CE889-SP Neural Networks and Deep Learning

Spring Term 2022

There is one assignment, by which you are expected to demonstrate the understanding of knowledge learnt from the module and the practice of machine learning models applied to a realistic classification problem. The assignment will be counted for 20% of the final mark of the module. The remaining 80% is based on the exam.

1. Objectives

- Understanding the knowledge of neural networks and diverse models
- Being able to program to achieve models for a tailored context
- Being able to apply neural network models (including deep learning models) to a required application

2. Requirements

- Making the codes of Logistic model for the mental workload classification. You need to program from scratch by yourself. Python functions should be created separately for each step (e.g., forward propagation and gradient calculation). It is not allowed to directly use the command for Logistic model from a toolbox.
- Selecting a deep learning model for the mental workload classification. For the deep learning model, you can use any publicly available packages/toolboxes. It is very encouraging to adapt the existing deep learning models for the purposes of performance improvement. If you use publicly available codes, you need to include proper

references and explicitly state where the codes are from in the report.

3. *Submission Files and Submission Deadline*
Files:
1. Report
2. Codes (i.e., Python scripts)

Submission Deadline:
See the date shown on the submission system (Faser)

4. *Contents should be presented in the report* (No more than 10 pages for the whole report)
- Cover Page (Personal Information: Name, ID, Date etc.)
- Main Body
    - Abstract (a summary of your report)
    - Backgrounds (introduce relevant works, such as previous studies/papers/state-of-the-art relevant methods etc.)
    - Methods (a description of the methods)
    - Results (classification accuracies, accuracy comparison etc.)
    - Conclusions (a short summary of your results/findings)
- Reflections (no more than a half-page)
- References (papers, online webpages, books etc.)

5. *Dataset*
The location you can download the dataset and the information about the dataset are given in the instructions of Lab 6.

6. *Target*
- Obtaining classification accuracy using Logistic model

- Obtaining classification accuracy using a deep learning model (selected by yourself)
- Comparing the performance (accuracies) between models to understand the parameter tuning of deep learning models and how performance varies over the different settings.

7. *How you can receive a good mark*

- A concise but comprehensive summary of the background of the workload classification
- A well-organised report with professional tables and figures
- Descriptions of each part mentioned in the above session **4** are clear and complete.
- Achieve a good performance in the classification
- Have insightful discussions on the results
- An in-depth reflection
- The submitted scripts (Python codes) can be used to replicate the classification results shown in the report

You will receive a high mark if your work meets all the above requirements. Otherwise, the mark will be appropriately reduced.