CS 846: Advanced Topics in Software Engineering (Winter 2020)

This course will cover advanced topics in software engineering, with a focus on techniques that improve software reliability and developers' productivities, e.g., software testing, debugging, usabilities of programming tools.

This will be a seminar-style course, with students giving most of presentations. Students will read papers, write critiques, present papers and finish a course project. Through this project, I hope that students can have a brief experience of conducting research in software engineering, critiquing academic papers and delivering presentations.

Logistics

Instructor	Chengnian Sun
Time	09:00-11:50 am Thursday
Location	DC 2585
Email	cnsun@ (Please prefix your email subject with **[CS846] <your name>:<your subject>'**)
Office Hour	At DC 2339 by appointments
Official Website	Learn UWaterloo
Report Format	ACM SIG Proceedings format

Marking Breakdown

- Weekly Paper Review (**23%** with 1% for each paper (excluding Paper #1))
  Each week, each student should critique all the papers for that week except Paper #1 in the first week and submit via Learn (Folder called Week#) a one-page critique of the paper before the start of class. The critique should offer a brief half page summary of the paper + 3 things that you want to discuss about the paper in class. You do not need to submit a critique for the paper you are presenting, but need to submit critiques for the other papers that week.

  - Format: PDF only in ACM SIG Proceedings format
  - Length: one page for each paper
  - Report file name: **Week#_Paper#_YourName.pdf**
  - LEARN folder: Week#
  - Deadline: 21:00 on Wednesday before class

- Paper Presentation (**15%**)
  Each paper will be assigned to one student who will act as a presenter. The presentation will last 20 mins strictly and the discussion will last 20-30 mins. Each student should upload the slides to Learn (Folder called Presentation) by 21:00 on Wed before class.

  Role of presenter: As a presenter you should not simply repeat the paper's content (remember you only have 20 mins), instead you should point out the main important findings of the work. You should highlight any novel contributions, any surprises, and other possible applications of the proposed techniques. You should check the authors' other work related to the presented paper. Finally you should place the work relative other papers covered in the course (especially the papers covered in that particular week).

  Your presenations should

  - have at least one slide that lists the main contributions of the paper.
  - have at least one slide explaining the data mining/analysis technique used in the paper.
  - have at least one slide that places the paper relative to any recent work done by the authors of the paper.
  - have at least one slide that links places the paper relative to other papers presented that week.
  - have as the final slide, a listing of at least three technical points that you like and three areas that should be improved.

  - Format: PDF only
  - File name: **Week#_Paper#_YourName.pdf**
  - Deadline: 21:00 on Wednesday before class

- Class Participation (**15%**)
  Students are expected to read all papers covered in a week, come to class prepared to discuss their thoughts and take part of the classroom discussions. As a discussant, you should take an adversarial position by pointing out weak and controversial positions in the paper. You should

present a short rebuttal of the paper. You should come prepared with problems and counterexamples for the presented work (Note that this is what you are writing in the document that you submit each week for each paper).

- Course Project (**50%**)
  The course project can be done alone or in a group of two or three students. You can pick one from a list of projects in the file "project_list.pdf" in LEARN. You can also propose your own project, but need to seek the instructor's approval before submitting your project proposal.

  The course project includes the following components.

  - Proposal (**5%**): a two-page PDF file in ACM format. The proposal should have the following structure:
    1. A description of the problem area you plan to investigate
    2. A motivation for why this project is interesting/important
    3. The tools and dataset you plan to use or extend
    4. A set of research questions you want to investigate, labeled RQ1, RQ2, etc.
    5. A description of how you plan to do the project, including a schedule of milestones for the major tasks. Note that you should include the milestones due by your progress report
    6. A brief overview of related research done by others and how your work differs
    7. A list of possible problems you may encounter, and what you propose to deal with them
  - Proposal presentation (**5%**): You are expected to do a strictly ten-minute (excluding Q&A) presentation on your proposal in the class.
  - Progress report (**10%**): a 1~2 page long report summarizing the progress of your project. The items in your progress report should meet the milestones listed in your proposal. If not, please explain the reason.
  - Final presentation (**10%**): present what you have done in this project. The presentation should be self-contained, and easy to follow. The follow should follow a typical research conference talk.
  - Final report and source code (**20%**): The final report should be around ten pages long, and follow the general format of research papers. You should try to sell your report by highlighting the technical challenges, and novel contributions, as well as the technical merits.
    Source code and data. If the course project is NOT your own research project, the source code and data should be tracked by a bitbucket.com repository created by the instructor. This is mainly to ensure that all group members contribute and all code revisions are transparent to the instructor. If this is a project related to Perses, whether the source code is merged into Perses will be a dimention of evaluation.

Schedule

Academic Integrity

UWaterloo policy on academic integrity will be strictly enforced.

Acknowledgement

This webpage is adapted from Prof. Michael Godfrey's and Prof. Mei Nagappan's CS 846 pages.