

CS 309: Autonomous Intelligent Robotics

FRI I

Lecture 22:

Final Papers

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What should I write?

- This depends a bit on the type of content.
 - Does your paper evaluate:
 - Software?
 - A device?
 - A machine learning algorithm?
 - Something about HRI?
 - Is your algorithm the important thing, or the results of a study?

In general

- Abstract
- Introduction
- Background
- Method / Approach / Methodology
- Experimental Setup / Evaluation
 - Experimental Setup
 - Testing a scientific principle
 - Evaluation
 - Testing system performance
- Results
- Discussion
- Conclusion

Abstract

- Very briefly summarizes the paper.
 - Usually 2 paragraphs. Hitting only the high points.
 - “We designed a robot which uses a deep network and monocular computer vision to follow people in the hallway. We set up an experiment <details>. We found that the system works <details>.”
- It is not a “teaser” for the paper. You tell the reader your results and how you found them.

Introduction

- Introduces your problem, your approach, and how you evaluate your system.
- This should “motivate” your problem. Why do you want to solve it?
- This should be written for an audience who are educated in artificial intelligence or robotics in general, but not specifically familiar with your problem.
- Generally, this includes details about other previous work that you or others have done.
 - For instance, if I wrote a paper on deep networks solving Go, I should mention AlphaGo and AlphaGo Zero.

Background

- This is where you establish that your approach is unique.
 - Since this is an intro class, your work does not need to be unique.
- It also establishes that your approach is informed.
 - Your work needs to be informed.
 - You should show that you know what the basic approaches to your problem are, and how others have tried to solve it here, by discussing what they have done.
 - Try to base your background section on those of papers we've read in class.
- This should be FILLED with citations to other people's work, or detailed mathematics describing well-known approaches to your problem.

Method

- This is where you describe your software. Be detailed about the stuff that is unique to you, but skip boring details that aren't news.
- Tell the reader at a high level how your algorithm works, and software fits together.
- Do not tell the reader that you purchased hardware on eBay; weird and unnecessary mathematics that do not help their understanding; or specifics about a previous study that has nothing to do with the current work.
 - I've seen all 3, but only during peer review!

Experimental Setup

- These are the details regarding how your system is tested.
- You do not include results here.

Results

- These are your results, both in terms of the raw statistics and how they are to be interpreted.
 - Classical formats divorce the results from their interpretation, but that has fallen out of favor in Computer Science.
 - “This number is lower, therefore, the robot was moving faster.”
- You should generally include statistical tests that demonstrate your point.
 - “Results were statistically significant ($F(32,3) = 8.2, p=0.01$).”

Discussion

- Why do people care about your results?
 - “Our finding that people are likely to tune out dull, humming noises, but attend to sharp, sudden noises tells us that alarms should be sharp and sudden.”

Conclusion

- Briefly recaps the paper, including what you have done and the results of any experiment.
- Discusses the significance of the finding.
- Discusses potential usage of the results or future work.
- **ABSOLUTE MAX OF 3 PARAGRAPHS,
GENERALLY 2.**