CS6041/8041 Theory of Computation Systems - Project Guideline

Research Project/Paper

Objective: The purpose of this project/paper is carry out one of the following:

- Develop a research on a selected topic of theory of computations and write a research paper that can be published and/or presented in a conference. The best starting point is from IEEE Xplore or ACM digital libraries and identify recent publications pertaining your preferred topic.
- Develop a project based on your selected paper and its related work that improve or experiment on different conditions the methods that were published. Proof or simulation your proposed models. Submit with results with detailed analysis, in addition to the complete documentation.

For Ph.D. students (individual project), one of the following topics must be selected for your project.

- Complexity, computability and reducibility.
- Kolmogorov complexity and Solomonoff's theory of inductive inference applied to Turing Machines.
- Infinite time TMs of Hale.
- Quantum computers and erasability (Neal Anderson).
- Alternative (natural) models of computation: neural networks, genetic algorithms, swarm technologies.

Literature survey: Go to ACM digital library or IEEE Xplore (from library.kennesaw.edu) and identify recent papers (from 2016 to now) that is most related to what you are proposed to do in your project. Read the papers thoroughly and identify potential work you may improve over the existing methods. For example, apply another algorithm or tune parameters of existing algorithms that may enhance the performance.

Project reports: A project report (1st, 2nd and 3rd) is required at the deadline throughout the semester. Each of the reports must follow ACM paper template: Word Users: https://www.acm.org/binaries/content/assets/publications/word_style/interim-template-style/interim-layout.docx
Latex users: https://www.acm.org/binaries/content/assets/publications/consolidated-tex-template/acmart-master.zip
Overleaf Users: https://www.overleaf.com/gallery/tagged/acm-official#.WOuOk2e1taQ

Project/paper 1st Deliverable: You are required to submit a short one or two-paragraph description of your research or project **proposal** (first deliverable) by the due date.
You must propose and turn in a two page extended abstract about your project by the deadline. Thoroughly check correctness of grammars and spelling. Otherwise, some points will be off. The proposal must include the following headings:

a. Title and members' names
b. Abstract (less than 100 words)
c. Research Statement and Conjecture (summarize why your approach will work)
d. Preliminary Literature Survey and Methodology
e. To Do List with Deadlines/Milestones
f. Project Management
g. References

Project/paper 2nd Deliverable: Progress report due by the due date.
The midterm progress report must include the following headings:

a. Title and members' names
b. Abstract (less than 100 words)
c. Research Statement and Conjecture (summarize why your approach will work)
d. Related work (Literature survey)
e. Methodology
f. Progress (summarize what you have done and what you h ave not according to your proposal)
g. Preliminary Results and Analyses
h. Conclusion and Future Work
i. References

Project/paper 3rd Deliverable: Final project report or paper by the due date.
The final project report must include the following headings:

a. Title and members' names
b. Abstract (less than 100 words)
c. Research Statement and Conjecture (summarize why your approach will work)
d. Related work (Literature survey)
e. Methodology (with Your proposed methods and details)
f. Experimental Design, Results, Analyses, and Comparison
g. Conclusion
h. References

The purpose of this project/paper is carry out one of the following:

- Develop a research on a selected topic in theoretical computer science and write a research paper based on a recently published paper with your understanding and potential improvements, that could be published in a conference.
- Your selected topic should be related to topics covered in this course.

Project deliverables:

- Project/paper 1st Deliverable: You are required to submit a short one or two-paragraph description of your proposal (first deliverable).
- A progress report is due around midterm.
- Your final paper/project is due by the end of the semester.

Students are also required to submit a poster to the CCSE C-Day event, if any.

Note: The project grade is scaled to 100 points.

General Grading Rubrics for All Three Deliverables

100 Very well done, high level of understanding demonstrated with extra detail included, professional models and good writing standards utilized. Using the appropriate terminology
90 Good work, understanding of the principles demonstrated, followed directions, very few defects or errors.
80 Content demonstrated basic understanding of the material. However the overall content in omission of important details or missing answers.

70 There several parts that seem incomplete and not using the appropriate terminology. Does complete understanding of the concepts and/or principles discussed in the course.

5 Submitted with little effort shown

0 Not submitted, submission not accessible or unacceptable overall effort demonstrated