University of Windsor
ELEC-8900-57 Special Topics – Machine Learning
Fall 2023
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Course Project Instructions

Project Title: Apply Machine Learning to a topic/problem of your choice.

Project Description:

This course project provides an opportunity to explore a machine learning problem of your choice using real-world data. You will apply multiple machine learning techniques or variations of a single approach to a dataset using programming languages (i.e., Python and/or MATLAB) then compare the results and summarize your findings in a well-structured report. You will also present your project findings to your classmates in a 10–15-minute presentation during week 12 of classes, as outlined in the course syllabus. Please note that due to the large number of students in this course, most projects will be evaluated outside of the lecture time. This is a group project, with groups consisting of three students each. In this project, you may not use results from previous research or course projects.
Use the following Google Sheet to record your project title and group member names: http://tinyurl.com/mtjzw59e (Please, only one of the group members record the project and group information in the Google Sheet).

Important Note:
Due dates: In general, you should submit your project proposal a week before the start of reading week; your project proposal report is due on October 1, 2023, and conference with the instructor is from October 2 – 6, 2023, a schedule will be posted in due time for you to choose a conference time. You may start early and conference with the instructor before the dates mentioned above. The final project files submission (Final project Report, Programming Code and PowerPoint files) dates are provided at the end of this document.

Project Objectives:

1. To apply multiple machine learning techniques to a real-world dataset and compare their performance.
2. To gain experience working with real-world data and address the challenges it presents.
3. To develop skills in summarizing and presenting technical findings
4. To collaborate effectively with group members to complete the project.
5. Gain written and verbal communication by writing a well-structured report and present the project findings in-class.

Project Steps:

1. Form a group of three students and choose a machine learning problem and dataset to work on.
2. Research on the techniques and programming resources/tools you need to use.
3. Provide enough literature review on your topic.
4. It is encouraged that you work on a topic that uses images as a dataset. For example: X-ray or CAT Scan images for lung cancer, face recognition images… etc.
5. Prepare your project proposal.
6. Apply multiple machine learning techniques or variations of a single approach to the dataset and compare their performance using Python or MATLAB programming.
7. Your program must have a Graphical User Interface or designed a web application.
8. Summarize your findings in a report, use the IEEE template provided to you, including details on the techniques used, their performance, and any challenges encountered. Your report should be 4 - 6 pages. See instructions below.
9. Prepare a 10 - 15-minutes presentation in order to share your findings with your classmates, see instructions below. The date, time and location for the presentation will be announced at least two weeks before the scheduled presentation time, which will be during week 12 of classes.
10. Submit your report, programming code and presentation files by the specified deadline.

Project Timeline:

- Sept. 15: deadline to form groups.
- Oct. 1: Submit 4 - 5-page (single column) Project Description/Proposal **(10% of your project grade).**
- Oct. 2 – 6 or before: Conference with the instructor to discuss and approve the project proposal.
- Oct 31. Submit 4 - 5-page (single column) Progress Report **(10% towards your project grade)**
- Nov. 19: Submit 4-6 pages project report (in IEEE conference paper 2-column format) **(30% of your project grade).**
- Nov. 19: Submit your complete code with a read me file explaining how to run your code **(20 % of your course grade).**
- Nov. 19: Submit a 3 – 5 minutes video explaining how your program works, and test it with different scenarios **(10% of your project grade)**
- Nov. 22: Submit your PPT files **(20% of your project grade).**
- Nov. 23 – 24: Time and location of presentations to be announced, please note that you are encouraged to attend all of your classmates' presentations.

Note that all your assignments/reports must be submitted to Bright Space.

This project is worth 30% of your course grade.

Project Proposal Instructions

Submit a 4 – 5-page (single column), including the cover page and references page, project proposal supported with references formatted in IEEE reference style, see links below. Include the following in your project proposal:

- Cover page: project title (provide an appropriate title for your project, your title should reflect the problem you are going to work on), your name, course name, instructor name, date, college name and university logo.
- Motivation for choosing the topic.
- A short introduction includes some literature review to support your motivation.
- An explanation of your planned project/research idea and how you are going to implement it. What kind of ML techniques, for preprocessing, feature extraction, classification … etc. you used in your project.
- You could include a flowchart for the methodology and explain briefly each stage of your project.
- A brief description of the dataset used.
- Programming language and ML libraries you will use.
- A timeline revealing the length of time for the completion of project.
- A paragraph describing anything that might limit the scope of the project you plan to conduct (if applicable)
- Conclusion
- References page: Provide a list of papers you found from your initial research on the topic. All references must be relevant to your project and should be from authentic sources such as IEEE, ACM and scientific databases available through the Leddy Library. Prepare all references and citations according to the IEEE reference guide. It is expected that you will expand this list of references as you progress in your research/project implementation. Make sure you add all references your used in this course project to your final report.
- IEEE Referencing Style:
    - https://ieeeauthorcenter.ieee.org/wp-content/uploads/IEEE-Reference-Guide.pdf
    - https://tinyurl.com/yhn9xd2m
    - https://vimeo.com/220916942
    - IEEE Citation Generator: https://www.mybib.com/tools/ieee-citation-generator

Guidelines for formatting your final report:

- Use the following IEEE conference paper template to format your final report. http://tinyurl.com/48aarw8s
- Note that your paper should be 4 – 6 pages (2-column format).
- Include 10 -20 references in your final report. Note that no penalties for including more than 20 references or submitting over 6 pages.

Guidelines for preparing your presentation slides:

- Use MS. PowerPoint.
- Slides should be concise and to the point.
- Slides should reflect the main ideas in your report / research paper.
- In your slides present your reflections and understanding of the topic.
- Do not copy the paragraphs of text from your paper on to the slides.
- The slides content should be in bullet format – Font – Times New Roman, size 24 – 28.
- Each slide should discuss a single idea/theme.
- Each slide should have a title, size 32 - 36.
- All slides should be numbered at the bottom right corner.
- The presentation should be 13 - 17 slides (including the cover slide and the references slide)
- Include a cover slide which should contain the project title, your name, instructor name, date and the university name. Font – Times New Roman, size: 28 - 36. (You could add the university logo or design a logo for your own project).
- Use bullet points on slides and no more than 5 bullet points on each slide assuming most bullets are only 1 line. Each bullet point should not exceed two lines.
- Always use less text and use more images.
- Choose colors that have high contrast, so they are easily seen. Dark backgrounds should have light text and bright accent colors. Light backgrounds should have dark text and bold accent colors.
- Use an appropriate presentation template.
- Do not leave lots of empty space in your slides try to make things look centered.
- Include a references page (list the 5 most important references in your paper) No need to cite them in the slides only list them on the last slide of your PowerPoint. Must follow IEEE formatting.
- If you use images from the internet, add the url in small font size below the image or at the bottom of the slide. If you choose not to do this, then you can add a slide for image references at the end of your presentation.
- Always strive to use non-copyrighted images or creative commons images that can be reused or modified.
- If some of your websites' urls are too long (more than one line) use https://tinyurl.com/app/ to shorten these links.