Air Traffic Management: Neural Network Method

Choice of model structures: Multi-Layer Perceptron Back Propagation

- Uses single input layer (2 neurons, bias term)
- Uses single hidden layer (12 neuron, bias term)
    - Integrate sigmoid activation
- Uses single output layer (1 neuron)
    - Integrate linear activation

Training

- Learning rate = 0.001
- Trained with 1000 epochs and measured Mean Squared Error (MSE)
- Forward Propagation → x_train through all layers, produces predicted taxi time
- Loss function → difference between predicted vs actual y_train
- Back Propagation → compute gradient of loss with all weights

Sub-dataset(s) to use:

- Training: 70%
- Testing: 20%
- Validating: 10%

Conducting the statistical tests:

Evaluation on Performance and Reliability of NN (use MAE, RMSE, R^2) - Statistical Analysis on Residuals