Cardiff Metropolitan University | Prifysgol Metropolitan Caerdydd

School of Technologies

Assessment Brief

Module Code	Module Title
CIS 6005	Computational Intelligence
Academic Year	**Semester**
2024-2025	2

Module Leader email

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Content

Assessment title	Abr.	Weighting
Deep learning Plus AI Mini project	WRIT1	100%

Pass marks are 40% for undergraduate work and 50% for postgraduate work unless stated otherwise.

Task/assessment brief:

Version1:

Artificial Intelligence (AI) and Deep Learning have emerged as highly influential fields that continue to shape modern technological advancements. Artificial Intelligence broadly refers to the development of computational systems capable of performing tasks that traditionally necessitate human intelligence such as natural language processing, image and speech recognition, decision-making, and adaptive learning from prior experiences. Within this domain, Deep Learning stands as a specialized subfield of Machine Learning (ML), leveraging multilayered artificial neural networks to model and solve highly complex problems. By enabling systems to automatically extract hierarchical patterns and representations from vast amounts of unstructured data, deep learning has become a transformative force across diverse industries, ranging from healthcare and finance to autonomous systems and advanced data analytics, thereby redefining how challenges are approached and solutions are engineered.

Select an **ongoing, real-world Kaggle competition**, build a valid leaderboard-submitted ML solution, and package your trained model into a usable application suitable for a real-world environment (e.g., a web app/ desktop application/ mobile app/ production style API service).

You must:

- Enroll in the competition and follow all official rules (data usage, team size, submission limits, code requirements).
- Submit predictions to Kaggle (at least one public and one final/private leaderboard submission).
- implement a working app (desktop, web, mobile, or API) that uses your trained model to make predictions on new data.

Based on the selected competition scenario, you can use any programming language of your choice in which **one or more of the following techniques** are utilized.

1. Regression techniques
2. Support Vector Machines
3. Neural Networks
4. Clustering techniques
5. Ensemble methods, e.g., Random Forests

Note: Students are required to select an active competition from the Kaggle platform that is scheduled for the year 2025. The selected competition must have a clearly defined start and end date, and therefore, *competitions that operate indefinitely with a rolling leaderboard are not eligible for selection.*

You will be assessed on the following criteria.
A comprehensive report of no more than 4000 words explaining the following aspects of your project

Tasks

You will be assessed on the following criteria.

A comprehensive report of no more than 4000 words explaining the following aspects of your project.

a. Introduction to the concept of deep learning **(L01) (10 Marks)**
b. A literature review or similar applications **(L01, L03) (20 Marks)**
c. Exploratory data analysis (EDA) **(LO2) (10 Marks)**
d. System architecture and how your application differs from other existing applications, machine learning technique used (e.g., ANNs, DTs RFs, etc.) **(LO2) (10 Marks)**
e. Full model evaluation ,Implementation details and practical demonstration **(L02) (40 Marks)**
f. Conclusion of the final model and the success of using deep learning techniques in the mentioned domain in your own words **(L01, L03) (10 Marks)**

Word count (or equivalent): 4000

This a reflection of the effort required for the assessment. Word counts will normally include any text, tables, calculations, figures, subtitles and citations. Reference lists and contents of appendices are excluded from the word count. Contents of appendices are not usually considered when determining your final assessment grade.

Academic or technical terms explained:

CI – Computational Intelligence
DL- Deep Learning

ML- Machine Learning
AI – Artificial Intelligence

Submission Details

Submission Deadline:	This will be provided on the Moodle submission point.	**Estimated Feedback Return Date**	This will normally be 20 working days after initial submission.
Submission Time:	By 2.00pm on the deadline day.		

Moodle/Turnitin:

Any assessments submitted after the deadline will not be marked and will be recorded as a non-attempt unless you have had an extension request agreed or have approved mitigating circumstances. See the School Moodle pages for more information on extensions and mitigating circumstances.

File Format:

The assessment must be submitted as a pdf document (save the document as a pdf in your software) and submit through the Turnitin submission point in Moodle.

Your assessment should be titled with your:

student ID number, module code and assessment ID,
e.g. st12345678 BHL5007 WRIT1

Feedback

Feedback for the assessment will be provided electronically via Moodle. Feedback will be provided with comments on your strengths and the areas which you can improve. View the guidance on how to access your feedback.

All marks are provisional and are subject to quality assurance processes and confirmation at the programme Examination Board.

Assessment Criteria

Learning outcomes assessed

L01 - Critically appraise a comprehensive/detailed understanding of the computational intelligence domain

LO2 - Design and develop computational intelligence software artefacts.

LO3 - Critique and contextualize emerging research in the area of computational intelligence

Other skills/attributes developed

This includes elements of the Cardiff Met EDGE (Ethical, Digital, Global and Entrepreneurial skills) and other attributes developed in students through the completion of the module and assessment. These will also be highlighted in the module guidance, which should be read by all students completing the module. Assessments are not just a way of auditing student knowledge. They are a process which provides additional learning and development through the preparation for and completion of the assessment.

ETHICAL	• Ensuring that developed machine learning applications are fair, transparent, and accountable is paramount. This involves adhering to data privacy regulations, implementing robust security measures, and following best practices. • Ensuring user consent for data usage and model development and safeguarding users' rights and privacy. • Incorporating ethical considerations into the design and deployment process helps mitigate biases and enhances the transparency of the algorithms
DIGITAL	• Maintaining strong grasp of relevant programming languages and maintain familiarity with various machine learning algorithms and mastery of languages such as Python, with its extensive libraries like TensorFlow, Keras, and scikit-learn, is essential for implementing and experimenting with algorithms. • Having proficiency in dataset preprocessing techniques, including data cleaning, normalization, and augmentation as well as data visualization is mandeory.
GLOBAL	• Being aware of international regulations and standards that might impact service development and data handling. • Embracing diverse perspectives and being flexible in adapting service design to meet the needs of global contexts.
ENTREPRENEURIAL	• Identifying opportunities to create new businesses or to enhance the existing process using computational intelligence related application development.

Marking/Assessment Criteria

Report Marking Criteria (100%)

Task	Poor (0-39)	Average (40-49)	Satisfactory (50-59)	Good (60-69)	Excellent (70-100)
Introduction to the deep learning (10 Marks)	Provides very limited, totally lacking in relevance, partial answer	Maintains limited structure and contents are not very relevant	Provides the adequate answer. Tendency of the answer is not to be very clear in line with the main tenets of the topic.	Provides a clear and logical sequence with a sense of direction. Maintains proper citations to support the provided arguments.	Maintains very clear and logical structure in line with the main tenets of the topic with proper citations.
A literature review of similar applications (20 Marks)	Provides very limited, totally lacking in relevance, partially answered. Maintains irrelevant selection of research papers.	Maintains limited structure and selected research papers are not very relevant	Selected research papers are in line with the topic, summarization is adequate but maintains lacking or unclear arguments.	Maintains correct selection of research papers, given a proper summarization of the selected paper and flaws in factual content and reasoning.	Provides a very solid understanding of the subject matter. Maintains very few flaws in factual content and reasoning and the answers are very analytical. The explanations are complete and well-structured. An additional set of papers with similar architecture has been used to provide a better evaluation of each paper outcome and also a very critical analysis

					across all papers
Exploratory Data Analysis (10 Marks)	Provides very limited, totally lacking in relevance, partially answered. Provides poor data analysis	Maintains limited structure, not very relevant and provides moderate level of data analysis	Provides basic data analysis with few insights	Provides a good level of data analysis with an acceptable level of insights.	Provides an excellent data analysis with high number of insights, charts, etc.
System architecture and how your application differs from other existing applications, machine learning technique used (10 Marks)	Maintains poor grasp of ML techniques and the ML system implemented.	Understands the inputs and outputs of the system and can explain how the system is used but doesn't demonstrate sufficient understanding of how the ML technique works.	Maintains satisfactory understand of how the ML technique works and compared and contrast different ML techniques.	Maintains good explanation on how the ML technique works with some flaws and a good understanding of technique with comprehensive knowledge of how and why ML techniques works.	Provides an excellent grasp of technical concepts and ability to explain, compare and contrast the advantages and disadvantages of the ML techniques used. Maintains the ability to clearly explain why the technique works and how it is applied to the specific problem at hand with coherency.
Full Model evaluation, Implementation details and practical demonstration (40 Marks)	ML system doesn't work to a satisfactory level. Poor implementation overall. Poor implementation details on the report and poor practical demonstration of the system	Maintains poor understanding of how the system works and although the system works fails to explain how and why it works that are not answered up to a satisfactory level. Moderate	Provides only a limited understanding of how the system works. Provides only limited information and fails to navigate the code flow. Provides satisfactory level of	Provides a good explanation of how the system works but the provided code is not exceptional. Occasional wrong information is provided and although libraries have	Provides a well-thought-out implementation details with a clear setup. Ability to pinpoint which code segment is supposed to host the ML application and how inputs and outputs are

		level of implementation details on the report and moderate level of practical demonstration of the application.	implementation details on the report and satisfactory level of practical demonstration of the application is provided	been used not sufficient understanding on how exactly they could be used. Good level of implementation details in the report and good level of practical demonstration of the application.	processed. Able to know which function invocations are being called during system functioning, navigate through the function flow in code and demonstrate the knowledge of libraries. Excellent implementation details on the report. The learner has provided an excellent level of practical demonstration of the application
Conclusion (10 Marks)	The conclusion is missing or very lacking in structure and clarity	Maintains limited structure, celerity, and arguments	Provides an adequate level of content and focus. Flaws of logical flow and arguments	Maintains a good structure of some minor errors and flaws in factual content and reasoning	Provides a very good conclusion with evidence on a high level of critical analysis and writing.

Further Information

Who can answer questions about my assessment?

Questions about the assessment should be directed to the staff member who has set the task/assessment brief. This will usually be the Module Leader. They will be happy to answer any queries you have.

Staff members can often provide feedback on an assignment plan but cannot review any drafts of your work prior to submission. The only exception to this rule is for Dissertation Supervisors to provide feedback on a draft of your dissertation.

Referencing and independent learning

Please ensure you reference a range of credible sources, with due attention to the academic literature in the area. The time spent on research and reading from good quality sources will be reflected in the quality of your submitted work.

Remember that what you get out of university depends on what you put in. Your teaching sessions typically represent between 10% and 30% of the time you are expected to study for your degree. A 20-credit module represents 200 hours of study time. The rest of your time should be taken up by self-directed study.

Unless stated otherwise you must use the **HARVARD** referencing system. Further guidance on referencing can be found in the Study Smart area on Moodle and at www.citethemrightonline.com (use your university login details to access the site). Correct referencing is an easy way to improve your marks and essential in achieving higher grades on most assessments.

Technical submission problems

It is strongly advised that you submit your work at least 24 hours before the deadline to allow time to resolve any last minute problems you might have. If you are having issues with IT or Turnitin you should contact the IT Helpdesk on (+44) 2920 417000. You may require evidence of the Helpdesk call if you are trying to demonstrate that a fault with Moodle or Turnitin was the cause of a late submission.

Extensions and mitigating circumstances

Short extensions on assessment deadlines can be requested in specific circumstances. If you are encountering particular hardship which has been affecting your studies, then you may be able to apply for mitigating circumstances. This can give the teachers on your programme more scope to adapt the assessment requirements to support your needs. Extensions and mitigating circumstances policies and procedures are regularly updated. You should refer to your degree programme or school Moodle pages for information on extensions and mitigating circumstances.

Unfair academic practice

Cardiff Met takes issues of unfair practice **extremely seriously.** The University has procedures and penalties for dealing with unfair academic practice. These are explained in full in the University's Unfair Practice regulations and procedures under Volume 1, Section 8 of the Academic Handbook. The Module Leader reserves the right to interview students regarding any aspect of their work submitted for assessment.

Types of Unfair Practice, include:

Plagiarism, which can be defined as using without acknowledgement another person's words or ideas and submitting them for assessment as though it were one's own work, for instance by copying, translating from one language to another or unacknowledged paraphrasing. Further examples include:

- Use of any quotation(s) from the published or unpublished work of other persons, whether published in textbooks, articles, the Web, or in any other format, where quotations have not been clearly identified as such by being placed in quotation marks and acknowledged.
- Use of another person's words or ideas that have been slightly changed or paraphrased to make it look different from the original.
- Summarising another person's ideas, judgments, diagrams, figures, or computer programmes without reference to that person in the text and the source in a bibliography/reference list.
- Use of assessment writing services, essay banks and/or any other similar agencies (NB. Students are commonly being blackmailed after using essay mills).
- Use of unacknowledged material downloaded from the Internet.
- Re-use of one's own material except as authorised by your degree programme.

Collusion, which can be defined as when work that that has been undertaken with others is submitted and passed off as solely the work of one person. Modules will clearly identify where joint preparation and joint submission are permitted, in all other cases they are not.

Fabrication of data, making false claims to have carried out experiments, observations, interviews or other forms of data collection and analysis, or acting dishonestly in any other way.

How is my work graded?

Assessment grading is subject to thorough quality control processes. You can view a summary of these processes on the Assessment Explained Infographic.

Grading of work at each level of Cardiff Met degree courses is benchmarked against a set of general requirements set out in Volume 1, Section 4.3 of our Academic Handbook. A simplified version of these Grade Band Descriptors (GBDs) with short videos explaining some of the academic terminology used can be accessed via the Facilitation of Learning resource page.

We would strongly recommend looking at the Study Smart area of Moodle to find out more about assessments and key academic skills which can have a significant impact on your grades. Always check your work thoroughly before submission.