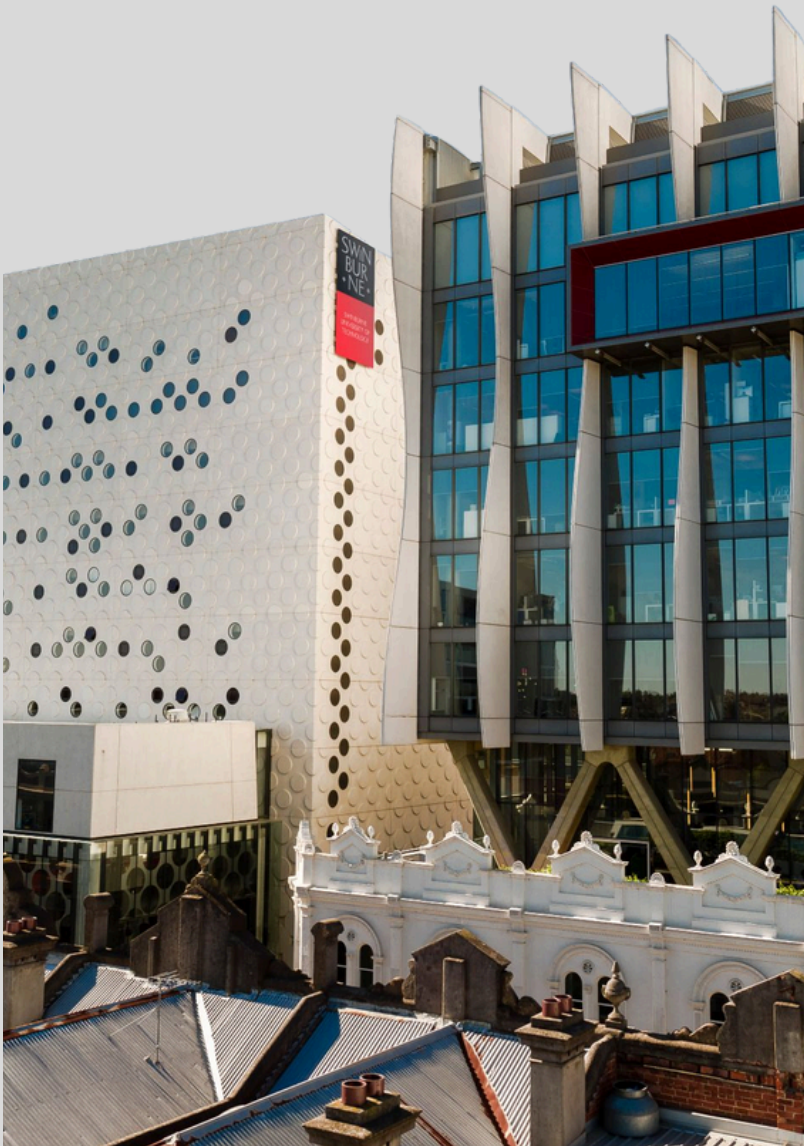# TASK B.6.2 REPORT

COS30018
Intelligent Systems

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Task B6 (Part 2)

This report analyzes the v0.6_codebase_stock_prediction.ipynb notebook to demonstrate that it successfully fulfills the requirements of "Task B.6 - Machine Learning 3," which is to develop and experiment with ensemble models combining classical statistical models with Deep Learning (DL) models.

Experimentation with Different Ensemble Models

The second requirement was to experiment with different ensemble models and their configurations.

Requirement Fulfillment: This is comprehensively achieved in Cells 7 through 13. The notebook is structured as a series of experiments, building and evaluating multiple models before combining them into various ensembles.

a. Experimenting with Different Models:

Deep Learning Models: The notebook systematically trains and evaluates three different DL models: LSTM (Cell 7), GRU (Cell 8), and a simple RNN (Cell 9). This directly fulfills the requirement to experiment with different DL networks.

Statistical Model: An ARIMA model (Cell 11) is trained, providing the statistical component for the ensembles.

b. Experimenting with Ensemble Configurations:

Fulfillment: Cell 13 is dedicated to creating and evaluating these different ensembles.

Details: The code doesn't just create one ensemble; it creates three different combinations, allowing for a robust comparison:

ensemble_arima_lstm = (aligned_arima_preds + aligned_lstm_preds) / 2.0

ensemble_arima_gru = (aligned_arima_preds + aligned_gru_preds) / 2.0

ensemble_arima_rnn = (aligned_arima_preds + aligned_rnn_preds) / 2.0

This demonstrates clear experimentation with different ensemble compositions as required.

Summarizing and Comparing Results:

Fulfillment: The results of all experiments are collected and summarized in Cell 14, "Final Results and Recommendation".

Details: A dictionary (models_performance) is created to store the Mean Absolute Error (MAE) of every individual model and every ensemble. The results are then printed in a sorted list, providing a clear ranking of which model or ensemble performed best. This final summary is a crucial part of the experimentation process.

Conclusion

The v0.6_codebase_stock_prediction.ipynb notebook successfully fulfills all criteria for the assignment. It demonstrates the implementation of both the required individual models and creates a functional set of ensemble models. Furthermore, it methodically experiments with different combinations (ARIMA+LSTM,

ARIMA+GRU, ARIMA+RNN) and presents the comparative results, completing the full scope of the required tasks.