CS 378: Autonomous Intelligent Robotics
FRI II

Instructor: Justin Hart

September 6, 2018

http://justinhart.net/teaching/2018_fall_cs378/

Today

- Project proposal overview
- The peer review process
- How to write a good paper
- How to give a good talk
- Prepare for next class
- Project discussion

Your project proposals

- For your project proposals, you will use the HRI author kit in LaTeX
  - http://humanrobotinteraction.org/2018/call-for-papers/
    - sigconf (NOT acm_sig, which is for journals)
  - To simplify this, try using Overleaf
    - Easier to collaborate
    - Simpler learning curve
  - LaTeX is available on all of the machines in the 3rd floor lab and in GDC 3.414
- Proposals will be 2 pages (1 page may be insufficient, so making it a bit longer)
  - Proposals are now due next WEDNESDAY, the 12th

Your project proposals

- Articulate the problem that you want to solve
- Perform a literature survey discussing prior work in this area
  - Demonstrate that you understand what has come before
  - Demonstrate that your method and/or hypothesis is motivated by this knowledge

Your project proposals

- Describe your high-level approach to solving it, and possible technical details that you know up-front
- Plan project milestones that you think you can hit for FAIR SW & FAIR Conference
  - These are likely to change a bit, but will help you estimate your progress to your goal
- Describe how you plan to measure your final success
  - Plan an experiment, study, or metric that you can use
    - It must be convincing to someone who has access to only your final report, as this is how scientific research is peer reviewed

The peer-review process

- Before research is published and archived, it is peer-reviewed
- Other scientists working in the research area of the paper read it and score it based on a scoring rubric
  - For conferences, this is typically a 5 or 10 point scale
  - Journals and some conferences use a 100 point scale
  - The scale is broken into sections
  - Typical sections include
    - Technical correctness
    - Novelty
    - Scientific Merit / Interest
    - Readability
    - Adequate references to the literature

The peer-review process

- Typically 3 reviewers read the paper (or grant submission)
- The reviews go to a meta-reviewer, program committee (PC) member, editor, or a panelist in charge of the meta-review
- The scores are compiled, the meta writes a meta-review

The peer-review process

- In a 1-phase peer-review, at this point the editor, program committee, or panel choose which papers will be published and archived
- The papers are ranked roughly by score and discussed
  - The reviewers who read the paper, or PC member assigned to the paper lead the discussion
    - At conferences, many many people will read the papers, but only the relevant committee will perform this discussion
  - People may advocate for or against the inclusion of the paper
- After this, authors get an email telling them whether or not their paper got in, its final score, and the set of review forms from the reviewers

The peer-review process

- In a 2-phase peer-review, the review process is followed by a rebuttal period
- In the rebuttal, authors write rebuttals addressing the criticisms of reviewers
- The same set of reviewers will read these rebuttals, modify their scores, and write a new set of comments
- The reviews are then compiled in the same fashion for a second time, and the committee/panel/editors meet after the second reviews (rather than the first)

The peer-review process

- In this class, the peer-reviewers / program committee will be the mentors, and you will receive feedback similar to that given on a peer-review on your final paper
- Your performance in peer-review will help me to evaluate your paper, but will not be your final grade

How to write a good paper

- At a high level
  - Articulate your point early
    - The intention of your abstract is to entirely summarize what your paper is about in 1 brief paragraph
    - Your introduction should also get to the point very early, there are no points for dramatic tension
  - Be concise.
    - “Brevity is the soul of wit.” -William Shakespeare, Hamlet
    - Avoid unnecessary text, story, or backdrop unless it is informative

How to write a good paper

- At a high level
  - Motivate your point well
    - Why are you solving this problem?
      - Who cares?
      - Of what value is the solution?
  - Demonstrate an understanding of your problem
    - Make the reviewer understand
    - Being smart is worth zero points. The reviewer needs to understand the problem, its motivations, solutions, and any conclusions drawn after reading the paper.

How to write a good paper

- Sections (these may change based on topic)
  - Abstract
    - Special brief section at the front summarizing the paper
  - Introduction (usually in this order)
    - Motivation and brief discussion of what will happen in the paper
    - Literature survey
    - More detailed high-level description of what will happen in the paper
    - Note that these sections do not get subheadings. This is the natural flow of the introduction.

How to write a good paper

- Sections
  - Background (generally only in technical papers, or scientific papers requiring lots of motivation for the problem)
    - Describes fundamental knowledge for understanding the rest of the paper
    - Describes any common models or formulas used
    - For instance:
      - A vision paper will often start with a quick description of the Pinhole Camera Model and the distortion model used in the paper
    - This section is not always necessary. You only include it if you do not expect the average reader to know what you are talking about without it. You can assume that your reviewers will share your technical background.

How to write a good paper

- Sections
  - Methodology (generally only in experimental papers)
    - Describes your experiment in detail
    - Describes the experimental procedure
    - If study participants were recruited, how they were recruited, if they were compensated, and potential benefits to the participants
    - Describes metrics used
      - Was there a survey passed out? What was on it?
      - Are you measuring how fast people perform a task?
      - Are you measuring correlation of human behavior to a model?

How to write a good paper

- Sections
  - A model of.. An approach to.. A system that.. (generally in technical papers)
    - The nitty-gritty technical details of the implementation
    - Formulas required to develop the solution
    - Do not include things that the reader is unlikely to care about
      - System specs in a paper not about how fast an algorithm works
      - Where the sensors are sold
      - The language the implementation is written in, unless code is made available
    - Do include things that influence the results
      - What optimizer is used
      - The computer vision library used for face recognition

How to write a good paper

- Sections
  - Evaluation (technical papers, generally)
    - This is the same as methodology, but for technical papers
    - How do you know how well your system performs?
    - How do you know that it is as good or better than other systems?

How to write a good paper

- Sections
  - Results
    - The results from testing
    - Report statistical significance on all metrics in human studies (and sometimes in technical papers)
  - Conclusions
    - What the results mean
  - Future work (optional, generally rolled in with conclusions)
    - What comes next
  - The end is always a paragraph that neatly wraps up the paper, generally in the conclusion

How to write a good paper

- You are not done yet
  - Acknowledgements
    - Who paid for this?
    - Did someone help?
  - References
    - All of the parenthetical citations as full citations
- Tone
  - Be formal
  - Avoid contractions
  - Use present-tense, active voice unless something only happened in the past
    - The Denavit-Harteberg parameters describe the motion of revolute joints.
    - We recruited 100 study participants from the population of undergraduate computer scientists who have taken at least one course in the systems sequence at UT Austin.

How to write a good paper

- Citations
  - This is not the citation of a source of a quote. Those are footnoted (and rarely used in scientific studies).
  - Every idea put forth in the paper must be defended either through an experiment, a proof, or a citation.
    - The citation means that someone else demonstrated this point, and the reader should read that paper.
    - In practice, the literature survey establishes that the work presented in the paper is a good idea, because it builds on other things that have already been studied by others.

How to write a good talk

- Do not simply put the paper on the slides
- Talks usually last 15 minutes with 3 minutes for questions (and 2 for setup)
- Put details on the slides behind you so that the viewers can follow, but generally do not read from your slides
  - Do as I say, not as I am doing right now
- Plan for 1-2 minutes per slide, depending on how “dense” the slides are

How to write a good talk

- Talks are more thematic and less technical
  - Only the details required to describe the work are discussed
  - “We want to see what happens when the robot looks towards a study participant and then towards an object being handed over, before handing the object to the participant.” **- YES**
  - “Following Listing's Law, the robot performs a ballistic saccade to place the person in its foveal field of view, according to Formula 3. After this, it performs a second saccade centering the object held in its workspace. At this juncture, the robot uses open-loop servo control to move its arm into a pose placing the object immediately into the person's workspace, allowing the person to grasp the object from a pose that optimizes their ability to perceive the object (roughly the length of a bent, relaxed arm placed in front of the face).” **- NO**
    - You discuss these kinds of details if they are important. These two paragraphs say the same thing.

How to write a good talk

- Short (15 minute) talks are generally not broken into explicit sections. Longer talks (dissertations, keynotes) may be.

How to write a good talk

- Rough breakdown
  - Title Slide
    - Say who you are, thank everyone for attending
  - Introduction
    - Quickly introduce the problem that you are trying to solve
  - Motivation
    - Why is this problem interesting?
    - What are you trying to accomplish in solving it?

How to write a good talk

- Rough breakdown
  - Implementation / Experimental Design
    - The guts of what you do
  - Evaluation
    - How you are testing your system or how the experiment was actually carried out
  - Results
    - The numbers & charts (generally presented as charts)
    - You discuss what the numbers say, rather than what they are.
      - Not “mean of 12.5, sd = 0.5,” but “more people liked the smiling robots.”
  - Conclusions
    - What does all of this tell you?
      - “You should make robots that smile, because people hate angry robots.”

How to write a good talk

- In a 15 minute talk, this gives you roughly 2 minutes per section, but some are more important than others
- Spend more time on your results and conclusions than explaining your experimental design
- Keep everything light and topical
  - Details get spelled out in the questions, be prepared for hard questions. The people who **like** your work will give you the hardest questions.

Prepare for next class

- Every group bring 3 slides briefly discussing their preliminary project ideas
  - This is **not** intended to be what you actually propose, but what you're thinking of **now**
- Plan to talk about your project idea for about 5 minutes
  - In conference parlance, this is called a “lightning talk” and lasts only 3 minutes
    - 3 minutes is harder. In certain venues, they actually cut your mic at 3 minutes.
- Plan to discuss your idea for another 5 minutes with the class
- It is okay if your ideas are still **very** preliminary at this point. This is an exercise to get you started.

Prepare for next class

- Slide 1 – Title Slide
- Slide 2 – A few bullets on your idea
- Slide 3 – Open-ended, but **relevant**.
  - It can be more bullets

Top Ten Suggestions for Authors
(from Peter Stone)

1) Get someone whose native language is the submission language to read it; get someone who's good at copy-editing to do a pass for clarity, spelling, and grammar. Reviewers are more kindly inclined toward papers they don't have to struggle to understand.
2) No-one has ever been annoyed by a reference (almost), but there are about a zillion ways to annoy a reviewer by leaving a reference out. Use Google Scholar and, seriously, set aside some time for this part. For a six-page paper, aim for a solid half-page, minimum, unless you're doing something extremely obscure. Read the abstracts, skim the papers if you can, but cite ’em.
3) Think very hard about your abstract and intro, which set the reader's mood up front. Make these sections clear and compelling, and state your claims.don't make the reader get to page 4 in order to find out what they're reading. If you only copy-edit one thing, make it this.
4) Similarly, the conclusion is the last thing the reviewer reads before writing their review; it's a crucial moment. Spend time on it. State clearly that the work is awesome and what makes it so awesome.
5) Reviewers do a first cut on what papers they'll review mostly by the keywords you choose when submitting. Think about what population is going to have the most positive take on your work, and use those keywords. Don't shotgun. A TMS person who ends up with a hardcore theory paper will be lost (and annoyed).

Top Ten Suggestions for Authors

6) The reviewer is just as sleep-deprived as you, and less familiar with the topic. Spell stuff out in very small words. If you have lots of equations, use English captions to render them quickly readable.

7) Get someone else to read it. Your advisor, a coworker, another student, or your mom. But basically, anybody who hasn't been staring at it for 73 consecutive hours.

8) For readability, break up the flow of the text. Pictures are great (for complicated graphs, use the captions, they get eyeball time). Lacking pictures, use section headers and sub-headers intelligently. This lets the reviewer's brain reset.

9) Use the conference template. Don't make up your own reference style, don't tweak the margins, don't cunningly use 11-point Times instead of 12-point. Just use the damn thing.

10) (from Brad Knox) When your brain is too fried and/or you are too deep into the writing process to properly proofread what you've written, instead try reading out loud as fast as you can, Micro Machines style (that's a 1980's US commercial reference). This is strangely refreshing when you're a bit burnt out. You'll catch a large number of misspellings and grammatical errors. You'll also get a little bit of an understanding of what you're reading aloud and will likely identify some sentence-flow and content-level issues.