


The assignment brief is subject to change. Please check the NILE site for updates regularly.

	Faculty Of Art, Science and Technology Field of Computing
Module Level:	Level 5
Module Code + Name:	CSY2082 Introduction to Artificial Intelligence
Credit Value:	20
Module Leader:	Mu Mu mu.mu@northampton.ac.uk
Assessment Code + Type:	AS1
Assessment Deliverable(s) as stated in the Module Specification:	The aim of this assessment is to develop and demonstrate knowledge, understanding and practical skill of data processing, data visualisation and classical machine learning techniques such as regression, classification and clustering.
Weighting (%):	50%
Submission Date:	10 Nov 2024
Feedback and Grades:	See NILE for feedback under Assessment and Submission

LEARNING OUTCOMES ALIGNED TO THIS ASSESSMENT
Aim: The module introduces fundamentals of data science and machine learning. Students will practice using data processing, modelling and visualisation tools for problem solving of practical challenges and the development of AI-driven applications
Subject-Specific Knowledge, Understanding & Application
a) Explain and use fundamental concepts and techniques of data analysis and artificial intelligence.
b) Analyse machine learning datasets and identify significant information relevant to problem space.
c) Design, develop and evaluate a machine learning model for a use case scenario.
Changemaker & Employability Skills
d) Identify and solve well-defined problems using data science tools

To achieve this, you will need to:

1. Work independently to design, develop and evaluate a solution using machine learning techniques.
2. Demonstrate an understanding of your work and how it relates to the brief.

NOTE: Students who can not demonstrate understanding of their work, will not pass.
The module tutor may invite you for a viva-voce. Poor demo/viva could negatively influence other sections in the marking criteria and result in an overall fail grade.

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ASSESSMENT OVERVIEW

This assignment requires you to complete all assignment tasks to achieve the learning outcomes. You should complete this assessment individually.

The assessment includes three key elements:

1. **Data exploration**
2. **Machine learning modelling, including reasoning for your design**
3. **Evaluation**

ASSESSMENT TASKS

Assignment scenario:

A large US-based estate agent contracts you to analyse their sales data and improve their business operations using machine learning.

Your tasks include cleaning up the given dataset, visualising critical information and developing solutions using techniques learned from this module.

You must explain the technical details of your work (e.g., machine learning techniques and your choice to configure them) AND summarise each of your findings in plain English (the customer may say: "Yes, the equations are impressive, but why do they matter to my business?").

You are assigned to:

1. Carry out **data exploration**. Visualise the data and showcase what you learn from the current housing market that could be valuable to the client.
2. **Preprocess** the data for machine learning, e.g., handling missing data, reformatting data, etc.
3. Create a **regression model** to predict the house price based on the features in the dataset. Use train/test split to evaluate the model performance.
4. The client is considering creating specialised teams for houses at different price points (e.g., luxury, affordable, budget, etc.). How many teams should they create and why (using **clustering**)? Create a **classification** model to allocate new houses to the designated team. Use train/test split to evaluate the model performance.
5. **Advise** the client on what other information (not included in the dataset) may further improve the model performance. Develop a prototype if you can.

Besides your assignment submission, your weekly practical & git repository updates are assessed as part of the project management evaluation (see Marking scheme).

DELIVERABLES

The deliverables of the assignment are:

- *.ipynb Python notebook file(s) that includes:
 - **Python code and results.** You are encouraged to develop multiple alternative solutions and compare their pros and cons. Please only show meaningful alternatives and not minor incremental changes.
 - **Explanations of your work and discussions using Markdown fields.** Use headings and sub-headings to improve the readability of your notebook.
 - **Final summary and Personal reflections.**
 - Evidence of regular project updates in your assignment **GitHub repository** (a **screenshot** of your Code->Commits timeline).
- A **5-minute demo video presentation** that showcases your work. Use screen recordings and voice-over commentary. Students who are not able to provide voice-over commentary should contact the module tutor for alternative arrangements.

There will be two submission points for:

- Python notebook
 - Demo video
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ASSESSMENT REGULATIONS AND POLICES

Assessment Submission

- The deadline is 11.59pm (British time) on the due date *provided on NILE*
- Submit your work on NILE, under:
Assessment and Submission | Assessment 1
- The completion and submission of your assignment is your responsibility
- Only work submitted through NILE will be marked
- Submission should be in the appropriate format
- You must grant relevant access to videos and links

Work correctly uploaded to Turnitin will get a receipt for proof of submission. Submission not through Turnitin, will have a green banner at the top of the screen for successful submission.

Use of Generative AI and Others work

- This assessment applies the following Generative AI guidelines

Category 2: GenAI can be used in an assistive role

You may make use of GenAI in your assessment in an assistive role, but you must acknowledge this appropriately. Steps 2 and 3 outline the different types of GenAI use, what you need to acknowledge and how you should do this.

Note: See University Of Northampton Guidance on GenAI:
<https://libguides.northampton.ac.uk/artificialintelligence/guidance>

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Academic Integrity

- The UON's Policy on Academic Integrity and Misconduct must be strictly implemented
- Submitting this assignment means that this is entirely your own individual work
 - All work for this submission must be your (your group's) own
 - All work for this submission must be based on module content
- All work for this assignment must be developed originally & solely for this submission
- You may discuss work with other students, but any code written should be your own
- All sources must be referenced and clearly cited
- You must submit all items of the assessment according to the submission procedure stated in this document
- Failing to meet the university's guidance on AI and Plagiarism will impact your grade
- Failure to follow the submission procedure may impact your grade
- A high similarity report from TurnItIn may impact your grade, subject to investigation

Note: See *University Of Northampton Guidance on Plagiarism*

Grading:

Your grade is dependent on achievement of the specified learning outcomes for this assessment. The rubric is used as a standard benchmark so assignments are marked equally. The grading rubric is based on the criteria you are assessed on. See the marking criteria rubric *provided on NILE*.

- Marks are given for assignment requirements only
- Late submissions, within 7 days of deadline, maximum grade is a pass, (40%)
 - This does not include resits, which are already capped at pass (40%)
- Late submissions, more than 7 days after the deadline, are fails
- Grades above 39% are a pass mark
- Passed assessments can not be retaken to improve the grade
- Students with grades less than pass (40%) get 1 opportunity to resit the assessment
- Standard resit grades are capped at a pass (40%)

Extensions and Mitigating Circumstances

Students who experience extreme unprecedented circumstances that impact their study can appeal for extensions or mitigating circumstances to extend the deadline of their assessments.

- A student who attends an examination or submits an assessment declares themselves 'fit to sit' and cannot afterwards submit a claim for Mitigating Circumstances.

Marking Criteria

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Sample Marking Criteria

Criteria	Levels of Achievement					
	Excellent	Very good	Satisfactory	Needs some more work	Needs much more work	No submission
Problem analysis and design (30%)	21 to 30 points Outstanding analysis of the problem space using the given context and the choose of machine learning techniques to deliver and evaluate proposed solutions. Use reliable external data source to improve the design. Clear and appropriate referencing.	18 to 20 points Very good analysis of the problem space and utilisation of different machine learning models to achieve the project objectives.	15 to 17 points Appropriate but basic problem analysis and ML design to complete the project.	12 to 14 points Lack of details in analysis and model design. Project not complete.	1 to 11 points Major issues in design. Project not complete.	0 to 0 points Not covered
Data visualisation (20%)	14 to 20 points Excellent visualisation of data that clearly supports data exploration and reveals correlations that leads to model design. Multiple methods used to explore the data systematically.	12 to 13 points Good data visualisation that support data exploration and model design.	10 to 11 points Basic visualisation of given data that guides a simple model design.	8 to 9 points Lack of data visualisation effort.	1 to 7 points Very little work.	0 to 0 points Not covered
ML Implementation (40%)	28 to 40 points Excellent implementation and comparative analysis of multiple machine learning models.	24 to 27 points Working solution with good implementations.	20 to 23 points Working solution with at least one method used for each task.	16 to 19 points Some minor issues in implementation	1 to 15 points Major issues in implementation	0 to 0 points Not covered
Project management (10%)	7 to 10 points Excellent progress demonstrated via weekly update of the project in Git repository. This must be demonstrated using a screenshot of the Git activity.	6 to 6 points Frequently updates of the project that show a good level of engagement with the assignment.	5 to 5 points Occasional updates of the project over time. Completed project.	4 to 4 points Lack of progress throughout the semester. Completed project.	1 to 3 points Little evidence of engagement with the assignment work.	0 to 0 points Nothing presented