Group Project Guideline

AIE1901 - AI Exploration - LLM for Optimization

Jie Wang, 2025/10/14

What is This Project About?

- **Core Objective**: Find a non-trivial, interesting optimization problem, use LLM to solve it
- **Your toolkit**: Prompt engineering, API calls, creative problem-solving
- **Goal**: To use an LLM as an optimization tool or assistant.

What is This Project About?

- **Midterm Presentation:** It is about project proposal, and includes content like what kind of problem you want to solve, why this problem is interesting, and some initial findings.
- **Final Presentation:** It is a formal presentation about the whole project, and should include problem motivation, modeling, solution, results, and analysis.

Project Timeline

Milestone	Timeline	Description
Topic Brainstorming	Week 5 (Sep. 29 – Oct. 12)	Discuss and select a problem domain
Project Proposal	Week 6 (Oct. 13 – Oct. 19)	1. Find your problem, approach, and goals 2. Meet the Instructor
Midterm Presentation	Week 7 (Oct. 20 – Oct. 26)	Present your proposal to the class
Implementation & Testing	Week 8 – Week 10 (Oct. 27 – Nov. 16)	Build your solution, run experiments, and collect data (optional)
Final Presentation Prep	Week 11 (Nov. 17 – Nov. 23)	1. Analyze your results and create your final deck 2. Meet the Instructor
Final Presentation	Week 12 (Nov. 24 – Nov. 30)	Present your full project to the class
Summary of the class	Week 13 (Dec. 1 – Dec. 7)	Summarize the class (This is supposed to be the final lecture of this course)

Office Hours

- For each group, please schedule a 30-min meeting with the instructor to discuss the topic of your group project ***within this week (October 13 - 19)***
- Notify the instructor in email. The meeting can be either online or in-person

Project Presentation Rehearsal (Optional)

- For each group, please attend either one of the following project presentation rehearsal:
    - October 19 (Sunday), 8pm-9pm, TA206
    - October 20 (Monday), 8pm-9pm, TA206
- The instructor will provide feedback to the whole group before the formal midterm presentation on October 21.

Step 1: Problem Identification

- Brainstorm: As a group, discuss optimization problems that interest you.
- Scope: CRITICAL! Choose a problem that is complex enough to be interesting but small enough to be manageable in one semester. "Optimizing global shipping routes" is too big. "Optimizing a delivery route for 10 packages around campus" is much better.

Rules about Midterm Presentation

- Each team is given **10 minutes** for presentation and **5 minutes** for Q&A session. **Every team member** is expected to present..
- **Outline**: This presentation is about your plan. It should convince the instructor and everyone that your project is well-thought-out and feasible.

Rules about Midterm Presentation

1. **Title Slide.** Project Title, Group Member Names, Group Leader
2. **The Problem.** Clearly define the optimization problem you are tackling. Why is it interesting/relevant. You cannot simply copy and paste all texts of the problem you want to solve. You must present it to the classroom to ensure everyone understands your setup.
3. **Proposed LLM Approach.** How do you plan to use the LLM?
4. **Success Metrics**. How will you measure performance? Is there any heuristic approach to solve this problem?
5. **Potential Challenges & Questions.** Show you've thought ahead. What are the challenges you need to solve during this project? Be prepared to answer questions from the audience.

Assessment Criteria for Midterm

- **Creativity & Originality**: Did you choose a novel problem or a clever approach? (weights 10%)
- **Clarity of Presentation**: Were your midterm presentation well-organized and easy to follow? (weights 35%)
- **Depth of Analysis**: Did you go beyond "it worked" or "it didn't work" and provide thoughtful insights on why? (weights 20%)
- **Teamwork**: Did the group work effectively together? (Assessment will include a confidential peer evaluation component where you will rate your teammates' contributions). (weights 25%)
- **Peer Review:** How does the classmates outside your group evaluate your presentation (weights 10%)

Step 2: Implementation & Experimentation (Weeks 8-10)

- **Divide the Work**: Assign clear roles to each team member.
    - **Prompt Engineer:** Designs and refines the prompts for the LLM
    - **LLM Interaction Lead:** Runs the prompts and manages API calls (if used)
    - **Data Manager:** Creates sample problem sets and collects the LLM's outputs
    - **Analyst:** Evaluates the results against your success metrics
    - **Visualization Lead:** Creates charts and graphs for the presentation
    - **(Note: Roles should be collaborative, not siloed!)**

Step 2: Implementation & Experimentation (Weeks 8-10)

- **Iterate and Refine:** Your first prompt may not be perfect. You will need to experiment with different phrasings, examples, and instructions.
- **Document Everything**: Keep a detailed log of your prompts, the LLM's responses, and what you changed each time. This is key for your final presentation.

Step 3: Final Presentation (Weeks 11-12)

- Each team is given 15 minutes for presentation and 5 minutes for Q&A session. Every team member is expected to present
- **Analyze Your Results:** Did it work? Why or why not? What were the limitations? Was the LLM creative? Did it make errors?
- **Create Your Presentation:** Tell the story of your project. See the detailed outline below
- **Prepare for Q&A:** As a group, brainstorm questions the audience might ask and prepare answers