Assignment 1  
Regression Models

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36106 - Machine Learning Algorithms and Applications

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# Business Understanding

## Business Use Cases

The project focuses on evaluating engineering students’ academic performance, personal traits, and their college characteristics in order to make predictions of their salaries in the industry. For that, the application of the predictive model can be seen in a variety of industries and scenarios.

For examples:

Use case 1 - College Graduates and Students: They can use our model to understand the specific subjects or attributes might impact their starting salaries and be able to examine themselves which help them to be informative and make the right decision about their career planning and skills enhancement.

Use case 2 – Universities and educational institutions: Based on their existing and extracurricular profiles, these organizations may use forecasts to advise their students about possible income expectations. It helps in refining educational programs to improve employability and pay results, at the same time helping to define realistic professional objectives.

Use case 3 – HR Departments and Recruitment Services: By using the model, they may improve offers and negotiations by estimating reasonable wage ranges for recent grads. This tool facilitates the recruiting process by bringing offers and expectations into line with the standards of the industry.

The complexity of the factors determining wage results and the need for willingness in salary negotiations are the main obstacles motivating this initiative. The chance is in using machine learning to examine these complex relationships and provide stakeholders insights that were hard to measure before. Data never lies. As long as the historical information is validated and trustful, building an algorithm for formulate a trend that could use for predicting future data is the best thing we can do when it comes to assessing salaries. In this world where everybody placed their benefits above everything else, evaluations can become biased, leaving room for individuals to be exploited. Therefore, I see machine learning as a method to bring balance to negotiations, providing metrics that serve as fair tools benefiting both parties involved in the agreement.

1. Key Objectives

* Specify the key objectives or goals of the project.
* Identify the stakeholders and their requirements.
* Explain how the project aims to address these requirements.

Instructions: Specify the key objectives or goals of the project, highlighting the desired outcomes. Identify the stakeholders involved and their specific requirements. Explain how the project aims to address these requirements through the use of machine learning algorithms.

The objectives (goals) of the projects are:

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# Data Understanding

* Provide insights into the dataset used for the project.
* Describe the data sources, data collection methods, and any data limitations.
* Discuss the variables/features present in the dataset and their significance.

Instructions: Describe the dataset used for the project, including its sources and any limitations. Discuss the variables or features present in the dataset and their relevance to the project. Include any exploratory data analysis conducted to understand the data better.

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# Data Preparation

* Describe the steps taken to prepare the data for modeling.
* Discuss the data cleaning, preprocessing, and feature engineering techniques applied.
* Document any handling of missing values, outliers, or imbalanced data.

Instructions: Describe the data preparation steps taken before modeling. Include details about data cleaning, preprocessing, and feature engineering techniques applied. Explain how missing values, outliers, or imbalanced data were handled and any transformations performed on the dataset.

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# Modeling

* Describe the machine learning algorithms used for modeling.
* Discuss the rationale behind selecting these algorithms.
* Explain the parameter tuning and model selection process.

Instructions: Describe the machine learning algorithms used for modeling, providing a rationale for their selection based on the project goals. Explain the process of parameter tuning and model selection. Include details about the algorithms' implementation and any considerations made during the modeling phase.

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# Evaluation

## Results and Analysis

* Present the results of the model evaluation, including accuracy, precision, recall, F1-score, etc.
* Analyze and compare the performance of each model.
* Discuss the key insights gained during the experimentation phases.

Instructions: Present the results of the model evaluation, including accuracy, precision, recall, F1-score, or any other relevant metrics. Analyze and compare the performance of each model, highlighting the key insights gained during the experimentation phases. Discuss the implications of these insights on the project's goals and potential areas for further improvement.

## Business Impact and Benefits

* Assess the impact and benefits of the final model on the business use cases.
* Discuss how the model contributes to solving the identified challenges or exploiting opportunities.
* Quantify the improvements achieved and the potential value generated.

Instructions: Assess and discuss the impact and benefits of the final model on the identified business use cases. Explain how the model contributes to solving the identified challenges or exploiting opportunities. Quantify the improvements achieved and discuss the potential value generated by the model.

## Data Privacy and Ethical Concerns

* Assess the data privacy implications of the project.
* Discuss any ethical concerns related to data collection, usage, or model deployment.
* Address steps taken to ensure data privacy and ethical considerations.

Instructions: Assess the data privacy implications of the project, considering any sensitive information or privacy concerns related to data collection, usage, or model deployment. Discuss any ethical concerns and considerations. Address the steps taken to ensure data privacy and mitigate ethical concerns.

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# Conclusion

* Summarize the key findings, insights, and outcomes of the project.
* Reflect on the project's success in achieving its goals and meeting stakeholders' requirements.
* Discuss any future work, recommendations, or next steps based on the project's outcomes.

Instructions: Summarize the key findings, insights, and outcomes of the project. Reflect on the project's success in achieving its goals and meeting stakeholders' requirements. Discuss any future work, recommendations, or next steps based on the project's outcomes.

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# References

* Include a list of references used throughout the project report.

Instructions: Include a list of references used throughout the project report, following the appropriate citation style.

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