Project Review for Machine Learning-based Sydney Trains Carriage Load Prediction (2020)

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Stakeholder: Sydney Trains

This project aims to develop a machine learning-based prediction methodology to provide expected carriage load along a train journey, particularly to estimate the real-time carriage load when a train departures from a station platform.

This project attempts to use machine learning techniques to provide customers with better information in terms of carriage occupancy.. This pioneering study has achieved significant success and has shown the potential to integrate machine learning methods to support real-time prediction in transportation-related tasks. The success of this project will benefit customers and provide more visibility of current crowding level to train planners, which dir ectly contributes to developing low-cost, reliable, resilient, and efficient transport systems.

This team has successfully completed the following tasks:

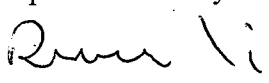
1) highlighted the information that affects the carriage load
2) measured the distribution similarity of carriage loads during peak and off-peak hours
3) compared the dwell time change with and without applying passenger flow control
4) developed a Waratah fleet carriage load prediction model
5) extended the model to make predictions for Non-waratah fleet
6) enhanced the prediction accuracy when disruption raised
7) developed an addon model for trainload prediction

The team menbers have shown excellent problem-solving skills with professional data analytics methods. The prediction accuracy of carriage load has been controlled within the ± 4 passengers for Waratah Fleet, and ± 7 for Non-waratah Fleet. The prediction model can also give reasonable predictions when there is a disruption in the operation. The development model fulfils the requirements, and the exploratory data analysis provides insight into the passengers' travel patterns. The stakeholders are satisfied with the performance and would like to look for further collaborations; one potential project is real-time Opal data analysis and prediction.

We consider this is a great successful collaboration with Sydney Trains and has built a strong connection between Sydney Trains and UTS.

Stakeholder Representative: Ruimin Li

the Manager of Operations Analysis & Modelling Department

Signature: 

Date:08/07/20