CS 584 Project Final Report Guidelines

Submission deadline: 11:59AM (noon) on 12/13/2023

Required files for submission:

1. **Final project report**: please use the provided template. If you choose to use other format, please set font size as 12 and use single line space. Please do not use font size larger than 12 and larger line space.
    a. For project with one student: you will need to have at least 6 pages for the main content without references.
    b. For project with 2-3 students: you will need to have at least 8-10 pages for the main content without references.
    c. You can have unlimited pages for references.
2. **Implementations**: please submit all your codes for this project, including the codes for data processing, model training, results analysis, etc.
3. **Related data**:
    a. In the final report, you need to clearly mention the data resources and provide the related link to the data resources.
    b. Please submit all the required input data that are used in your implementation.
4. If you work on the predefined project, please also check the project requirement, and submit the required data.

Final Report Guidelines:

A comprehensive project final report is crucial to introduce the topic and the work you have explored through the whole semester. Based on your project proposal and midterm report, please consider the following suggestions to update each key section.

Blue indicates new added instructions for midterm report based on the project proposal guidelines.

Green indicates the new added instructions for the final report submission.

1. **Concise and descriptive title**: The title should reflect the core objectives and focus of your project.
    - New added: You have the option to update your title if needed to reflect your project objective. But it is not suggested to change the project topic.
2. **Introduction**: Provide a concise abstract that offers a brief overview of your project. Highlight the main objectives, methodologies, and anticipated outcomes. Discuss relevant previous work, existing challenges related to your project.
    - New added:

1) Update any relevant background information or literature review you identified when working on your project.
2) Summarize the progress you made so far. Include milestones achieved, tasks completed, and any major findings or insights.
3) Improve and update the introduction section based on your current progress on the project.
4) Highlight any challenges or obstacles encountered and how they were addressed or plan to be addressed.

- New added:
  1) Have a detailed discussion about the background information or literature review about your project topic.
  2) Summarize the challenges to solve the task in your project.
  3) Summarize the main contributions in your project. For example, your contributions can include but not limited to proposed a new task, proposed a new model, investigate the existing models, evaluated the performance, performed parameter sensitivities, performed ablation studies, and so on.

3. **Problem formulation:** Formally formulate the task as a machine learning task (e.g., binary classification, seq2eq, multi-class classification, regression, etc.). You can describe this task using equations or definitions if needed.
   - New added: Update and improve the problem formulation based on your progress. Include any necessary notations or equations.
   - New added: provide the formal and detailed problem formulation about the task in your proposal. You can use notations and equations if needed.
4. **Methods**: Detail the methodologies, techniques, and tools you intend to employ to achieve your project objectives. Outline any innovative approaches you're considering.
   - New added:
     1) Describe more details about the methods, techniques, and implementation used in your project.
     2) Explain the reason that you choose the specific methods and techniques to solve the task, and why they are suitable to solve your task.
     3) Provide the details of any challenges or obstacles encountered and how they were addressed or plan to be addressed.
   - New added:
     1) Similar to the above instructions added for midterm report.
5. **Datasets and Experiments**: Specify the datasets you will be utilizing in your project. Describe the experiments you plan to conduct, such as the parameters you'll study and the metrics you'll use for evaluation.
   - New added:
     1) Present any data, data preprocessing you have conducted to this point.

2) Present any experiments, or analyses conducted up to this point.
3) Discuss and analyze the results and your findings.
4) Provide your plan for future experiments and analysis.

For the experiments and analysis to show and report, you can consider the following options.

1) **Overall performance**: you can report the overall performance with the specific evaluation metrics for your task.
2) **Performance comparison**: you can consider several baseline methods and compare the performance of the model you select with baseline methods.
3) **Ablation study** to analyze the importance of different components in your model: If there is any specific components that can be removed or added based on your design, you can use the ablation study to remove it and evaluate the effect of it on the model performance. For example, you can remove the layers in a neural network, specific features or modules and analyze the model performance before and after removing. This analysis is valuable for understanding the impact of specific module on model performance and provide the insights on the model behavior in general.
4) **Parameter sensitivities**: this is used to assess how sensitive a model's performance is to changes in its hyperparameters. You can identify important hyperparameters in your model, and define a range of their values. For example, in a neural network, you might vary the learning rate, the number of hidden layers, or the number of units in each layer. Then you can train and evaluate the model using different combinations of hyperparameters within the specified ranges. Record the performance metrics for each combination of hyperparameters and analyze the results to understand how changes in the hyperparameters impact the model's performance. You can use tables or plots to organize and analyze the results.
5) **Illustrative examples**: you can consider identifying representative data samples to illustrate the model performance on the specific examples. For example, if the model provides correct/incorrect results on a data sample, why is the underlying reason.
6) **Visualization**: you can visualize your results with various plots. For example, you can provide the bar plots of the results for parameter sensitivities. You can get the heatmap to visualize the attention weights in your model.
7) **Any other aspects**: feel free to provide any evaluation and analysis that are suitable for your project.

- New added:

1) Provide detailed information about data you used in your project, along with the basic data statistics and the strategies you used for data pre-processing and data split.
2) Describe what evaluation metrics are used for your task. If there are any new defined metrics used, please provide detailed descriptions about why and how they are defined and calculated.
3) Introduce the implementation details of your models, such as how you setup the model parameters (such as learning rate, batch size, number of epochs, dimension of word embeddings or hidden states), how you select the best model, what is the vocabulary size, and so on.
4) If you compare the performance of different models or baselines, provide a brief description about the baseline methods.
5) Follow the provided list of experiments, discuss and analyze the results and your findings from different aspects, such as general performance, parameter sensitivities, ablation studies, visualizations, etc.

6. Conclusions

- This is a new section added for final report. Please summarize the project discussion with the following aspects: what task is solved in the project, what are the challenges to solve the task, how you solve the problem, what experiments you performed, what is your findings, what you learnt through this project, is there any aspect that can be potentially improved in the future, and so on.

7. **Project management**: Introduce the members of your project team, including their roles and responsibilities. Outline the timeline of your project, highlighting key milestones and deadlines.
    - New added: Please update this section based on your current progress on the project. What are the contributions of each team member to the current progress? Update the timeline and milestones accordingly.
    - New added:
        1) Please clearly provide the detailed roles and responsibilities of each team member in the project.
        2) It is important to make sure every team member has sufficient contributions in the project.
8. **Key references**: Include a list of essential references related to your project.
    - New added: please update the list of references with the new references you used during the project.
    - New added:
        1) Please include all the references you used in your project.

Final presentation

Please find our plans for the project presentation as follows.

Time: **12/04/2023 and 12/11/2023**

Location: **In class**

About the Presentation:

(1) We have 41 projects in total. We will have 23 presentations on 12/04/2023 and 18 presentations on 12/11/2023. Please check your presentation date in the presentation list.

(2) Due to the large number of projects in the class, each project presentation should be about 5 minutes, followed by Q&A with at most 1 question.

(3) For the group project, it would be better to have all group members participant in the presentation. It is also ok to have one group member to present, but it is expected that all group members participate in the Q&A.

(4) Each team needs to prepare the slides for your presentation. You can consider following this outline for your presentation and focus on your solutions and experimental results.

   a. **Introduction**: introduce the background, overview task, current status in the literature.
   b. **Challenges**: introduce the existing challenges to solve the task
   c. **Your solutions or contributions**: describe your work/contributions in this project.
   d. **Experimental results:** introduce the dataset, evaluation metrics, experiments, results, and your findings.
   e. **Summary**: conclude the presentation with a summary of the task, your contributions, your experimental findings, and what you learnt through the project.

(5) For each project, please submit the presentation slides on Canvas under the 'project presentation' by 11:59AM (noon) on the presentation date.

(6) After the presentation, you can still improve and update your final report before the submission deadline.