CAP 6619: Deep Learning (2021 Fall)

Research Report Instruction

(For Students Substituting Final Exam) (10 points (term) + 18 Points (final))

Due date [Dec 15 2021, Firm]

This instruction only applies to students who intend to use a longer version of the term project report (i.e., a research report) to substitute the final exam. If you DO wish to participate in the final exam, please follow the "Course Report Instruction (For students participating in final exam)" in the Canvas.

The grading of the term project report is based on the following criteria.

1. **Overall [3 pts]:** You should organize your report in IEEE format, with 4,000 words minimum. Please note that table/figure do not count towards the word limitation. You can use IEEE word or Latex temperate from the following URL
    a. **Template:** http://www.ieee.org/conferences_events/conferences/publishing/templates.html.
    b. **Plagiarism:** You cannot copy any sentences, paragraphs, or figures, from any external sources (such as published papers or Internet). If Turnitin indicates that a submission is over 30% similar to any other submissions, the instructor will carry out a Plagiarism investigation.
    c. If you have to cite a figure/graph published somewhere else, please properly cite the source of the reference [0 credit if plagiarism check returns over 50% similarity to any published work]. [Grading of grammars and typos are included in the "Overall"]
2. **Title and Abstract [1 pt]:** Your report should have a brief and informative title and an abstract. The abstract should have 200-300 words, which summarizes the problem you intend to address in the report. Briefly describe designs and solutions which will be proposed in the report, and briefly summarize any conclusions the report intends to draw. [200-300 words]

3. **Introduction [2 pts]:** Your report should have an introduction section with 500 – 1000 words. The introduction should clearly state (1) what is the research problem to be studied in the report; (2) the motivation of the problem studied in your report; (3) how are the problem solved by existing methods, if any; and (4) a brief description about the method you will propose in the report. You should cite at least 8 relevant references (publications) in the introduction. If your report is about literature review, you will need to cite at least 15 references in the Introduction [500-1000 words]

4. **Related Work [2 pts]:** Your report should have a related work section to summarize works (algorithms) which already exist to solve the problem. For example, if you are developing a deep convolution neural network for traffic sign recognition, you need to summarize existing traffic sign recognition methods, such as how do existing methods solve the problem, what are the features and the classification models used in the design, etc. [500-1000 words]

a. If your report is about literature review, you may provide a brief summary about existing survey paper which addresses similar topics. For example, if you are working on deep learning for health informatics, you may need to summarize any existing reports (or survey papers) which address the application of deep learning to the health informatics domains. Clearly explain the difference between your literature review and any existing publications in the field. For example, an existing survey paper may focus on deep learning in health informatics, from health providers' point of view, whereas your report is more focused on deep learning from patients' point of view (or for a particular health care area).

5. **Main body [9 pts]:** In the body of your project, you will need to provide technical details of your design [2000-2500 words]
    a. If your report is about new design to solve a research problem, you will need to describe your designs. Use flowcharts, figures, or some pseudo-code to describe your algorithm details. [Please use at least two figures (or flowcharts) to demonstrate the system framework or architecture]
    b. If your report is about experimental studies, you will need to provide a brief description about your learning/classification methods, the benchmark datasets, and different measures applied. You should also explain how the experiments are carried out in your study, and what type of empirical study goals you intend to achieve.
    c. If your report is about literature review or survey, you should provide well-organized subsections to summarize the resources, methods, or any other relevant materials related to the survey. You must use five tables/figures/flowcharts to summarize and/or compare different methods (or resources). You will need to cite at least 30 references in this section.

6. **Experiments [8 pts]:** In the experiments, you need to introduce (1) main purpose of the experimental studies; (2) what are the tools used to design the algorithms; (3) what are the baseline methods for comparisons; and (4) what are the performance measures and data used for empirical studies. You should also use figures and tables to report the results collected from your studies, and summarize the experimental results [1000-1500 words].
    a. Experimental settings: including an introduction of baseline methods, programming tools/languages, the setting of the parameters used for different methods. [1 pt]
    b. Benchmark data: Provide detailed description about data used for your study, including detailed information about the size/dimension of the data.[1 pt]
    c. Baseline methods: In order to demonstrate the performance of your method, you will need to use a baseline approach, and compare the performance of your design with the baseline. For example, if you are developing a gender prediction method for networked data, you can build a simple classifier, and compare your method with this baseline, which will demonstrate the merits of your method, and validate your hypothesis [2 pts]
    d. The results: The detailed results reported in figures/tables with necessary analysis and descriptions. You will need to include at least one figure and one table to show the results. [2 pts]

e. Analysis of the Results: Please compare the performance of your method and the baseline approach, and analyze why your method can obtain a good performance. Please also add a case study example (e.g. an example of a review report and the predicted result from your method) to why this sample was predicted with the reported score [2 pts]

If your report is about literature review or survey, you might not have experimental results to report. The 8 points for the experiments will be included in the *Main Body*, with the number of words for the project Body being 3000 words minimum.

7. **Conclusions [1 pt]:** In the conclusions, you should briefly summarize the research problem studied in your report. Explain what you have done and summarize the major findings. Draw any informative conclusions, which can be useful to guide the followers [150-200 words]

8. **References [2 pts]:** Please cite at least 10 relevant references in your report. At least 3 of them must be from 2015 or after. If you are doing a literature review, you have to cite at least 50 references, and at least 15 of them are from 2015 or after.