

# Research Methodology in Computer Science

## Organization of An Academic Paper

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March 2021

# Academic Paper

- A journal paper
  - ▶ Long paper (10-20 pages)
  - ▶ Comprehensive research
- A conference paper
  - ▶ Short paper (3-8 pages)
  - ▶ New idea with some results
  - ▶ Get the credit
- A technical report: A research on a specific technology owned by a company
- A master/Ph.D. thesis
  - ▶ A research record on a student's master/Ph.D. career
  - ▶ New ideas to solve a research problem
  - ▶ Requirements of the research quality

# Organization of an academic paper

- Title / Authors
- Abstract
- Introduction
- Literature Review
- Problems
- Methods / Algorithms / Experiments
- Analysis / Results
- Conclusions / Future Works
- Acknowledgements
- References

# Title and Authors

- Title
  - ▶ The title should be simple and clear
  - ▶ The title should indicate the main idea of the proposed method
  - ▶ No abbreviation will be better
- Author
  - ▶ Who is the main contributor?
  - ▶ Who has no academic contribution
  - ▶ Who is the corresponding author?
  - ▶ What is the order of the authors?
  - ▶ Single author of a thesis

# Abstract

- words limit: 150 words
- directly indicate the problem and results
- put keywords in Abstract
- write the abstract after complete all other sections

# Introduction

- the MOST important section in an academic paper
- motivation first (A story or an application or a frequently occurred problem)
- brief introduce the problem
- brief introduce the results
- Organization of the paper

# Literature Review

- You should convince the reviewers/readers that you have completely surveyed the researches related to your paper
- Divide the researched into closely related or not
- Introduce the researches that not closely related to your research in one/two sentence(s)
- Introduce the researches that closely related to your research carefully
  - ▶ Indicate the main differences between the problems or the algorithms
  - ▶ *They did not consider the situation that....*
  - ▶ *We consider the other situation that....*
- In the final paragraph, tell the reviewers/readers the uniqueness of your research
  - ▶ *We are the first to ....*
  - ▶ *The problem has not been investigated...*
  - ▶ *We proposed a new algorithm.....*

# Problems

- Clearly define the problem you want to discuss
  - ▶ use mathematical notations (follow others)
  - ▶ define the notations precisely
  - ▶ give a table for references
  - ▶ be careful for typos



- Clearly describe the methods you proposed
  - ▶ use mathematical notations
  - ▶ define the notations precisely
  - ▶ be careful for typos
  - ▶ follow the styles that in Algorithms textbook

# Results

- Provide the environments that you implement/verify the algorithms
- Provide observations of the results
- Provide discussions of the observations
- Verify the results

# Conclusions

- The last section of the paper
- Conclude the research
- Provide the future research directions

# Acknowledgement

- Funding
- Lab owner or Instrument owner
- Anonymous reviewers
- Someone who gives help without academic contributions

# References

- Order of the references
- Styles of the references
- Correctness of the references

# Next week

- Your research presentations
- Powerpoint or PDF file format will be fine
- 10-15 minutes
- Tell us your reserch records
- The order of the presentation