Machine Learning Term Project Proposal Instructions

Introduction

As part of the course requirements, each group will work on a term project focusing on various areas of machine learning. This project will allow you to apply the concepts and techniques learned in class to a real-world problem of your choice.

Proposal Submission

Each group is required to submit a brief proposal outlining their planned project. The proposal should be half a page in length and include the following details:

1. **Project Title**: Provide a clear and concise title for your project.
2. **Group Members**: List the names of all group members.
3. **Dataset**: Describe the dataset you plan to use. Include details such as the source of the dataset, the type of data it contains, and why it is relevant to your project.
4. **Initial Plan**: Outline your initial plan for the project. This should include:
    - The problem you are addressing.
    - The methods and techniques you intend to use.
    - Any preliminary steps you will take to begin your project.

Group Requirements

1. Each group should consist of exactly 5 team members.
2. Each group must appoint a **Team Leader**. The team leader, in addition to working on their assigned tasks, is responsible for:
    - Assigning tasks to each team member based on their strengths and interests.
    - Monitoring the progress of each member to ensure that project deadlines are met.
    - Coordinating group meetings and maintaining communication among the members.
    - Preparation and organizing the project presentation file.
    - Acting as the primary point of contact between the group and the course instructor or teaching assistants.

Submission Details

- **Due Date**: Oct 20th 2025
- **Submission Method**: Submit your proposal on Canvas in PDF format.
- **Document Format**: Ensure that your proposal is well-organized and clearly written. Use a standard font and size, and maintain consistent formatting throughout the document.

Guidelines for Project Proposal

1. The project can cover any area within the broad field of machine learning. Be creative and select a topic that interests you and your group members.
2. Ensure that the dataset you choose is appropriate for the project and that you have access to it.
3. Your initial plan should demonstrate a clear understanding of the problem and outline a feasible approach to solving it.
4. The proposal should reflect a collaborative effort, with all group members contributing to its development.

Evaluation Criteria

Your proposal will be evaluated based on the following criteria:

- **Clarity and Conciseness**: Is the proposal well-written and to the point?
- **Relevance and Feasibility**: Is the proposed project relevant to machine learning and feasible within the given timeframe?
- **Comprehensive Plan**: Does the proposal include a comprehensive initial plan that outlines the steps you will take to complete the project?

Term Project Deliverables and Submission Requirements (What to submit at the end of the semester)

At the end of the project, each group should submit the following:

1. **Jupyter Notebook**: A comprehensive Jupyter notebook containing all the implemented machine learning algorithms. This should include:
    - Data Exploration and Visualization.
    - All the data preprocessing steps.
    - The implementation and evaluation of multiple machine learning models.
    - Visualizations and analysis of the results.
2. **Presentation**: Each group will prepare a presentation (20 minutes) to present their project. The presentation should include:
    - **Introduction**: Brief overview of the problem and its significance.
    - **Dataset Overview**: Discuss the dataset used and its characteristics.
    - **Project Plan**: Discuss the approach you are going to take to handle the data.
    - **Exploratory Data Visualization**: Show the key findings from the initial data exploration.
    - **Data Preprocessing and Preparation**: Explain the data preprocessing steps.
    - **Experimental Results**: Show the performance of various machine learning models, including deep learning and ensemble learning techniques, if applicable.
    - **Conclusion**: Conclude with the key takeaways and lessons learned.

    The presentations will be conducted over Zoom from **Dec 1st to Dec 3rd**.

Evaluation Criteria

Your project will be evaluated based on the following criteria:

- **Clarity and Conciseness**: Is the final presentation well-written and to the point? and is the Jupyter notebook well-documented and easy to follow?
- **Relevance and Feasibility**: Does the project effectively address a real-world problem or research question relevant to machine learning? Is the scope appropriate given the timeframe and resources available?
- **Comprehensive Plan and Implementation**: Does the Jupyter notebook include a complete workflow, such as dataset exploration, feature selection and engineering, model building, evaluation, and conclusions? Is the code well-organized and documented?
- **Modeling and Analysis**: Quality and variety of machine learning models implemented. Are appropriate models chosen for the problem? Is the model performance evaluated using relevant metrics? Are comparisons made between models?
- **Presentation and Communication**: Quality of the final presentation and communication of the findings. Does the presentation demonstrate a comprehensive understanding of the project? Are the results and conclusions presented clearly and effectively?

Support and Resources

If you have any questions or need further guidance, please feel free to reach out to me. I am here to help you succeed in your term project.

Important Dates

- **Final Project Submission Deadline**: **Dec 1st to Dec 3rd**. (Before presentation time)
- **Project Presentation Dates**: **Dec 1st to Dec 3rd**. (over Zoom)

Conclusion

I am excited to see the innovative projects you come up with. This term project is an excellent opportunity to explore machine learning in depth and apply your knowledge to real-world problems.