Assignment

100 Marks

Deep Learning Project

Due Date: 12th Week of Lectures + Labs

In this assessment you will be working as a group on a deep learning-based project. A team should have 4 members (Appoint a leader).

Programming Assignment - Introduction
You are required to solve a real-world problem using Deep Learning based on any real-world dataset. You may use a publicly available dataset from a source like the following one (you can choose any other data source. Be sure to cite where you got your data from. **The dataset has to be real-world data that is published on the internet**). Following are two example data sources for Deep Learning datasets.
http://archive.ics.uci.edu/ml/index.php
https://www.kaggle.com/datasets

Based on a dataset, you need to develop a Deep learning algorithm and then get the test results. You may use Python as the programming language and Jupyter Notebook or any other IDE as the development environment.

Assignment Requirements

If you are working on a supervised learning problem, FOUR models may be used to generate and compare the results. For unsupervised learning, THREE models may be used. For reinforcement learning problems, TWO models/algorithms may be used.

- Make sure to create a GitHub project for the assignment.
  - **Each member is required to save their progress and push the changes to the repository frequently. At minimum once a week.**
- Feel Free to use the Issue Tracking, Branches, Project and any other tools available in GitHub.

- You are required to write a report that includes,
  - Introduction to the problem.
  - Background information about the algorithm used.
  - Detailed analysis of the chosen dataset including visualization.
  - Feature selection and pre-processing techniques used.
  - Model Architectures.
  - Results and comparison.

- You are required to use appropriate matrices to demonstrate the performance / efficiency of the developed models and compare the model performances among each other.

- During the 20 minute VIVA you are required to show a demonstration of your work along with a small presentation that introduces the problem, summarizes the dataset, feature selection, the pre-processing techniques you have used, model architecture and the results obtained.

- You are required to create a 10 minute video of the work you carried out and upload to YouTube.

Submission Requirements

- The report will need to submit to Turnitin Assignment which will be made available on the 10th week of lectures. The report name may be the registration number of the member who is submitting the report.

- The Code will need to be submitted to Grade Scope Assignment which will be made available around the 10th week of lectures.

- VIVA schedule will be posted on courseweb on the 11th Week.

- You may upload the following files to courseweb as a **single zip** file**. The respective leader of the team needs to submit**. The file name should be the ID of the member that is submitting.
    - Members.txt (member names, IDs, emails)
    - Report.pdf
    - Turnitin similarity report
    - Submission.txt (**link to the GitHub project** + link to a **YouTube presentation/demo** of 10 mins)

For Supervised/Unsupervised learning

Criteria	Good (10-8)	Average (4-7)	Poor (0-3)
Selection of an appropriate dataset (5%) (the dataset should not be part of a tutorial and should be complex enough and should be hosted somewhere.)			
Description of the dataset (5%) (the link to the dataset should be given. The attributes of the dataset should be properly described. The context of the dataset, size and other parameters should be described)			
Data Preprocessing (10%) (applying necessary cleansing of the data, dimensionality reduction, encoding etc)			

Application of the appropriate learning algorithms/models (10%) (Justification for the algorithms/models, layers chosen, and activation Functions.)			

Implementation (5%) (code quality, comments and readability of the code)			
Results (5%) (test results, comparison of results)			
Critical analysis and Discussion (30 %) (How the accuracy could be improved? Possible future work)			
Professionalism of the Report (10%)			
VIVA Demonstration (20%)			

For Reinforcement learning

Criteria	Good (10-8)	Average (4-7)	Poor (0-3)
Selection of an appropriate problem (5%) (the actions and the environment should be of enough complexity)			
Description of the inputs and data captured (5%)			
Description of the reward function (10%)			
Application of the appropriate learning algorithms (10%) (Justification for the algorithms. Introduction and background of the algorithm)			
Results (10%) (test results)			
Critical analysis and Discussion (30%) (How the accuracy could be improved? Possible future work)			
Professionalism of the Report (10%)			
VIVA (20%)			