CSC 595 - Research Skills

Course overview

Nishant Mehta

Introductions

- Who am I? Your guide in this course: Nishant Mehta
- What I do:
  - Machine Learning Theory
  - Capoeira (not regularly)
- Introduce yourself!

Goals of this Course

A core goal of this course - **get you started on the track to great research**

- How can you recognize great research? What does it look like?
- What are the traits of great researchers?
- What is the process of science? How does it evolve?
- Also, what is your role, and how can increase the chances that are you are influential?
- How are papers reviewed? How can you be a great reviewer? How can you write a paper that appeals to reviewers?
- What are research ethics?
- What is the role of cross-disciplinary thinking in great research?

Goals

Another goal - see the big picture. This helps both for motivation and for long-term planning.

- Why am I doing a PhD (or why might you want to do a PhD later, in case you are doing a Master's now)?
- What job do I want? There are many possibilities…
- What are the stages of my graduate program? How will I be evaluated? What things do I need for the next step (after I graduate)?

Goals

Of course, a primary goal - to learn fundamental skills of research:

- What are some research patterns for generating ideas?
- What are some strategies for thinking creatively, and for getting unstuck?
- How can you I cross-disciplinary thinking to do great research?
- How can I prepare and give a great talk?
- How can I write a great paper?
- How can I have effective personal interactions in my research community?
- How can I work effectively with my advisor?

Goals

Another (super-important) goal - help you have a happy graduate school experience:

- Student panel on fun in Victoria
- Time management
- Constructive procrastination
- How to stay motivated
- Student panel on skills for surviving grad school
- Computer Science Graduate Student Association(CSCGSA - stay tuned!)

Some notes on this course

- A radical departure from previous offerings of this course
- I am closely following the model set up by Nick Feamster and Alex Gray, who initially created and taught this course at Georgia Tech
  - https://noise-lab.net/research-course/
  - You can read more about their course design principles on the above webpage

Course Assignments and Grading

- This course is Pass/Fail. Below a B is considered Failing
- The course has the following components:
  - 4 assignments
  - 5 mini-assignments
  - Project
  - Participation
- You need a passing grade for each component to pass the course
- Participation will be recorded via attendance (so we'll have to check attendance). You have to attend all lectures (a very limited number of times, an absence can be excused by giving a written note)

Please take this course seriously

- The primary purpose of your graduate degree is research
- This course is meant to super-charge your research
- It is possible to fail if you do not adequately complete core components of this course
- Failing is not fun for anyone!

Submission and (if necessary) resubmission

- All work will be graded as pass or redo
- You can have at most one redo per component,
- A redo is possible only if you submitted something (not just a stub)
- The deadline for the redo is the due date for the next assignment or mini-assignment

Mini-Assignments

1. Why Research?
2. Time Log
3. Project Interim Report
4. Elevator Pitch
5. Personal webpage

Assignments

1. Recognizing Good Ideas
2. Generating Ideas
3. Critiquing Ideas
4. Talk Reviews

Assignment 1: Recognizing good ideas

- What you'll do:
  - Search a top conference in your area for two papers that you think are good ideas, as well as one paper that you ***don't*** like.
  - For each paper of the two papers you liked, briefly summarize the paper, argue for why the paper is good research, and suggest a potential future work.
  - For the paper you didn't like, similarly summarize the paper and argue for why the paper is not good research. Suggest a way to improve the work ("to do it right")
- How this benefits you:
  - You'll learn how to navigate large conference proceedings, filter down to what you think is good research, and think critically to defend your choices for good research. Also, by looking for both papers you like and papers you don't like, you'll cultivate your research taste.

Assignment 2: Generating ideas

- What you'll do:
  - You now have a collection of classmates' summaries of research papers.
  - Take two papers from different research areas and, combining an idea from each paper, come up with a new research idea
- How this benefits you:
  - Creativity
  - Cross-disciplinary research pattern for idea generation
  - Expanding your knowledge

Assignment 3: Critiquing ideas

- What you'll do:
  - Review (an assigned subset of) your classmates' proposed research ideas from Assignment 2
  - As part of a small group, argue for a "best idea" among your group's subset
  - The originator of the best idea from the whole class will be given a cash prize!

Assignment 4: Talk Reviews

- As part of the project, we will have a mini-conference (near the end of class) where each of you gives an in-class research presentation
- What you'll do (for Assignment 4):
  - Write reviews for some of the presentations from the main research project
- How this benefits you:
  - You'll think critically about what makes a good talk and gain experience on crafting constructive feedback
  - You'll also get your classmates' feedback on your own presentation

Project

- What you'll do:
  - Propose a main research project (it's easiest if this is with your advisor)
  - Work on the project throughout the term, culminating in a final presentation and a final report (analogous to a mini-conference paper)
- How this benefits you:
  - Directly learning about research by doing it
  - Opportunity to apply research skills from this course to actual research

Contacting me

- Office hours are by appointment
- You can always reach me at my email address: nmehta@uvic.ca (put [CSC 595] in the subject line)
- The course webpage, along with the course schedule, is here:

  https://web.uvic.ca/~nmehta/csc595_fall2025/