Spring 2024
Introduction to Artificial Intelligence

Final Project Specification

Introduction

We are approaching the end of this semester. We hope that you have made good progress on your final project. As you may recall, you are expected to submit **a 15-minute video-recorded presentation** and **presentation slides**.

Video Recorded Presentation

Ready to prepare your 15-minute recorded presentation? Please read the following instructions carefully. The following items are expected to be covered in your presentation. We will grade your score based on these sections. If you have any questions, please feel free to let us know in the following **Final Project QA Sheet**!
https://lopsided-soursop-bec.notion.site/Final-Project-QA-Sheet-858d047ac61e42a88d5ea494f5a6b9c9?pvs=4

- **Introduction** - Brief overview of your problem. Why this problem is important? Why we spend time working on this?
- **Related work** - Describe papers/works that are relevant to your final project. Please also explain the difference between your work and the existing ones.
- **Dataset/Platform** - Explain the dataset/platform you used for your final project. For instance, the size of the dataset, distribution of classes, or how your implement platform for Game AI.
- **Baseline** - Explain how you implement baselines. For example, you are working on an object recognition problem. You may choose Convolutional Neural Network (CNN) as your baselines. Your main approach may be a Transformer. Please give a brief description of the baselines in the video.
- **Main Approach** - Please propose a main approach. You should describe the algorithm in detail. Specifically, please discuss how they apply to your problem (what are the inputs/outputs, variables, factors, states, etc.)?
- **Evaluation Metric** - Please include metrics, both qualitative and quantitative, you are using to evaluate the performance of your baselines and proposed method. Note that please explain your metrics in detail.
- **Results & Analysis** - Please present the performance of your baselines as well as main approach. Additionally, please analyze the results you obtained.

For example, you are working on an object recognition problem, and there are 10 different classes. Most of the classes achieve reasonable results using CNN. However, one of the classes performs unsatisfactory compared to others. Why?

Presentation Slide

The slide should cover the key items specified previously. Additionally, please incorporate the following information:

- **Github link** - Please upload your source code Github. Your repo should include an overview of the task, prerequisite (your coding environment, packages version (e.g., requirements.txt in Python)), usage, hyperparameters you set, experiment results, and so on.

- **Reference -** Please provide the reference to the original source, dataset or the method you use.

- **Contribution of each member** - Please include the contribution of each member with **proportions**. We understand the condition that some members may fail to contribute to this project; thus, we will adjust your score if the contributions are significantly unequal. Feel free to let us know if you have any concerns about this part.

Potential Tasks

1. LAION5B: An open large-scale dataset for training next-generation image text models
   a. image --> text generation (GitHub)
   b. text --> image generation (GitHub)
2. WuKong: A 100 Million large-scale Chinese Cross-modal Pre-training Benchmark
   a. zero-shot image classification (GitHub)
3. MoCapAct: A Multi-Task Dataset for Simulated Humanoid Control (GitHub)
   a. Motion imitation (imitation learning)
   b. Motion completion (imitation learning)
   c. Go-to-target (RL)
4. MineDojo: Building Open-Ended Embodied Agents with Internet-Scale Knowledge (GitHub)
   a. Programmatic task (RL)
5. KING: Generating Safety-Critical Driving Scenarios for Robust Imitation via Kinematics Gradients (GitHub)
   a. Scenario generation (optimization)

6. Ravens: Ravens is a collection of simulated tasks in PyBullet for learning vision-based robotic manipulation, with an emphasis on pick and place (Github).
7. Other Sources: Interesting datasets and benchmarks from NIPS Datasets and Benchmarks 2022

NG Topics

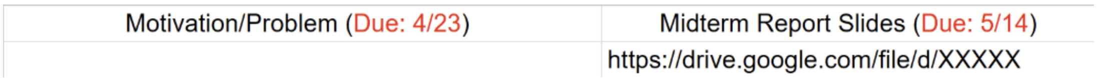
- Tasks done in past 2-year AI courses (Google Sheets: Previous Repo)
  - RL for small game (pacman, mario, …)
  - CNN for xxx classification
- If we find your work is similar to/the same as the ones done in the past 2 years, your final project score will be low!
- Rule of thumb:
  - Work on a project that applies learned or new algorithms for interesting/important applications
  - Detailed analysis of an existing algorithm

Submission

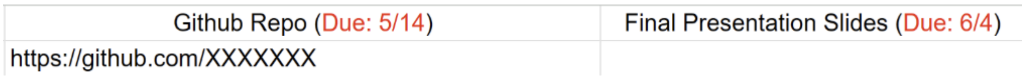
1. **The deadline is 6/4 (Tue) at 23:59:00,** you need to submit the following two files to the E3 system.
   a. **Link of your video** (Please attach the video link in the Link.txt file)
   b. **Final Presentation Slides** (The filename should be Team{TEAM_ID}_Slides.pdf)

```
├ 📜Link.txt
└ 📜Team{TEAM_ID}_Slides.pdf
```

2. As this is the final project, we **DO NOT accept any late submissions**.
3. **Only one team member needs to submit the recorded presentation and slide.**
4. Please also fill in the Google sheet: 2024 with the corresponding item before each due date as the following.



Motivation/Problem (Due: 4/23)	Midterm Report Slides (Due: 5/14)
	https://drive.google.com/file/d/XXXXX



Github Repo (Due: 5/14)	Final Presentation Slides (Due: 6/4)
https://github.com/XXXXXXX	

   - For the midterm report slides, please provide 1-2 page slides including topic, progress, and goals.
   - For the GitHub repo, please first create it before its due date, and you can modify it afterward.

5. We will select **5 groups** for a live presentation on **6/11 (Tue) (tentatively)**. We note that those selected groups **should** present your work (not optional this time). Those selected groups will have additional scores and perhaps some bonus awards (e.g., best poster, best presentation, and best-voted poster/presentation). Please be well-prepared as you might be one of the outstanding teams.

Scoring Criteria

Hard constraint: NG topics at most 60 points, plagiarize from 2023/2022 0 point

1. Originality (15 %)

15%	Surprising application or analysis aspect
10%	Utilize different dataset or model/method
0%	Only reproduce reference

2. Difficulty (10%):

10%	Topics from NeurIPS benchmark/dataset or other challenging topics
7%	other cases
0%	CNN classification for xx / RL for small game

3. Clarity & Organization(20%)

   Richness and clarity of expression

   - Introduction
   - related work
   - dataset / baseline
   - proposed method
   - contribution of each member

4. Completeness (55%)

   Including：

   a. Introduction (5)
   b. Related work (5)
   c. Dataset/Platform (5)
   d. Baseline (5)
   e. **Main Approach (15)**
      - Only use pre-built model from package (scikit-learn, PyTorch …etc)：at most 5 points
      - Do not explain the detail of your approach: minus 5 points
   f. Evaluation metric (5)
   g. **Results & analysis & Others (15)**
      - Type of experiment (5)：If there is only one type,e.g.,change the learning rate, then you'll get at most 2 points.
      - Discussion and analysis (5)：Only numerical values without discussion and analysis will receive a maximum of 2 points.
      - Limitation of your work (2)
      - Try to apply the model/method to practical use. (3)

<u>Example</u>

Final Project example

1. Originality (15 %)

15%	
10%	V
0%	

2. Difficulty (10%):

10%	
7%	
0%	V (CNN for xx classification)

3. Clarity & Organization(20%) **base on your video presentation**

   Richness and clarity of expression

   - Introduction
   - related work
   - dataset / baseline
   - proposed method

4. Completeness (55%)

   Including：

   a. Introduction (5) **5 points**

   b. Related work (5) **5 points**

   c. Dataset/Platform (5) **5 points**

   d. Baseline (5) **5 points**

   e. **Main Approach (15)** **8 points**

      - Only use pre-built model from package (scikit-learn, PyTorch …etc)：at most 7 points
      - Do not explain the detail of your approach: minus 5 points

   f. Evaluation metric (5) **5 points**

   g. **Results & analysis & Others (15)** **12 points**

      - Type of experiment (5)：If there is only one type,e.g.,change the learning rate, then you’ll get at most 2 points. **5 points**
      - Discussion and analysis (5)：Only numerical values without discussion and analysis will receive a maximum of 2 points. **5 points**
      - Limitation of your work (2) **2 points**

- Try to apply the model/method to practical use. (3) **0 point**

Completed analysis but with easy task and naive method won’t get too much points in total.