



SEP769 CYBER PHYSICAL SYSTEMS COURSE PROJECTS

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Introduction

For the second part of the SEP 769 course, students need to complete one hands-on project in a group of 2-5 students. All projects are implementation based. Each deep learning project is adapted from a Kaggle competition or other well-known dataset, where a challenge (from a specific industry) for an open-source dataset is stated.

Each group can pick their project from the project lists uploaded on Avenue along with this document. Some more project options are given in “Picking your project” section below.

The teams will report in detail the results of their findings and comment upon the understanding that they have developed about the problem domain

Students are encouraged to form groups (2-5 members), before the submission due date of project options. This will help you to carry out work in small teams of like-minded individuals and develop interpersonal skills.

Picking your project

Each group (2-5 students) should send an email to [\[mirzaa24@mcmaster.ca\]](mailto:mirzaa24@mcmaster.ca) (subject line starting with “SEP769 Project”) and rank the projects in the order you would like to work on them (e.g., a project at rank #1 is the project you would like to work on the most and the project in rank #5 means you are least interested in). Then, based on your preference and popularity distribution of projects, a project will be assigned to your group.

Note:

1. You may decide to work on a project of your own liking. In that case, you need to submit the details of your project in the project proposal and get instructors approval/comments before proceeding further.
2. You may see some of the projects done at Stanford for making your own project proposals: [Click here for the link](#) and [also here](#).

Deliverables and Deadlines

1. Project Option Submission and Team Members – July 6th, 2023

Students need to form a group (2-5 students) and submit your project options along with the names and student IDs of group members, by 6th July 2023 (mid-night) in the following format:

Group / Team Members

No.	Student ID	Student name
1		
2		
3		
4		
5		

Project Options

Rank	Project Title
#1	
#2	
#3	
#4	
#5	

Assignment of Projects to Groups – July 8th, 2023

Projects will be assigned to the groups by July 8th, 2023 (mid-night) by the instructor. Groups can send their concerns to resolve any issues as soon as possible.

2. Report 1 – Project Proposal (10% of project marks) – June 15th, 2023

Each student group/individual need to submit a project proposal (1 -3 pages at most). The project proposal will be of 10% of the project marks. The proposal should include the following information (along with project title and group members names):

- **Problem Specification and Motivation** – why are you motivated to solve this problem. What is the nature of the problem (applied or theoretical)? Describe the problem that you intend to solve.
- **Methodology Used** – What deep learning, neural or machine learning methodology are you planning to apply or improve upon?
- **Testing and Experimentation** – What kind of test/experiments you plan to run? How are you going to evaluate your neural/deep learning/machine learning strategy?

- **Project Plan and Milestones** – How your project is divided into specific tasks? What are the responsibilities of individual members of your group?

You may include references/pointers to some relevant/existing datasets and examples of prior research on the selected topic in your proposal. The main idea of the project proposal is that you could get instructor's feedback about your project.

3. Final Project and Its Submission (85% of project marks) – August 10th, 2023

The deliverables for the final projects are:

1. **Final Report** – Consists of two parts:
 - a. **Detailed Report** – This should give all the details of your project in the form of Word/LaTeX report style document. The report should include sections on (1) Introduction, (2) Problem Statement / Review / Background, (3) Theory and Datasets, (4) Implementation Details, (5) Explanation of the Source code, (6) Results and Discussion, and (7) Recommendations for Future work.
 - b. **Article Style Report** – Each group is required to submit a 5-page project report (IEEE conference style), including all text, figures, and appendices. The students can have an additional page (i.e., the 6th page) only for references.
2. **Recorded Video Presentation** – Each project group is required to prepare a short video presentation of their project and submit it along with their final report. The video should be between 15 - 25 minutes duration. This is usually the time allocated for a conference presentation.
3. **Project Code** – Each group will submit a link to a Github repository or zip file with the code of your final project. The root directory of the code should have a README.txt file giving details about how to download the dataset required and to run the code in the repo/zip file to replicate the results given in the final report.
 - Codes must be clean, commented, easy-to-read, and executable (fully functional without errors).
 - If not submitting the code in zipped file, you are recommended to create a GitHub repo and commit your codes there (share the link to the repo in report)
 - Codes will be reviewed using an AI-powered tool, so be careful. There is zero-tolerance policy for plagiarism.

Further breakdown of the 85% marks for the final project will not be given and depends on the evaluation metric used by the instructor for that project (will mainly depend upon the submitted report, video presentation and the code). Some of the following factors will be considered while evaluating the projects:

1. **Technical quality** of the project.
2. **Significance** – did the group work on a real-world problem or only a toy-problem? What is the impact of this work?
3. **Novelty** of the work – How novel the approach used is? Is it a common or relatively unexplored approach?
4. **Code** – How much code has been written by a project team and how much is taken directly from a previous work? Can the results given in the project report be replicated by the code submitted using the instructions given in the README.txt file?

Please make sure that you take particular note of these factors in your final project deliverables.