

Data and Information Ph.D. Qualifier Exam

Spring 2023

January 11, 2023

1 Written Exam

You will prepare a technical report that addresses a set of questions. Your answers should be based on the topic of your chosen reading list. *You should state the chosen reading list at the beginning of your report. Your report is due on January 27, 2023 by 5pm EST. Your submission in PDF format should be emailed to lifuh@vt.edu.*

1.1 Questions

1. Describe an important research problem in your chosen topic.
 - (a) Why is this problem important to solve?
 - (b) What are the technical challenges with solving this problem?
2. Describe prior approaches to solve this problem or closely related problems.
 - (a) Organize similar approaches together to describe their general approach and document their individual differences.
 - (b) What are the foundational ideas behind the approaches you have covered?
 - (c) What are the strengths and limitations of prior approaches?
 - (d) How do prior approaches evaluate success?
 - (e) Are there any limitations with existing evaluation methods?
3. Describe a new approach to solve the problem. In your description, explain the key intuition behind your approach and why you think it is likely to be effective.
 - (a) What limitations of prior work would be addressed by your new approach?
 - (b) How would you evaluate your new approach?

Your report should be well supported by literature with proper citations. You should include figures, tables, pseudocode, or equations as appropriate to clarify your explanations. Your chosen reading list will serve as a starting point to identify a research problem, and it is expected that you expand the provided list to include more papers relevant to your research problem.

1.2 Formatting rules

The report should be no more than 8 pages long for the main content, excluding references. You can use unlimited number of pages for references. You should use the NeurIPS 2022 format. The template can be found here: <https://www.overleaf.com/latex/templates/neurips-2022/kxymzbpjwsqx>.

1.3 Grading

Grading will be based on the following rubric:

- 40% for technical writing (clarity, organization, presentation).
- 40% for demonstration of knowledge on topic area and reading list.
- 20% for synthesis of insights from prior work, new approaches or evaluation methods.

2 Oral Exam

You will present a brief talk covering the answers to your chosen problem. Oral exam will be for 15 minutes, with 10 minutes for the presentation, and 5 minutes for answering questions posed by the faculty examiners. The presentation will be scheduled soon after the report is submitted.

2.1 Grading

Grading will be based on the following rubric:

- 30% for presentation quality (clarity, effectiveness of visuals).
- 40% for technical content (motivating the problem, discussing prior work and your new approach).
- 30% for question-answering.