Coursework Assignment

Academic Year 2023-24

Module Title:	AI and Applications	
Module Code:	ECM2423	
Assessment Title:	Deep Learning for Predicting Credit Card Defaults	
Assessment type:	**Summative**	Weighting: 40 %
Module Lead:	Dr Mohammed Abdelsamea	
Hand in deadline date:	**14th March 2024**	
Assessment Summary	This assignment aims to check students' ability to build, implement, validate, and evaluate an appropriate model to achieve the prediction of credit card defaults using the given dataset. It also aims to check their ability to identify the main challenging problems in the given dataset, define potential solutions, and communicate/discuss the results. The students must complete the following activities: • Students must demonstrate their ability to implement and validate an appropriate deep learning model to solve the given problem. • Students should employ theoretical concepts to build an appropriate model and solve the problem in a systematic way. • Students must demonstrate their ability in evaluating the performance of the proposed model. • Students must demonstrate their ability to professionally communicate the results.	
Tasks	a) Design a deep learning technique for predicting credit card defaults from the CCD (credit card default) dataset. b) Validate and evaluate the performance of the model. c) Write a short report (2000 words max) to describe the architecture of the model, the training process, main deep learning challenging problem, your findings and attempts to cope with the challenging problem and improve the performance of the AI system.	

Deliverables	Report + Python code.
Structure of the report	The report must include: • Abstract: what are the main findings of the report? • Section 1: Introduction. This section should summarise and highlight the aim of the report, a brief description of the task and the problem, related work and suitability of different deep learning approaches, achievements of the report, and finally describe how the report is organised. • Section 3: Proposed method. Provide a description of the proposed methodology including the pre-processing phase. • Section 4: Experimental Results. Provide a detailed description of the hyperparameter settings, evaluation process, and obtained results. • Section 5: Summary. Discuss and highlight the main findings in this report. • References

Marking Criteria:

Table of Assessment Criteria and Associated Grading Criteria

Assessment Criteria	1. Design and validate deep learning methods using modern deep learning tools.	2. Professionally report deep learning results providing clear solutions to the given task.	3. Critically appraise recent trends in relative deep learning literature.
Weighting:	40%	30%	30%

	Grading Criteria 0 – 29% F	The validation is missing or inaccurate/wrongly conducted. Wrong techniques have been used. No hyperparameter setting is included. Python code is missing. Model has not been evaluated.	Non-existent experimental details. No findings have been highlighted in the report. A poor organisation of the report makes it very hard to understand. Sentence, paragraph and section structuring are poor.	Little to no rationale is given of the importance of deep learning in relative applications. The report and basic concepts of deep learning are missed or not understood. No details of the deep learning problem.	
	30 – 39% E	The validation of the method is quite misleading. Misleading techniques have been used. hyperparameter setting is missed. Comments in the Python code is either missing or are irrelevant. Performance evaluation is missed.	Poor existent experimental details. Poor and non-significant findings have been highlighted in the report. Poor grammar and poor academic writing style are used.	The suitability and comparison between the different methods is conducted poorly. The report and basic concepts of deep learning are poorly understood. Little details of the deep learning problem were provided. Sentence, paragraph and section structuring show little understanding of the work.	

	40 – 49% D	Satisfactory validation. Satisfactory techniques have been used. Parameter setting is missed. Comments in the Python code are at minimal. Performance evaluation is incomplete.	The report shows satisfactory experimental details. Some findings have been highlighted in the report. Grammar is reasonable but the academic writing style is unacceptable.	The suitability and comparison between the different deep learning approaches and software tools in relative applications are conducted but not complete. The report and basic concepts of deep learning are demonstrated satisfactory. Complete details of the deep learning problem is not well introduced. Sentence, paragraph and section structuring show a shallow understanding of the story.	

	50 – 59% C	The validation process is acceptable. Accepted techniques have been used. Hyperparameter setting is provided but not clear. Comments in the Python code is not complete. Performance evaluation is not clear.	The report shows acceptable experimental details. All the findings have been highlighted in the report but not clearly delivered. Grammar is acceptable but academic writing style can be noticeably improved.	The suitability and comparison between the different deep learning approaches and software tools in relative applications is well conducted but needs improvement. The report and basic concepts of deep learning are almost understood. Complete details of the deep learning problem were provided. Sentence, paragraph and section structuring provide an understanding of the story but needs improvement.	

	60 – 69% B	The validation process is missing clarification. Appropriate techniques have been used. Hyperparameter setting is incomplete. Comments in the Python code is provided in most parts. Performance evaluation is clear, but more metrics are needed.	The report shows good experimental details but not in a systematic way. Findings have been clearly highlighted in the report. Grammar is acceptable but academic writing style can be a bit improved.	The suitability and comparison between the different deep learning approaches and software tools in relative applications is well conducted but need further attention. The basic concepts of the deep learning were understood from the report. Details of the deep learning problem are there but missing clarification. Sentence, paragraph and section structuring provide a high-level of understanding but needs further attention.	

	70 – 79% A	The validation process is complete. Good techniques have been used. Hyperparameter setting is complete but missing clarification. Comments in the Python code is thorough but not concise.	The report shows good experimental details organised systematically. Important findings have been clearly highlighted in the report. Grammar is excellent but the academic writing style is technically sound.	The suitability and comparison between the different deep learning approaches and software tools in relative applications is nearly completed. The report and basic concepts of deep learning are nearly demonstrated and understood from the report. Details of the deep learning problem are clear. Sentence, paragraph and section structuring provide a clear understanding of the story.	

	80 – 89% A+	The validation process is complete with clear graphs. Excellent techniques have been used. Hyperparameter setting is complete. Comments in the Python code is concise in all parts.	The report shows excellent experimental details. Findings are significant and accurately highlighted in the report. Grammar and academic writing style are excellent.	The suitability and comparison between the different deep learning approaches and software tools is professionally conducted but relative applications have not been fully covered. The basic concepts of deep learning are accurately demonstrated and understood from the report. Details of the deep learning problem are excellent. Sentence, paragraph and section structuring are excellent.	

	90 – 100% A*	The validation process is complete with excellent graphs. Outstanding techniques have been used. Hyperparameter setting is complete with outstanding explanation. Comments in the Python code is excellent and concise in all parts.	The report shows excellent and scientifically-sound experimental details. Findings are appealing and professionally demonstrated in the report. Grammar and academic writing style are appealing.	The suitability and comparison between the different deep learning approaches and software tools in relative applications is professionally conducted. The basic concepts of deep learning are professionally demonstrated and easily understood from the report. Details of the deep learning problem are appealing. Sentence, paragraph and section structuring are appealing.