CCAI470: Neural and Deep Learning Models
Instructor: Inas A. Yassine
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Project Guidelines

For your final project, you will undertake a practical exploration of a deep learning problem, using a dataset from a Kaggle competition. This project is intended to help you apply theoretical knowledge gained throughout the course in a real-world scenario. Below are the detailed guidelines and requirements:

Overview

1. **Project Selection**:
    - Select a deep learning problem from a Kaggle competition. Ensure the problem aligns with one of the key topics covered in the course, such as Computer Vision, Natural Language Processing, Generative Modelling, Speech Recognition, or Reinforcement Learning.
    - Clearly define the problem you are addressing and ensure the dataset for the problem is accessible.
2. **Project Objectives**:
    - Begin the project by thoroughly understanding and articulating the problem, including its significance, challenges, and potential impact.
    - Develop a comprehensive solution by designing, implementing, and analyzing a deep learning system.
    - Submit a complete system implementation, including datasets, code, and detailed documentation of your work.

Instructions for Submission

This is a **group-based assignment**, with a maximum of 3 members per group. The project is divided into **three phases**, each with specific deliverables:

Phase I: Problem Definition and Dataset Analysis

- **Submission Deadline**: Thursday, March 20, 2025.
- Deliverable: A **1-page report** that introduces and defines the problem you are tackling. The report should answer the following:
    - **Significance of the Problem**: Why is this problem interesting? What is its real-world impact?
    - **Challenges**: What are the technical or practical challenges associated with solving this problem?
    - **Type of Problem**: Specify the category of the problem (e.g., Computer Vision, NLP, etc.).
    - **Inputs and Outputs**: Provide a detailed explanation of the inputs and outputs of your system, with an example if applicable.
    - **Dataset Description**: Identify and describe the dataset(s) you will be using, including source, structure, and any pre-processing steps needed.

Phase II: Design Proposal and Literature/Market Analysis

- **Submission Deadline**: Thursday, April 17, 2025.
- Deliverable: A **detailed report** that includes:

- The proposed design for your system, including the architecture and methods you plan to use.
- A **literature review** of similar problems and solutions, highlighting key research findings or approaches that influenced your design.
- A **market analysis** (if applicable) to showcase the relevance or potential applications of your project in industry.

Phase III: Final Design, Implementation, and Results

- **Submission Deadline**: Thursday, May 15, 2025.
- Deliverable: A **comprehensive final report** accompanied by:
  - **Final System Design/ Architecture employed** : A detailed description of the implemented system, including all components and architecture.
  - **Codebase**: Fully functional code that can be executed to reproduce your results.
  - **Dataset**: Provide the final dataset used in your implementation.
  - **Results and Analysis**: Discuss the system's performance, evaluation metrics, and insights gained. Include graphs, charts, and visualizations where applicable.
  - **Challenges and Future Work**: Reflect on the challenges faced during the project and suggest areas for future improvement or research.

General Rules and Notes

- **Submission Format**:
  All reports must be submitted as PDF files via Moodle. Ensure all documents are well-organized, clearly written, and include references to any external resources used.
- **Collaboration and Academic Integrity**:
  You are encouraged to discuss ideas and approaches with classmates; however, all work submitted must be original and written in your own words. Any evidence of academic dishonesty, including plagiarism or code copying, will result in penalties as per course policies. Review the definition of cheating outlined in the first presentation for clarity.
- **Grading Criteria**:
  Your project will be evaluated based on:
  - The clarity and depth of your problem definition.
  - The soundness and creativity of your design proposal.
  - The quality and performance of your final implementation.
  - The depth of analysis and quality of documentation.

Key Deadlines

- **Phase I**: Problem Definition and Dataset Analysis – **Thursday, March 20, 2025.**
- **Phase II**: Design Proposal and Literature/Market Analysis – **Thursday, April 17, 2025.**
- **Phase III**: Final Design, Implementation, and Results – **Thursday, May 15, 2023**

Best of Luck,

Inas A. Yassine