CS4287: Neural Computing

Assignment 1: Multilayer Perceptron (MLP)

Team-Based Project

Autumn Semester 2023 – 2024

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3rd October 2023 (Week 4)- **Version 1.0**

1. Objectives

- To build a "traditional" Machine Learning (ML) pipeline using a "traditional" MuiltLayer Perceptron (MLP) for classification.
- Explore the impact of varying hyperparameter(s).

2. Submission

Submit a **pdf** describing

1. The Data Set (2 marks)
    a. Visualisation of some of the key attributes is necessary for a top grade
    b. Any pre-processing such as normalisation applied to the data
2. The network structure and other hyperparameters (2 marks).
3. The Cost / Loss / Error / Objective function (1 mark).
4. The optimiser (1 mark).
5. Cross Fold Validation (2 marks).
6. Results – accuracy and/or precision and/or recall (2 marks).
    a. Include plots if opting for a top grade.
7. Evaluation of the results (2 marks).
8. Impact of varying a hyperparameter(s) (3 marks).

Submit a **Jupyter notebook** with the code where:

- The book is named CS4287-Prj1-ID1-ID2
    - Where ID1 and ID2 are the student id numbers of the team members

- The first line in the book is a comment with names and ID numbers of the team members
- The second line in the book should be a comment stating if the code executes to the end without an error.
- The third line in the book should be a comment with a link to the original source where you opted to reuse an existing implementation.
- Every critical line of code MUST be commented by **YOU**. To demonstrate a deep understanding of that code.

3. Sample Data Repositories

Open Data Repositories

- UC Irvine Machine Learning Data Repository
- Kaggle datasets
- Amazon's AWS datasets

Metaportals that list open data repositories

- Data Portals
- Open Data Monitor
- Quandl

Other

- Wikipedia's listing of data repositories

4. Notes and Guidelines

- This assignment **constitutes 15%** of the total marks awarded for this module.
- You will work in a team of 2.
- **Submission deadline is 23:59: Thursday 19th October (Week 6).**
- NO SUBMISSIONS WILL BE ACCEPTED AFTER THIS DATE!
- Submission is via the Sulis Assignment tool.
- You MAY be required to provide the lecturer with a walk through of your project submission during an interview in Teaching Week 8-10.
    - The project will be awarded an F grade if a walkthrough is not provided when requested to do so.
- Programming language is Python.
- A grading rubric will be published prior to the end of Week 5.