

## **LECTURE -09**

# **Reading Research Articles**

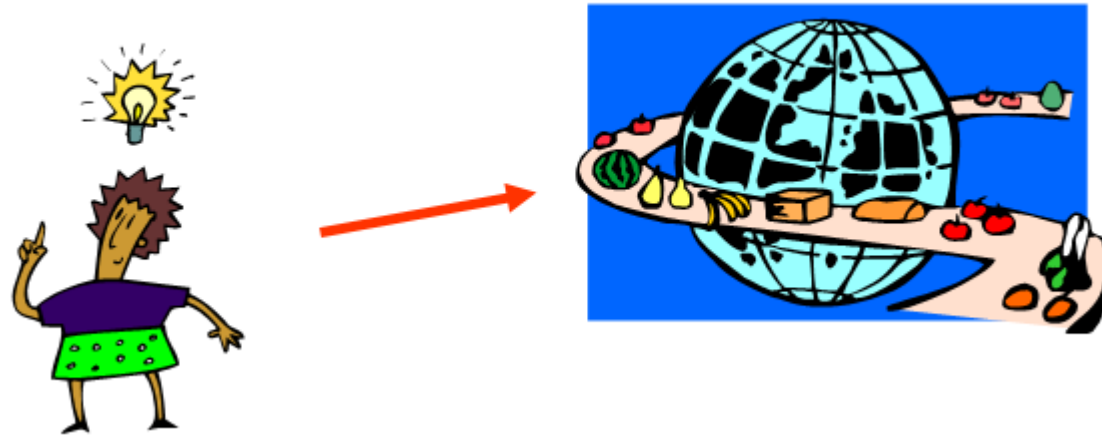
### **Course Instructors**

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## What is Research?

- Discovery of new things that have been independently verified by other professionals.
- Contribution to the existing knowledge in some way.
- Something new to humanity (not just new to you or your group).



## The Research Community

- All follow the same ethical principles.
- All use the same language and terms.
- All provide information to the world-wide community reported in a complete and open manner.
- All acknowledge the previous work of others.

## Why read Research Papers?

- The more you read, the better you will be able to write your own.
- Researchers read research papers to
  - Review them for a conference or a journal.
  - keep up-to-date in their field.
  - Conduct a literature survey of a new field.
- Researchers read relevant papers on regular basis.
- Learning to efficiently read a paper is a critical but rarely taught skill.

# Structure of Research Papers

| Section           | Purpose of the Section  |
|-------------------|---|
| Abstract          | To briefly introduce the reader to the aims of the study, the methodology, results and findings.  |
| Introduction      | To state a clear overall purpose for the study.<br>To define the research question(s) of the study.<br>To give a very brief background of relevant theory and practice for your topic.  |
| Literature Review | Review of the current literature on the research topic.<br>To summarize what conclusions have been reached in the literature so far for this problem.<br>To highlight main issue and controversies around the problem.                |
| Methodology       | Presents the techniques and methods used to address the problem in hand.<br>To demonstrate that you are aware of the research methods used to study this topic.<br>To explain and justify the method of data collection and analysis. |

## Continued

| Section    | Purpose of the Section  |
|------------|---|
| Results    | To present the findings of your research in an orderly manner, using heading planned in your methodology or headings arising from patterns found in the research.<br>Results are in the forms or figures/tables/graphs. |
| Discussion | To comment on the trends/findings and show your understanding of what your data suggests.<br>To highlight anything unexpected that came up.   |
| Conclusion | To sum up your findings and highlight the significance of the outcomes of your study.<br>To discuss the limitations of your study and indicate where further research is needed.  |
| References | To list all the reference materials that have been cited in the text of the report  |

# Three Pass Method for Reading

## **Pass 1: 5-10 Minutes**

- Read title, abstract, introduction.
- Read section and sub section headings.
- Read the conclusions.
- Take a glance at the references.

# Three Pass Method for Reading

## **Pass 1: Output**

- Type of paper ? (analysis of an existing system? Description of a research prototype? A survey paper?)
- Theoretical bases used to analyze the problem ?
- Paper's main contribution?



## Three Pass Method for Reading

### **Pass 2: 1 Hour**

- Read the paper with greater care, but ignore details such as proofs or experimental techniques.
- Look at figures, diagrams, graphs and other illustrations.
- Mark relevant unread references for further reading.
- Identify the limitations of the research work.

## Three Pass Method for Reading

### **Pass 2: Output**

- Grasp the content of the paper.
- After second pass, 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 specialty.

## Three Pass Method for Reading

### Pass 3: 1 Hour (reviewer) / 4-5 Hours (beginner)

- Virtually re-implement the paper.
- Compare the actual results with virtual results.
- Jot down ideas for future work.

## Three Pass Method for Reading

### **Pass 3: Output**

- Reconstruction of the entire structure of the paper.
- Identification of strong and weak points.
- Pinpoint implicit assumptions, missing citations to relevant work.
- Pinpoint potential issues with experimental techniques.

## Where to find Research Papers?

- Search relevant papers using keywords on IEEE Explore, ACM, HEC Digital Library.
- Identify research groups/authors working actively in your area of interest.
  - Go to their website.
  - Find where they published recently.
- Look at websites of top conferences and look up their recent proceedings.

## Assignment

- Read two research papers of your choice relevant to your interest area.
- Write down one paragraph for each paper outlining the **main contribution** and **limitation of the research work**.
- Submit the assignment to google classroom before the class next week.

## Acknowledgment

The three phase approach for reading a research paper presented in this lecture is inspired by S keshav's [How to Read a Paper](#).