Team Project Assignment Requirements

1. Summary

- This assignment is to be undertaken in groups of 5 to 6 students as a group assignment.
- Team formation method: Self-selection group formation on Moodle.
- This assignment is graded out of 30 marks (i.e., 30% of the course total marks).
- The mark awarded will be assigned to all team members, but individual marks may be moderated if the peer assessment and subsequent investigation identified an uneven contribution and effort across the group members.

2. Important dates

- Team formation: Tuesday 4th June 2024 at 5pm
- Report submission: Monday 29th of July 2024 at 5 pm
- Presentation pitch slides submission: Wednesday 31st of July 2024 at 9am
- Team presentation pitch on Wednesday 31st of July 2024 during Week 10 Seminar

*All dates are set in Australian Eastern Standard/Daylight Time (AEST/AEDT). If you are located in a different time-zone, you can use a time and date converter.

3. Case Study

The auto industry has consistently been at the forefront of embracing innovative technologies in manufacturing, marketing, and vehicles. Now, artificial intelligence (AI) is propelling the sector to new, unprecedented heights. By integrating AI into auto sales and marketing, dealerships, and OEMs (Original Equipment Manufacturers) are uncovering new opportunities to engage customers and stimulate growth.

Gumtree (gumtree.com.au) is one of Australia's leading online marketplaces where businesses and individuals can sell and buy cars, furniture, electronics, and more across Australia. Gumtree connects more than 6 million buyers and sellers, with over 45,000 new listings daily in categories like Home & Garden, Baby & Children, Sport & Fitness, Clothing & Jewellery and Gumtree Jobs. The primary objective of Gumtree is to facilitate successful, safe local trade. Notably, car sales represent a significant area of growth for the platform.

When sellers submit car listings on Gumtree, they are required to provide detailed information about the vehicle, write a description, and decide on a listing price. Often, users struggle to determine the appropriate price and craft an appealing description when submitting car listings. This can lead to inefficiencies and a lack of successful transactions. To address this issue, Gumtree plans to leverage AI-driven analytics to assist users in setting the right price. This estimation process, known as “car valuation”, considers multiple factors including, but not limited to, car brand, type, location, engine size, transmission, and more. A car valuation benefits both buyers and sellers: for buyers, it offers a clear indication of the car’s market value, reducing the risk of overpaying; for sellers, it increases the chances

of quick sale. This ensures that the pricing is competitive and reflective of the current market conditions, thereby enhancing user satisfaction and driving more successful transactions on the platform.

4. Requirements

The following are the requirements for the Team Assignment. Please read these requirements carefully before you commence your assignment and then again when you have completed your assignment to ensure that it meets the requirements.

In a hypothetical scenario, you team is hired by Gumtree with the following mission:

- Leverage AI to automate Gumtree's valuation process.
- Leverage Generative AI to suggest improved descriptions for users to include in their listings with a particular emphasis on environmentally friendly features (e.g. CO2 emissions, renewable energy, etc.).

You are provided with a large historical dataset of vehicle listings in the Greater Sydney area collected from gumtree.com.au as of May 2024. The dataset is available on Moodle as an Excel spreadsheet called gumtree_listings.xlsx under the Assessment section and the Datasets sub-section.

The dataset includes the following variables:

- listing_url: Link to a listing on gumtree.com.au
- listing_title: The title of the listing
- odometer: The number of km on the odometer of the vehicle
- body_type: The body type of the vehicle including Sedan, SUV, Ute Van/Mini van, Wagon, Hatchback, Convertible, Coupe (2 door), and Other.
- transmission: The transmission of the vehicle including Manual and Auto.
- manufacturer: The manufacturer of the vehicle including Alfa Romeo, Audi, Bentley, BMW, Chery, Chevrolet, Chrysler, Citroen, Daihatsu, Datsun, Dodge, Ferrari, Fiat, Ford, Great Wall, GWM, Haval, Hino, Holden, Honda, HSV, Hyundai, Infiniti, Isuzu, Iveco, Jaguar, Jeep, Kia, Lamborghini, Land Rover, LDV, Lexus, Mahindra, Maserati, Mazda, Mercedes-AMG, Mercedes-Benz, MG, Mini, Mitsubishi, Mitsubishi Fuso, Nissan, Other, Peugeot, Porsche, Ram, Range Rover, Renault, Rolls-Royce, Saab, Skoda, Ssangyong, Subaru, Suzuki, Tesla, Toyota, Volkswagen, and Volvo.
- engine_config: The configuration of the engine in terms of number of cylinders and engine size. For example, "4 cyl 2.0L" is a 2-litre engine size with 4 cynlinders.
- description: A description of the listing.
- price: The price advertised on gumtree.com.au
- price_conditions: The conditions of the advertised price including Drive Away, Auction, Excl. Gov. Charges, and Negotiable.
- Location: Suburb where the vehicle is located. e.g. Alexandria, NSW
- seller_type: The type of sale including Dealer demo, Dealer new, Dealer used, and Private.
- featured_image: Link to the vehicle photo featured on gumtree.com.au

Your Lecturer-in-Charge and tutors will assume the role of your direct managers/mentors. Throughout the term, you will work closely with your team members to apply the AI-Driven Business Analytics Process. In this project, you are required to use SAS Viya to train and test Machine Learning models using the provided dataset to predict vehicle price.

You will also apply Generative AI to suggest appealing descriptions for users to include in their listings with a particular emphasis on environmentally friendly features.

4.1. Expectations

To succeed in this project, you will need to manage your learning process carefully – including demonstrating agency in performing self-directed learning, critical thinking, conducting research, taking initiative, and more.

4.2. Deliverables

In this assignment you are required to submit a Team Report (in Word format) and Presentation pitch slides (in PowerPoint format). Submission instructions are provided on Moodle.

Only one team member is expected to submit the files and the entire team is expected to present during Week 10 Seminar.

Assessment Task	Weighting	Due Date	Mode of Submission
Team Report	70%	Monday 29th of July 2024 at 5 pm (AEST)	Submit the Team Report in Word format using the link Team Report Submission. Submit the Team Presentation Pitch Slides in PowerPoint format using the link Team Presentation Pitch Slides Submission. Present in-class during Week 10 Seminar.
Team Presentation Pitch Slides + in-class presentation pitch	30%	Wednesday 31st of July 2024 at 9am (AEST)	

4.2.1. Team Report requirements

In this Assignment, you are required to write a business report of 3500 words to implement the AI-driven business analytics process; articulate the business problem, apply suitable ML algorithms to make accurate predictions, derive actionable insights from the key findings of your analysis, and demonstrate how AI/ML contribute to address the business problem.

Your Team Report must include the following components:

1. **Overview of the Business Problem** (10 marks, 400 words)
    1.1. **Briefly discuss the business Problem**: Provide a succinct overview of the business problem and frame it within its relevant context. Discuss the stakeholders involved, outline the implications of the problem, and clearly articulate the business objective. (5 marks, 200 words)
    1.2. **Key proposed solutions**: Articulate the key proposed solutions in a clear and concise manner, and outline the expected outcomes and benefits? Provide a visualisation to illustrate the key proposed solutions, and the methodology employed in your project. This should clearly depict the steps taken, from data analysis to the implementation of solutions, providing a comprehensive overview of the project workflow. (5 marks, 200 words).
2. **Translate the Business Problem into Machine Learning Problems** (25 marks, 850 words)
    2.1. **Machine Learning Problems**: Convert the business problem into specific machine learning problems. Discuss which type of ML technique (e.g., Classification, regression, ranking, clustering, anomaly detection, recommendation) is most suitable to address the business

problem and outline your analysis objective. Provide justifications for the chosen ML technique. (5 marks, 150 words).

2.2. **Machine Learning Algorithm**: Explain the approach undertaken to determine the most suitable ML algorithm. Provide justifications for the chosen approach and algorithm. (5 marks, 150 words).

2.3. **Preparation of the Data (Clean and Transform)** (8 marks, 400 words)

2.3.1. **Data Cleaning**: Provide a detailed explanation of the different steps implemented to clean the data (e.g., handling missing values, addressing inconsistencies or errors, etc.). Justify each data cleaning step and support your arguments (4 marks, 150 words).

2.3.2. **Data Transformation**: Explain any data transformation techniques applied, such as encoding categorical variables and feature engineering. Provide clear justifications for these transformations (4 marks, 150 words).

2.4. **Feature Selection**: Conduct an exploratory data analysis to understand the data distribution. Identify possible relationships between variables, and underlying patterns/trends, detect outliers, and other anomalies. Discuss the process of selecting the most relevant features required to build the ML models. Identify the key predictor (s) (features) and the Target variable (s)? Provide justifications for feature selection and generate visualisations to illustrate your arguments. (7 marks, 250 words).

3. **Data Analysis for Price Prediction Models** (40 marks, 1200 words)

3.1. **Model Training**: Explain the training process using the selected features. Provide justifications for the choice of training and testing data split. Include details on any hyperparameter tuning performed to enhance the model's performance. (10 marks, 300 words).

3.2. **Model Testing and Evaluation**: Discuss the results of model testing, including relevant metrics used to evaluate the performance of the ML models to make accurate predictions. Discuss the relevant key metrics to do the evaluation such as average squared error (ASE), root average squared error (RASE), mean absolute error (MAE), etc. Compare the predictive performance of the different models. (10 marks, 300 words).

3.3. **Model Selection**: Based on the evaluation results, discuss the best performing ML model selected for price predictions. Provide a rationale for selecting the best performing model. (5 marks, 200 words).

3.4. **Discuss the key findings:** Critically discuss the predictions generated by the best performing model and provide plausible explanations for the key findings. Support your discussion with screenshots to illustrate the model's outcomes. (10 marks, 200 words).

3.5. **Generate Actionable Insights:** Derive actionable insights from the key findings and translate them into concrete recommendations to address the business problem. (5 marks, 200 words).

4. **Application of Generative AI to Foster Business/ Environmental Value** (20 marks, 750 words)

4.1. **Prompt engineering**: Discuss how Generative AI can be applied to generate appealing descriptions that highlight environmentally friendly features of the car. This includes a discussion of the data features used and the prompt engineering conducted. Provide a clear justification for your choices of data features and prompts. (10 marks, 300 words)

4.2. **Discuss the key findings**: Critically discuss the outcomes of using Generative AI and provide plausible explanations for the key findings. Derive actionable insights and articulate how these insights can inform business decisions. (5 marks, 200 words)

4.3. **Discuss Potential Applications of Generative AI**: How can Generative AI techniques used in this example be applied to other business contexts to solve similar environmental and sustainability challenges? Discuss specific examples of potential industries or applications, and justify how Generative AI can drive innovation and business value in these contexts? (5 marks, 250 words)

5. **Ethical Implications** (5 marks, 300 words)

   Discuss the ethical implications related to data privacy, potential biases in data and ML algorithms, and transparency and accountability in the analysis. Explain how these concerns can be addressed. Include examples and/or references to justify and support your arguments.

NB. Throughout the report, your arguments should be justified and supported with academic references and relevant examples.

Word Limit

Each section of the team report has a word limit, as indicated in 4.2. Deliverables. The distribution of word count proportionally reflects the complexity and significance of each section, totalling a maximum word length of 3,500 words. There is a (+10%) leeway in word limits for each section.

Please note that tables, figures, diagrams and references are excluded from the word count.

You should be mindful of the marks awarded to each section, as indicated in 4.2. Deliverables, when allocating the number of words spend on each section.

Please note that material presented in excess of the word limit for each section will not be considered when grading the assignment.

Formatting

The team report should be in 'business report' style (in Word format) with the following requirements:

- Arial 12-point font
- 1.5 spacing
- Page numbers on each page
- Team Project cover page included (provided on Moodle)
- All required sections included, as indicated in 4.2. Deliverables
- At least 5 relevant academic references to justify and support your arguments in the report.

Feel free to make whatever use of tables, figures, and diagrams that you believe appropriate and relevant to support your work. Tables, figures, diagrams and references do not count towards the word limit.

Lodgement

Upload your Team Report document (in Word format) on Moodle.

- You can only upload one report document.
- Only ONE submission from each group is required.
- You are advised to keep a copy of your submission.

Originality Checks

The originality of the submission will be checked using Turnitin. Please check the originality report generated by Turnitin during the submission process.

4.2.2. Team Presentation Pitch requirements

Purpose

The purpose of the presentation pitch is for your team to showcase and effectively communicate the key findings of your analysis and the actionable recommendations/solutions to solve the business problem.

Time limit

Each presentation pitch is to be no longer than 7/8 minutes. Failure to complete the presentation pitch within the allotted time will impact on the marks the group receives for the presentation pitch.

Who has to present?

All members of your group must participate in the presentation pitch during Week 10 Seminar.

You are expected to coordinate the work assignment before the presentation pitch, e.g., how a member's absence will be compensated with his/her other work allocation in the project. Absence on the day of the presentation pitch will not be taken into consideration in the peer assessment, unless in special circumstances in which explanation has to be provided.

The mark award to the presentation pitch will be applied to all group members, but individual marks may be moderated if the peer assessment and subsequent investigation identified an uneven contribution and effort across the group members.

Slides

You are expected to prepare and submit slides for your team presentation pitch. Slides are expected to be of a high quality and appealing.

Lodgement

Upload your Team Presentation Pitch Slides (in PowerPoint format) on Moodle.

4.3. Unequal contribution

In the case of unequal contribution, EACH team member must submit the following:

- Peer Assessment - EACH team member is requested to complete and submit a peer assessment via email (to the Lecturer-in-Charge).
- Please refer to the deadline of submission in the peer assessment form provided on Moodle.
- Individual diary - Each group member is required to submit an individual diary of the tasks done on the team project. The diary should describe the activities undertaken by the group member (date, time, description of the work done in the report and in the slides). The individual diary is necessary to assess the work done by everyone and assign different marks to the group members.

Where no peer assessment is received it will be assumed that you consider the work to have been evenly and equitably distributed across all team members. No diary is requested in the case of equal contribution.

4.4. Late Lodgement & Extensions

Late assignments (without approved extensions) will attract a penalty of 5% of the available marks per day of lateness (including weekends and public holidays). The penalty will be deducted from the mark your assignment is awarded. The assessment will not be accepted after 5 days (120 hours) of the original deadline unless special consideration has been approved. General information on special consideration for undergraduate and postgraduate courses can be found in the Assessment Implementation Procedure and the Current Students page. Please note:

- Extensions are only granted in exceptional circumstances. You will be required to substantiate your application with appropriate documentary evidence such as medical certificates, accident reports etc.
- You should note that extensions are not usually granted for computer-related problems or heavy workloads (at either your job or University).
- Students are expected to manage their time to meet deadlines and to request extensions as early as possible before the deadline.

4.5. References

It is expected that your team report will make use of at least ten recent academic journal articles and practitioner articles.

A list of references must be included at the end of the team report. The reference list should only list documents / websites that are cited in the assignment (references in text).

Your bibliography and in text citations must be formatted as per the requirements of the Harvard referencing style.

For information on how to acknowledge your sources and reference correctly, see:

https://student.unsw.edu.au/referencing

https://student.unsw.edu.au/harvard-referencing

4.6. Penalties

Penalties will apply in the following circumstances:

- The assignment contains spelling and grammatical mistakes.
- The submission requirements have not been adhered to.
- Failure to use the Harvard referencing style.
- The assignment is submitted late (5% marks penalty per day of lateness).
- The assignment contains material which is not properly cited in accordance with university policy.
- You should also note that plagiarism or other academic misconduct will not be tolerated, and all instances found will be pursued. At a minimum this typically entails the student being award zero (0) marks the plagiarize assignment.

4.7. Group Responsibilities

When working in a group you are expected to:

- Make an equitable contribution to the completion of the assignment

- Complete your work in a professional and timely manner
- Maintain proper academic standards
- Behave in a professional and decorous manner and treat your fellow teammates with dignity and respect

To ensure fair and equitable distribution of the work effort across the group, each group is required to keep a diary of its activities. Each group member is also required to keep a diary of the activities they undertake on the assignment. This diary is only to be submitted if requested by the lecturer (in case of unequal contribution) along with an individual confidential peer assessment.

4.8. Distribution and quality of work

Your group must plan and schedule its activities. It must meet on regular basis while the assignment is being undertaken and ensure that every group member is involved in the completion of the assignment. The work in the assignment is to be divided among the group members on an equitable basis. You are expected to complete your assigned tasks in a professional and diligent manner. You are also expected to contribute in a useful and constructive way to group activities.

It is very important that your group establish its expectations regarding quality, timeliness and level of effort at the very beginning of the assignment to ensure that you complete your team project, and you submit it on time. Most problems that arise in groups related to differences in these expectations. Being clear about what is expected at the start of the assignment allows group members to clarify the contribution of everyone and organise better the work.

If problems emerge in your group over the distribution of the work or its competent and timely completion you should, in the first instance, bring your concerns to the attention of the group. If this fails to remedy the situation then you should bring it to the attention of the lecturer in charge.

The lecturer in charge will, as a matter of course, call a meeting of the group. At that meeting each group member will be asked to describe in detail their input into the assignment and provide supporting documentation of this effort (i.e. the individual diaries). Where group members are found to be making inadequate effort or delivering a poor-quality product then they will be counselled to improve their effort. If sufficient improvement is not made to the satisfaction of the group, then the mark awarded to the group members may be moderated to reflect the relative input into the assignment.

4.9. Proper academic standards

All assignments are subject to the University's guidelines regarding academic misconduct and as such plagiarism is as unacceptable in this group assignment as it is in other assignment. If plagiarism is found in your assignment it will be fully pursed asper the University (see https://student.unsw.edu.au/plagiarism for details).

If your group suspects that one of your group member's work contains plagiarism, then you should raise this with the group member concerned and seek to have the problem rectified. All instances of at plagiarism are considered poor behaviour.

4.10. Behaviour in groups

You are expected to treat your fellow group members with dignity and respect. Group meetings and group communications are expected to be conducted in a decorous and professional manner. Poor or inappropriate behaviour in groups will not be tolerated. A group has the right to ask the lecturer to expel a poorly behaved individual from their group. If a group wishes to pursue this action, they must arrange a meeting with the lecturer to discuss the problem. The lecturer will take action as appropriate.

You also have the right to ask the lecturer to remove you from a group if the behaviour of your fellow group members is inappropriate. If you wish to pursue this course of action you must arrange a meeting with the lecturer to discuss the problem. The lecturer will take action as appropriate. Please note that if you are expelled from a group for poor or inappropriate behaviour you are expected to complete the assignment in full and no allowance made when marking assignment for the fact that it is a solo effort.

4.11. Use of Generative AI Tools (e.g. ChatGPT) in the Assignment

Given that this assignment requires students to demonstrate their critical thinking and creativity, you are permitted to use generative AI tools to generate initial ideas. However, you must develop or edit these ideas to such as significant extent that what is submitted is your own work. Only occasional AI-generated words or phrases may form part of your final submission. It is advisable to keep copies of the initial prompts to show your lecturer in case there is any uncertainty about the submission of your work. If the outputs of Generative AI content, such as that form ChatGPT, are included in your submission, it will be regarded as serious academic misconduct and subject to the standard penalties, which may include failing the assignment (FL), suspension, or exclusion.

Viva Voce

Any student may be called upon to provide a viva voce (from the Latin meaning 'living voice') for any assignment. A viva voce is an interview style meeting where you will be asked to explain, discuss, or use information related to any assignment or work produced for this course. These can be used to ascertain knowledge and ability including the extent to which the student has undertaken the required reading, done preparatory work and can demonstrate understanding of what they have written or presented. Viva voces are used in conjunction with submitted assessment work not instead of submitted work.

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4.12. Copyright

There are some file-sharing websites that specialise in buying and selling academic work to and from university students.

If you upload your original work to these websites, and if another student downloads and presents it as their own either wholly or partially, you might be found guilty of collusion — even years after graduation.

These file-sharing websites may also accept purchase of course materials, such as copies of seminar slides and handouts. By law, the copyright on course materials, developed by UNSW staff in the course of their employment, belongs to UNSW. It constitutes copyright infringement, if not academic misconduct, to trade these materials.