Project 1: Regression

Introduction

In this project, you will be implementing a regression method from scratch using MATLAB, based on the theory covered in Unit 1. You will need to evaluate your algorithm on each of the three datasets that will be provided (you may also add your own if desired), and compare the results to the relevant built-in algorithm in either MATLAB or Python.

Each group can choose from one of the following:

- Linear regression with gradient descent training
- K-nearest neighbors
- Decision trees

If needed, hints on how to outline some of the MATLAB can be provided at a later time.

Submission Requirements

To receive full credit for this project, you must submit your complete source code (including your input and output data files) as a single ZIP archive.

In addition, you must also submit a formal report that contains the following:

- Cover page (title, names of group members, date of submission)
- Table of contents
- Problem definition (what is being done and why)
- Theoretical analysis
- Algorithm development (can include flowcharts and/or pseudocode if desired)
- Simulation results
- Discussion
- Conclusion (summarize what was done?)
- Author contributions (briefly state what each group member contributed to the project)
- Appendices containing program output, and plots as appropriate.

Grading Criteria

This project is worth 150 points and is based on the following:

- Completeness: *15 points*
    - Was every required part of the project addressed?
- Problem definition: *15 points*
- Theoretical analysis: *20 points*
- Correctness of results: *25 points*
- Discussion: *15 points*
- Other report sections: *10 points*
- Coding style: *10 points*
    - Use of self-contained functions
    - Documentation of code
    - Avoidance of unnecessary code duplication
- Format/organization: *15 points*
    - Is formatting consistent?
    - How easy is it to read the report?
- Spelling and grammar: *10 points*
- Steadiness of progress: *15 points*
    - Each group must update the instructor of project progress each week
    - Either in class or by email

Due Date/Time

This project is due on Brightspace by **<u>March 3rd, 2024 at 11:59pm CST</u>**.