Spring 2023
Introduction to Artificial Intelligence

Final Project

April 11, 2023

Class Project - Generative AI

Introduction

In the final project, you will work in groups of **three to four students** to apply methods learned in the class to a real-world problem that you are interested in. In this final project, the topic scope is **Generative AI**, which has been a popular and highly focused topic since ChatGPT is performed. However, not only generating text can be called Generative AI, don't be constrained.

For instance, you are the painter and you want to know if combining Picasso's painting style with Van Gogh's painting style, what type of works will be produced. Therefore, having a generative AI for combining different painting styles is important for you to imagine how to combine these.

You can choose any field or problem that a generative model can help for. For example, generate video, title, code or recipe, even the sheet music can also be generated. So use your imagination to discover places where generative models can assist our life.

Video and Slide Requirement

Your 15-min video should be a comprehensive account of your project. In this final video we would like to see the proposed method, some new results, experimentation and/or analysis, and a Future Works section. We note that **demoing your work is optional**. Below is a full description of what you should include in your project final video. We will grade your score based on these sections.

- **Introduction** - Brief overview of your problem. Why might this problem be important?
- **Literature Review/Related work** - Description of other work/papers you've found that are related to your task. Just mentioning a paper is not sufficient; you should at least go into brief detail about what kind of approach they are using/how it relates to

your work if it's not immediately clear. Please also mention why your work relates or differs from these related works.

- **Dataset** - Description of data you are using - the size of the dataset, distribution of classes, any preprocessing you needed to do
- **Baseline** - Description and implementation of your baseline. For this video, you don't need to go too much into detail, but please still include some details.
- **Main Approach** - Propose a model and an algorithm for tackling your task. You should describe the model and algorithm in detail and use a concrete example to demonstrate how the model and algorithm work. Don't describe methods in general; describe precisely how they apply to your problem (what are the inputs/outputs, variables, factors, states, etc.)?
- **Evaluation Metric** - Please include what metrics, both qualitative and quantitative, you are using to evaluate the success of your problem. If relevant please include equations to describe your metrics.
- **Results & Analysis** - Please include the performance of your baseline as well as the performance of your main approach so far and any experiments that you have run. If your results are creative and can’t find a proper baseline, then you can analyze how you get the results you want. To sum up, include an analysis of your results, and how this might inform your next steps in fine-tuning your main approach. The analysis is very important, and it requires you to think about what your results might mean.
- **Error Analysis** - Describe a few experiments that you ran that show the properties (both pros and cons) of your system. Analyze the data and show either graphs or tables to illustrate your point. What's the take-away message? Were there any surprises? Use these experiments in the error analysis to describe potential errors in the method and why they may have occurred.
- **Future Work** - This section can be short, but please include some ideas about how you could improve your model if you had more time. This can also include any challenges you're running into and how you might fix them.
- **Code** - Please include a link to your Github/Bitbucket/etc. 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.
- **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.
- **References** - Please include a reference section with properly formatted citations (any format of your choice).

Discussion

TAs had opened a channel **Final Project 討論區** on Microsoft Teams of the course, you can ask questions about the final project in the channel. TAs will answer questions in the channel as soon as possible.

Grading

- **MP4 and Slide: 20%**
- **Report: 80%**

Submission

1. **The deadline for this homework is 5/30 (Tue.) 23:55:00.**
2. Submit one 15-min video and corresponding slide and report with the filename of **Project_Team{ID}.mp4**
   Project_Team{ID}_slide.pdf
   Project_Team{ID}_report.pdf,
   respectively. For example, Please write 05 if you are Team 5(Project_Team05.mp4).
3. The report should contain all details and your **code link**, you can refer to the video and slide requirements for your report content, some details not on the slide (ex: extra experiment data) can be put in the report too.
4. As this is the final project, we **won't accept any late submissions** for the final project.
5. **We only accept one mp4 and two pdf files**, the wrong format or naming format cause -10 points to your score. If your file is too large to submit on E3, please send an email to TAs.
6. **Only 1 team member needs to submit the video and slide**.
7. We will select **6 groups** for a live presentation on 6/6 (Tue.). We note that those selected groups **should** present your work (not optional this time). Those selected groups will have additional scores.. That is, the final class of this course is on 6/6. Please be well-prepared as you might be one of the outstanding teams.

IJCAI Workshop - CoachAI Badminton Challenge

Introduction

This is an open competition under the IJCAI conference. We encourage you to choose this as your final project, attending conference workshops will be a good reference and you will get **10 extra points** on your final project score. Since the competition has not officially started yet, please visit this website to learn about the background information and tasks of the competition. The competition host will upload a detailed introduction video and dataset on **4/17**, and will personally introduce the detailed information to the students in the class on **4/18**.

Report Requirement

In this section, we would like to see the proposed method, some new results, experimentation and/or analysis, and a future works section. Below is a full description of what you should include in your final report. We will grade your score based on these sections.

- **Introduction** - Brief overview of this competition.
- **Literature Review/Related work** - Description of other work/papers you've found that are related to your work. Just mentioning a paper is not sufficient; you should at least go into brief detail about what kind of approach they are using/how it relates to your work if it's not immediately clear. Please also mention why your work relates or differs from these related works.
- **Dataset** - Description of the preprocessing you conduct and some characteristics you found of the dataset. If you are confused about the meaning of features in the dataset, you can refer to the website just like [1].
- **Baseline** - Description and implementation of your baseline. In this part, you can briefly describe every method you conduct.
- **Main Approach** - You should describe the best model and algorithm work in this competition in detail. Don't describe methods in general; describe precisely how to apply to this work.
- **Evaluation Metric** - Please include what metrics, both qualitative and quantitative, you are using to evaluate the method you used. If relevant please include equations to describe your metrics.
- **Results & Analysis** - Please include the performance of your baseline as well as the performance of your main approach so far and any experiments that you have run. Also, include an analysis of your results, and how this might motivate your next steps in optimizing your main approach. The analysis is very important, and it requires you to think about what your results might mean.

- **Future Work** - This section can be short, but please include some ideas about how you could improve your model if you had more time. This can also include any challenges you're running into and how you might fix them.
- **Code** - Please include a link to your Github/Bitbucket/etc. 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.
- **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.
- **References** - Please include a reference section with properly formatted citations (any format of your choice).

Discussion

TAs had opened a channel **Final Project 討論區** on Microsoft Teams of the course, you can ask questions about the competition in the channel. TAs will answer questions in the channel as soon as possible.

Grading

- **Participation: 10%**
- **Private Leaderboard: 30%**
- **Report: 70%**

Submission

1. **The deadline for this homework is 6/13 (Tue.) 23:55:00.**
2. Submit one report with the filename of **Project_Team{ID}_report.pdf**. For example, please write 05 if you are Team 5 (Project_Team05_report.pdf).
3. The report should contain all details, you can refer to the report requirements for your report content.
4. As this is the final project, we **won't accept any late submissions** for the final project.
5. **We only accept one pdf file**, the wrong format or naming format causes -10 points to your score. If your file is too large to submit on E3, please send an email to TAs.
6. **Only 1 team member needs to submit the report**.