, extend and boundaries of your literature review
  2. Skim through the articles chosen (abstract, intro, results, conclusion) to verify that they align with your literature review goals
  3. Group the articles into categories
  4. Decide on media for review; Most convenient nowadays is cloud-based shared resource (google docs) -> share with group/supervisor
  5. Decide on a template for the reviews.
  6. You are ready to start reading!!
The template for review

1. Usually write down:
   1. The title,
   2. Keywords
   3. Summary (concentrated abstract)
   4. Focus (which problem is solved using which technique(s) for which results)
   5. Theoretical or experimental procedure (bullet points)
   6. Results brief (qualitative and quantitative)
   7. Advantages over competition
   8. Your take on the paper scope and content (useful, scientific honesty, quality and scope of results, practicability of implementation)
Analyze the literature (2)

Individual level:

General
1. Note key terms employed, keep track of their definition
2. Note strengths/weaknesses and emphases/focus of the paper as given by the authors

Introduction
1. Identify the problem statement and article structure in the introduction
2. Look at how the authors position themselves w.r.t. competing approaches
3. Check the references provided in introduction for the founding papers (usually oldest referred). They may hold the keys for a clearer description of the techniques/methodology introduced
4. Identify major trends or patterns and gaps in the literature review produced
5. Identify relationships between article read and literature review provided (helps to eliminate subsidiary papers)
Analyze the literature (3)

Methods
1. Try to produce a synthetic overview of the materials section: which methods for which output
2. Make track of the founding theoretical concepts (and a reference) behind the methods introduced
3. Make note of what you see as uniqueness of the methods employed (a specific equation, a variation from commonly employed theory)
4. Assess the strengths of the theoretical section. Good theory can be judged by the quality of the theoretical section. A poor theoretical section may point out to an end-user’s paper rather than an inventor’s publication

Materials
1. Gives a clear indication of whether a promising techniques can be replicated and thus of the extend to which you must read the paper
2. If not replicable (cost, conditions, equipment or software needed, etc..) then limited interest to the literature review.
3. If replicable, make an exhaustive list of all that is required and rank in categories (doable, maybe, impossible)
5. Make sure to write down the experimental conditions and boundaries of a given experiment

Results
1. Assess the strengths of the results section. A good results section must contain qualitative and quantitative data. Ideally, the authors will produce sound statistical outputs, tables, figures and so on.
2. The results will be criticized and potential solutions to correct undesirable results will be provided
3. Rare but very good: articles providing failed results and discussing the potential reasons for such failure are difficult to find but do teach you so much more. Such articles are difficult to publish...
4. Synthetize interesting results and keep a very brief note on expected results
Analyze the literature (4)

Conclusion
1. Provides a concise summary of what was attempted (so maybe read first the conclusion)
2. Little interest unless providing a clear indication of the next step in the author’s research

Bibliography
1. Gives a clear indication of whether the authors did an updated literature review for their publication
2. Search for the oldest references: They may hold the key to the founding papers
3. Search for the newest references: They may be the key to other competing approaches
4. Learn from the bibliography formatting and note differences between journals
5. Integrate the most promising references into your overall bibliography database (Endnote, else?)

Summarizing
Reduce your literature review to a one pager (no exception)
Experimental protocol

• Compulsory in environmental and medical studies
• Allows others to repeat your experiment
• May include H&S instructions and reference to applicable laws and regulation applicable to the procedures
  – e.g. Drones
• Describes the experiment environment, equipment required and a very detailed step-by-step description of the experiment
• May include operation instructions for all equipment involved
• May include all calculations and statistics used for the experiment
Experimental protocols

- Names of users
- Location of experiment
- Goals
- Techniques used
- Equipment required
- Step by step process
- Diagrams detailing placement of equipment
- Possibly photos of equipment and their functions
Examples

http://www.nature.com/nprot/journal/v9/n3/fig_tab/nprot.2014.035_F1.html

Look for other examples online
Questions?