CCT College Dublin Continuous Assessment

Programme Title:	HDIP in AI
Cohort:	HDip in AI -Sep22 cohort
Module Title(s):	Machine Learning
Assignment Type:	Individual **Weighting(s)**: 50% (ML)
Assignment Title:	CA2_ML_HDip_Lvl8
Lecturer(s):	Muhammad Iqbal
Issue Date:	23rd November 2022
Submission Deadline Date:	6th January 2023
Late Submission Penalty:	Late submissions will be accepted up to **5** calendar days after the deadline. All late submissions are subject to a penalty of **10%** <u>of the mark awarded</u>. Submissions received more than 5 calendar days after the deadline above **will not** be accepted and a mark of 0% will be awarded.
Method of Submission:	**Moodle**
Instructions for Submission:	Assessment must be submitted before 6th January 2023 as a Jupyter Notebook file and a PDF. The Jupyter Notebook File Must be saved as "YourName_ML_HDip_CA2.ipynb"
Feedback Method:	**Results posted in Moodle gradebook**
Feedback Date:	After the Exam Boards February 2023

Learning Outcomes:
Please note this is not the assessment task. The task to be completed is detailed on the next page.
This CA will assess student attainment of the following minimum intended learning outcomes:

Machine Learning

MLO 1 - Implement Machine Learning Algorithms to solve analytical problems.

(Linked to PLO 1, PLO 2, PLO 5)

MLO2 - Determine whether a given data analysis problem requires the use of supervised, semi-supervised or unsupervised learning methods. Develop and implement the chosen learning method.

(Linked to PLO 2, PLO 4, PLO 5)

MLO4 - Implement a range of classification and regression techniques and detail / document their suitability for a variety of problem domains.

(Linked to PLO 5)

Attainment of the learning outcomes is the minimum requirement to achieve a Pass mark (40%). Higher marks are awarded where there is evidence of achievement beyond this, in accordance with QQI *Assessment and Standards, Revised 2013*, and summarised in the following table:

Percentage Range	CCT Performance Description	QQI Description of Attainment
		Level 6, 7 & 8 awards
90% +	Exceptional	Achievement includes that required for a Pass and in **most** respects is significantly and consistently beyond this
80 – 89%	Outstanding	
70 – 79%	Excellent	
60 – 69%	Very Good	Achievement includes that required for a Pass and in **many** respects is significantly beyond this
50 – 59%	Good	Achievement includes that required for a Pass and in **some** respects is significantly beyond this
40 – 49%	Acceptable	Attains all the minimum intended programme learning outcomes
35 – 39%	Fail	Nearly (but not quite) attains the relevant minimum intended learning outcomes
0 – 34%	Fail	Does not attain some or all of the minimum intended learning outcomes

Please review the CCT Grade Descriptor available on the module Moodle page for a detailed description of the standard of work required for each grade band.

The grading system in CCT is the QQI percentage grading system and is in common use in higher education institutions in Ireland. The pass mark and thresholds for different grade bands may be different from what you have experienced in the higher education system in other countries. CCT grades must be considered in the context of the grading system in Irish higher education and not assumed to represent the same standard the percentage grade reflects when awarded in an international context.

Assessment Task
Students are advised to review and adhere to the submission requirements documented after the assessment task.

Note: All data wrangling, analysis, implementation of Machine Learning and visualizations must generated using python

Online retailer, eBay is providing an option of bidding to their customers globally. Bidding is employed to find the real price of items in the market based on the demand. The price offered by anyone participating in this process is termed as a 'bid'. A dataset is available at the following link and on Moodle for the bidding of customers

https://archive.ics.uci.edu/ml/datasets/Shill+Bidding+Dataset

Normal bids are classified as '0' bids in the data set and anomalous bids as '1'. Your goal is to use classification or clustering algorithms to predict the bids in the future. You would need to clean and prepare the dataset for the machine learning modelling under the following guidelines.

Machine Learning
- Provide a logical justification based on the reasoning for the specific choice of machine learning approaches (supervised/ Unsupervised) for the provided Shill bidding data set. **[0-20]**
- Machine Learning models can be used for Prediction, Classification, Clustering and Time series analysis. You should plan on trying multiple models (at least two) with proper parameter-selection using hyperparameters and show a comparison between the chosen modelling approaches. **[0-30]**
- You should train and test the Machine learning models in the case of supervised learning and use other metrics for unsupervised learning if appropriate. Use cross validation to provide authenticity of the modelling outcomes. Perform a comparison of ML modelling outcomes using a Table or graph visualization.**[0-30]**
- Describe the rationale for the selection of models and justify the choice of hyperparameters.**[0-10]**
- A Table or graphics should be provided to illustrate the similarities and contrast of the Machine Learning modelling outcomes**.[0-10]**

Report
A report is required to provide the details of work performed in all tasks in ML. The report should be based on Introduction, rationale of machines learning models and conclusions. Illustrations should be used to highlight the details of any section.
Conclusions, Findings of data set and references/citations in (HARVARD style).
This should be completed in the Jupyter Notebook Markdown.

Submission Requirements

All assessment submissions must meet the minimum requirements listed below. Failure to do so may have implications for the mark awarded.
All assessment submissions must:
- Be submitted before *6th January 2023* as a Jupyter Notebook file.
- 3000 (+/- 10%) words in report (not including code, code comments, titles, references or citations)
- The Jupyter Notebook File Must be saved as "YourName_ML_HDip_CA2.ipynb"
- Be submitted by the deadline date specified or be subject to late submission penalties
- Be submitted via Moodle upload
- Use Harvard Referencing when citing third party material
- Be the student's own work.
- Include the CCT assessment cover page.

Additional Information
- Lecturers are not required to review draft assessment submissions.

- In accordance with CCT policy, feedback to learners may be provided in written, audio or video format and can be provided as individual learner feedback, small group feedback or whole class feedback.
- Results and feedback will only be issued when assessments have been marked and moderated / reviewed by a second examiner.
- Additional feedback may be requested by contacting the Lecturer, Additional feedback may be provided as individual, small group or whole class feedback. Lecturers are not obliged to respond to email requests for additional feedback where this is not the specified process or to respond to further requests for feedback following the additional feedback.
- Following receipt of feedback, where a student believes there has been an error in the marks or feedback received, they should avail of the recheck and review process and should not attempt to get a revised mark / feedback by directly approaching the lecturer. Lecturers are not authorised to amend published marks outside of the recheck and review process or the Board of Examiners process.
- Students are advised that disagreement with an academic judgement is not grounds for review.
- For additional support with academic writing and referencing students are advised to contact the CCT Library Service or access the [CCT Learning Space](#).
- For additional support with subject matter content students are advised to contact the [CCT Student Mentoring Academy](#)
- For additional support with IT subject content, students are advised to access the [CCT Support Hub](#).