MIS710 – Machine Learning in Business - Trimester 2 2024
Assessment Task 1 – Case Study (Business Report) – Individual

DUE DATE:	**Friday 9th August 2024** **8:00 pm AEST (Melbourne), 3:30 pm IST (GIFT city)**
PERCENTAGE OF FINAL GRADE:	**40%**
WORD COUNT:	**Maximum number of words: 2000 words**

Description

Purpose

This task provides you with opportunities to learn supervised machine learning and Python skills (GLO1 & ULO1) and apply your digital literacy to research and develop a machine learning solution (GLO3, GLO5, and ULO2). By completing this task, you will gain knowledge and skills in selecting and applying one or more appropriate supervised machine learning algorithm(s) to develop and evaluate a machine learning solution and present and interpret the outcomes to business clients.

Case Study

Assignment 1 involves a consulting project with your client – Play Quest Conquer (PQC), an online gaming platform headquartered in Sydney, Australia, offering services globally. PQC boasts a diverse collection of online games. Users sign up and pay a monthly subscription fee to access their services. They can browse games, select what they like, and pay for them. The games they purchase will be added to the user's individual collection to 'own' and play, invite other users to play together, or even 'trade' games with each other. Moreover, users can mark certain games as 'Interest' or 'High Interest' indicating their level of interest to be invited by game owners.

The client's primary objective is to determine the factors influencing game ratings, which will inform their game development, acquisition, deployment, and promotion strategies. You are provided with a dataset acquired by PQC's market research team. Read the PQC Metadata for the description of the columns in the dataset. You are required to estimate Average_Ratings.

The client's specific objectives include extracting insights from the data, estimating game ratings, and identifying opportunities/strategies for improving user satisfaction and game acquisition.

Regarding the extraction of data insights, PQC has requested the following analyses as a starting point:

1. *General information and game configuration*: Summarise the kind of games in the dataset, in terms of game types, year of release, age category, minimum number of players required, and maximum number of players allowed.
2. *Game engagement*: Summarise the average play time? Are there outliers?
3. *Game engagement and rating*: Is there a relationship between the playing time and the average ratings?
4. *Game complexity and rating:* Is there a relationship between level of game complexity and the average ratings?

5. *How do game configuration, popularity and Interest* (e.g., minimum number of players required, maximum number of players allowed, and number of owners, number of traders, numbers of interests and high interests) correlate with *rating*? For example, are games purchased by more users likely to result in higher ratings?
6. Additional insights regarding data quality, other variables and relationships.

The dataset provided:

- **PQC_data.csv**– this is the dataset itself.
- **PQC Metadata.docx** – descriptions of the columns.

You are required to explore this dataset and develop and test a machine learning model(s) using Python. You are also required to report findings to Ms. Anita Craig, Market Research Manager, Play Quest Conquer.

Challenge: You are also supplied with a second dataset without labels: **PQC_competion.csv** You are invited to apply the model on this second dataset. The model with the best performance will win a small prize!

The dataset used in A1 has been developed based on an external dataset. The dataset then has undergone further pre-processing and resampling specifically for the purpose of learning. Therefore, it is important to note that the dataset may not accurately represent real-world scenarios. It is essential that your insights and conclusions are justified based on the provided dataset. The source of the dataset will be provided upon request after the assignment has been returned.

Specific Requirements

You are required to:

- Develop your business and data understanding.
- Prepare and explore the provided dataset, cleanse and pre-process data as needed.
- Undertake machine learning model development and evaluation.
- Report findings to Ms. Anita Craig, Market Research Manager, Play Quest Conquer.
- Format and present your report professionally. Two sample report templates are provided under Assessment Resources.
- Correctly use the APA7 style of referencing, and include in-text citations when quoting, referring to, summarising, or paraphrasing from any source:

  https://www.deakin.edu.au/students/studying/study-support/referencing

Deliverables:

Part 1. Business Report (PDF and Word files)

- A cover page (**not** included in the word count) that includes:
  - Report Title
  - Unit code and name
  - Student name and student ID
- A table of contents (**not** included in the word count)
- An executive summary of max. 200 words is required (**included** in the word count).

- The report should include:
    1. Business understandings including the business problem to address and other Business Analysis Core Concept Model (BACCM) elements in relation the case study.
    2. Data understanding, data preparation, exploration, visualization, and insights gained.
    3. The machine learning approach undertaken.
    4. The model and performance metrics.
    5. Discussion of the pros and cons of the model.
    6. Business solution and recommendations for implementation and improvement (based on the model).
- References using the APA7 style (**not** included in the word count)
- Optional appendices (**not** included in the word count – not subject to assessment)

Part 2. Python notebook

Optional Part 3: If you participate in the Challenge then submit a **PQC_competion_pred.csv** file with your predicted labels.

Important Notes

- The final submission should be presented professionally. The report should use clear, concise, and relevant language to communicate the content to the target audience.
- You should research to solve the business problem. In the end, you must exercise and understand the Python code yourself for your learning purposes, develop and present your business understandings and solution to the client. Cite and reference any sources you use.
- Your submission will be assessed using the Assignment 1 Rubric.

Student Toolkits

A set of toolkits was prepared by experienced Deakin students to help you learn the generic skills required in the Business & Law professions: https://d2l.deakin.edu.au/d2l/home/93063

You will find the following tool kits to be useful:

- Communication Skills - especially Writing Skills: https://d2l.deakin.edu.au/d2l/le/content/93063/viewContent/6086619/View

- Use APA7 style of referencing **and include in-text citations**: https://www.deakin.edu.au/students/studying/study-support/referencing

Learning Outcomes

This task allows you to demonstrate your achievement towards the Unit Learning Outcomes (ULOs) which have been aligned to the Deakin Graduate Learning Outcomes (GLOs). Deakin GLOs describe the knowledge and capabilities graduates acquire and can demonstrate on completion of their course. This assessment task is important in determining your achievement of the ULOs. If you do not demonstrate achievement of the

ULOs you will not be successful in this unit. You are advised to familiarise yourself with these ULOs and GLOs as they will inform you on what you are expected to demonstrate for the successful completion of this unit.

The learning outcomes that are aligned with this assessment task are:

Unit Learning Outcomes (ULOs)		**Graduate Learning Outcomes (GLOs)**
ULO1	Analyse and frame business challenges using machine learning concepts, techniques, and the machine learning model development lifecycle.	GLO1: Discipline-specific knowledge and capabilities
ULO2	Select and apply appropriate machine learning techniques to solve business problems and evaluate the machine learning model performance.	GLO3: Digital literacy GLO5: Problem-solving

Submission

You must submit your assignment in the Assignment Dropbox on the unit CloudDeakin site on or before the due date. The submission must include three files:

- A PDF file of the report for the assessment purpose.
- A Word file of the report for the back-up purpose. Name your document using the following syntax: **[unitcodeA1]_your surname_your first name_your Deakin student ID number.doc (or '.docx')**. For example, 'MIS710A1_Jones_Barry_123456789.doc'.
- One (1) Python notebook
- If you take part in the Challenge, submit your CSV file with labels PQC_competion_pred.csv

Submitting a hard copy of this assignment is not required. You must keep a backup copy of every assignment you submit until the marked assignment has been returned to you. If one of your assignments is misplaced, you will need to submit your backup copy.

Any work you submit may be checked by electronic or other means to detect collusion and/or plagiarism and authenticate work.

When you submit an assignment through your CloudDeakin unit site, you will receive an email to your Deakin email address confirming that it has been submitted. You should check that you can see your assignment in the Submissions view of the Assignment Dropbox folder after uploading and check for, and keep, the email receipt for the submission.

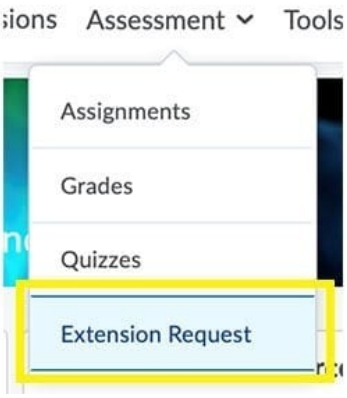
Marking and feedback

The marking rubric indicates the assessment criteria for this task. It is available in the CloudDeakin unit site in the Assessment folder, under Assessment Resources. Criteria act as a boundary around the task and help specify what assessors are looking for in your submission. The criteria are drawn from the ULOs and align with the GLOs. You should familiarise yourself with the assessment criteria before completing and submitting this task.

Students who submit their work by the due date will receive their marks and feedback on CloudDeakin 15 working days after the submission date.

Extensions

Extensions can only be granted for exceptional and/or unavoidable circumstances outside of your control. Requests for extensions must be made by noon on the submission date using the online Extension Request form under the Assessment tab on the unit CloudDeakin site. All requests for extensions should be supported by appropriate evidence (e.g., a medical certificate in the case of ill health).



Applications for extensions after 12 noon on the submission date require University level special consideration and these applications must be submitted via StudentConnect on your DeakinSync site.

Late submission penalties

If you submit an assessment task after the due date without an approved extension or special consideration, 5% of the **total marks** of the task (40%) is deducted for each new calendar day up to seven calendar days*. Work submitted more than seven days after the due date will not be marked and will receive 0% for the task. The Unit Chair may refuse to accept a late submission where it is unreasonable or impracticable to assess the task after the due date.

*'Day' means calendar day for electronic submissions and working day for paper submissions.

An example of how the calculation of the late penalty based on an assignment being due on a Thursday at 8:00 pm is as follows:

- 1 day late: submitted after Thursday 11:59 pm and before Friday 11:59 pm– 5% penalty.
- 2 days late: submitted after Friday 11:59 pm and before Saturday 11:59 pm – 10% penalty.
- 3 days late: submitted after Saturday 11:59 pm and before Sunday 11:59 pm – 15% penalty.
- 4 days late: submitted after Sunday 11:59 pm and before Monday 11:59 pm – 20% penalty.
- 5 days late: submitted after Monday 11:59 pm and before Tuesday 11:59 pm – 25% penalty.
- 6 days late: submitted after Tuesday 11:59 pm and before Wednesday 11:59 pm – 30% penalty.
- 7 days late: submitted after Wednesday 11:59 pm and before Thursday 11:59 pm – 35% penalty.

The Dropbox closes the Thursday after 11:59 pm AEST/AEDT time.

Support

The Division of Student Life provides a range of **Study Support** resources and services, available throughout the academic year, including **Writing Mentor** and **Maths Mentor** online drop-ins and the SmartThinking 24-hour writing feedback service at **this link**. If you would prefer some more in-depth and tailored support, **make an appointment online with a Language and Learning Adviser**.

Referencing and Academic Integrity

Deakin takes academic integrity very seriously. It is important that you (and if a group task, your group) complete your work in every assessment task Any material used in this assignment that is not your original work must be acknowledged as such and appropriately referenced. You can find information about referencing (and avoiding breaching academic integrity) and other study support resources at the following website: http://www.deakin.edu.au/students/study-support

Your rights and responsibilities as a student

As a student, you have both rights and responsibilities. Please refer to the document ***Your Rights and Responsibilities as a Student*** in the Unit Guide & Information section in the Content area on the CloudDeakin unit site.