COMP1818 (2024-25)	Artificial Intelligence Applications		Contribution: 100% of course
Course Leader: Hooman Oroojeni	Coursework		Deadline: 29 Nov 2024 23:30pm
This coursework should take an average student who is up-to-date with tutorial work approximately 50 hours Feedback and grades are normally made available within 15 working days of the coursework deadline			
Learning Outcome: On successful completion of this course a student will be able to: 1 Understand the emergence of specific application areas from AI techniques' progress 2 Understand how AI techniques are embedded in real-world applications in terms of system design and use of data 3 Analyse critically the use of symbolic AI techniques versus Machine Learning techniques			

Deadline

- An electronic copy of your work for this coursework must be fully uploaded on the Deadline of **23:30pm Friday 29 Nov 2024** using the link on the coursework Moodle page for COMP-1818.

Deliverables

- A **report**

- File format: a **single PDF** document generated by **LaTeX**. As a LaTeX compiler, we recommend Overleaf, but you can use any LaTeX compiler.
- Template: You **MUST** use the latest template uploaded on COMP-1818's Moodle site.
- Font size: 10pt.
- Page size: A4.
- Column: Double columns.
- Page limitation: 4 pages. References are not included in the page count.
- The title and abstract **MUST NOT** be on an independent page.
- Margin: as specified in the template
- All equations and tables **MUST** be generated by LaTeX.
- All figures **MUST** be generated properly (e.g., by matplotlib.pyplot.plot function in Python). Screenshots **MUST NOT** be used.
- All figures and tables **MUST** have captions and be referred to in the body text.

- **Source codes** (compressed as a **ZIP** file).

Notes

- Any submission that does not follow the specified format will have a **zero score** without any feedback.
  - Examples of submissions that do not follow the format:
    - A paper copy.
    - A scanned image of a hand-written paper.
    - A Microsoft Word file.
    - A PDF file generated by a Microsoft Word file.
    - A PDF file generated by a LaTeX without the specified template.
    - A PDF file that violates the page limitation or margin, font size, and page size specification.
    - A PDF file that contains screenshots.
    - A PDF file that contains tables and equations not generated by LaTeX equation commands.
    - A PDF file that contains figures and tables without captions or not referred to in the body text.
- In general, any text in the document must not be an image (i.e. must not be scanned) and **must** be generated from LaTeX. The template is provided in the Moodle site.
  - Why do we need to use LaTeX?
    - LaTeX has been regarded as de-facto standard software to generate academic documents with equations, such as machine learning papers. In recent top artificial intelligence conferences (e.g., NeurIPS), all documents

generated by other processors (e.g., Microsoft Word, Libre Office Writer) are rejected. This fact implies that academic documents generated by these types of software have zero value in this area. This coursework specification is also in line with this requirement in this area.

- There are limits on the file size (see the relevant course Moodle page).
- Make sure that any files you upload are virus-free and not protected by a password or corrupted; otherwise, they will be treated as null submissions.
- All coursework must be submitted as above. Under no circumstances can they be accepted by academic staff

The University website has details of the current Coursework Regulations, including details of penalties for late submission, procedures for Extenuating Circumstances, and penalties for Assessment Offences. See http://www2.gre.ac.uk/current-students/regs

Detailed Specification

This document provides the detailed specification on the coursework assessment, along with explanation on how group and individual work should be arrange within the groups and by the individuals.

This coursework consists of

- group survey and

- individual implementation and report.

Students are expected to work in groups of 3-4 people in principle. Member of the groups should equally contribute to the academic survey. Students are responsible to find a topic relevant to advanced AI applications from the themes covered in the lectures and/or those which should then be approved by the module leader.

The coursework has a survey part and an implementation part. Once a topic is chosen and approved, students within the group will read papers in the topic which are related to each other. Newer papers selected in the group must cite older papers.

The result of the group survey will be presented in group presentations. The presentation should clarify the relation between the papers read by group members, as well as motivations and technical details of each method. The presentation does not form the mark, but is awarded formative feedback.

The individual reports will be marked individually based on their merit and ability to demonstrate a good level of understanding of the topic in research and implementation.

Tasks allocations between group members

Group activities

- Select academic papers in the selected topic

- Read the papers to understand each technical details and clarify the relation

- Being part of a practical group research

- Identifying areas of interest to be carried out and reported individually

- Continuing to inform group members of the progress and benefiting from each other's findings

- Presentation (oral feedback will be given)

Individual activities

- Conducting further research on the individual elements identified

- Complete the following tasks

    1. **Practical Implementation** (complete code, trained model and data to replicate the results). Students must implement the method proposed by an academic paper (ideally the paper introduced in the group presentation). The source code must be error-free (i.e. no debugging necessary to run). Minimum requirements:
        - Coherent implementation (no errors, sound training pipeline),
        - Appropriate metric (Do not confuse metrics for classification, regression, clustering, dimensionality reduction, etc.)
        - Sound evaluation (comparison with trivial baselines, such as random flipping coin, outputting the most frequent label, outputting the previous value in time series, and existing artificial intelligence methods that can be applied to the topic.).

    2. **Written Report** (4 pages of a detailed description of the steps taken in carrying out the project):
        - Must follow the template uploaded on the Moodle website.

- o Should include references (citing other work) where appropriate (when images, data, code, or any other resources have been used from other sources)
  - o For document structure, please follow the template.

- Assessment: Writing the individual report (4 pages A4 + reference pages), detailing the research and the implementation with sound implementation (100% of the mark).
- The coursework marking will be based on the report, in principle. The submitted source codes are used, for example, to verify whether the description in the report reflects the implementation and the appropriateness of the implementation but do not have a specific ratio in marking. Even if the implementation is of good quality, it will be ignored if it is not explained well in the report.

Deliverables

Report (4 pages in A4 pdf format)

Source codes

Grading Criteria

The coursework for COMP1818 will be assessed using the following grade bands.

Marks	Undergraduate Criteria
>=80%	Meets all criteria. Shows a significant amount of critical analysis and exhibits an excellent understanding of the relevant issues.
70-79%	Meets most of the criteria. Demonstrates clear awareness of relevant issues with a high standard of critical analysis.
60–69%	Meets most of the criteria. Demonstrates clear awareness of relevant issues with a high standard of critical analysis. An attempt has been made at analysis using appropriate frameworks but may include some errors.
50-59%	Some of the criteria present but is mainly factual and descriptive with little grasp of analysis.
40-49%	Some of the criteria present and establishes a few relevant points but superficial or confused exposition of issues.
<40%	Little or no evidence of given criteria and no grasp of analysis. Does not demonstrate self-direction, originality in problem solving or a critical self-evaluation of the coursework process.

Assessment Criteria

For group presentation and individual report:

1. Understanding of the Problem Domain (20%)
   - Clarity, exactness and sufficiency in the explanations of the work (10%)
   - Logicality throughout all explanations and correctness in format (10%)

2. Development and Implementation of Ideas (40%)
   - Understanding the algorithm componenets and (hyper)parameters (10%)
   - Parameter fine-tuning, algorithm hybridisation, and modifications (10%)
   - Applying advanced features and further implementations (10%)
   - Result quality and code execution (10%)

3. Conclusion and Critical Review (40%)
   - Result comparison with the previous work and justification (10%)
   - Coherent summary (15%)
   - Critical discussion (15%)