



Final Project

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COSC 525: Deep Learning (Spring 2020)

1 Overview

The goal of this project is for you to further explore a certain subject that we covered in class or a new subject related to it (based on some previous work). This is an open project in a sense that you will propose the problem you would like to work on and the solution you are planning use. Your main goal should be to explore the characteristics of your problem/solution under the deep learning framework

2 A Few Guidelines

1. Most projects fall into one of these three categories:
(taken from <http://cs229.stanford.edu/projects.html>)
 - **Application Project:** This is by far the most common: Pick an application that interests you, and explore how best to apply learning algorithms to solve it.
 - **Algorithmic project:** Pick a problem or family of problems, and develop a new learning algorithm, or a novel variant of an existing algorithm, to solve it.
 - **Theoretical project:** Prove some interesting/non-trivial properties of a new or an existing learning algorithm. (This is often quite difficult, and so very few, if any, projects will be purely theoretical.)
2. Your work should be novel in some respect. That is, it should either address a new domain or further examine certain solutions in a specific domain.
3. Your project will not be judged by how well it succeeded, but rather by how well it was motivated/thought of/tested. Therefore, feel free to try some far fetched ideas.
4. You should not propose a completely new idea. Rather, you should further develop an issue explored in the course or from a paper, or the combination of two issues.

5. Try to find a recent paper which addresses the topic of your choice, and relate your work to it.
6. Try to not introduce multiple novelties - try to focus on one aspect so you can explore it sufficiently.
7. Make sure that the question you bring up in your paper, is answered by your paper.
8. Feel free to integrate things you are already working on into your project.
9. Good previous work can be found at the ICML and NeurIPS conferences.
10. You will be using Google Cloud to run your code. Details will follow.
11. Teams can be 2-3 students.

3 Sample Projects

Check out this link for examples of projects: <http://cs229.stanford.edu/projects.html>

4 Coding(30%)

You are required to write your code in python3. You are allowed to use certain external libraries (i.e. Tensorflow, numpy, matplotlib). However, if you are unsure make sure to check with me in order to get my approval.

5 Report (70%)

I will upload a Latex template to Canvas. Your report will need to include the following sections:

1. Abstract(5%)

2. Introduction(5%)

In this section you should discuss the question you are planning to investigate. Make sure to describe the problem clearly, and how you are planning to solve it. Also, clarify what your new contribution is (as opposed to previous works).

3. Previous Work(10%)

Discuss the previous work you are using as a starting point/reference. If you are working on a different domain include work that works on the same or similar domain. If you are using a new method, discuss other works which use similar methods. Note that you can use both academic papers in addition to online articles. Make sure to cite all sources.

4. Technical Approach (10%)

Describe the problem you are working on including the rules, goals, etc. Assume that the reader has not been introduced to this domain problem previously. Describe your network architecture/pre-processing/learning method. If you are examining different options describe them all. In addition, add diagrams to clarify.

5. Experiments and Results Analysis(30%)

Present the results which answer your hypothesis questions. These should include different graphs which clarify the answer and examine different aspects of your solution. Make sure to carefully describe how your experiments were conducted (how many runs, how it was initialized, etc. This section is the most important, and will be evaluated both on presentation and correctness.

6. Conclusion(5%)

What have you achieved in this project? What have you learned?

7. References

8. Appendices:

- Code Design(5%)

Describe the general structure of your code including functions, classes, and data structures used. If you are using code written by someone else make sure to cite it and emphasize the parts that you have written yourself.

- Workload Distribution

Describe how work was divided between the team members

6 Submission

You are required to submit one zip file with both the report and your code.