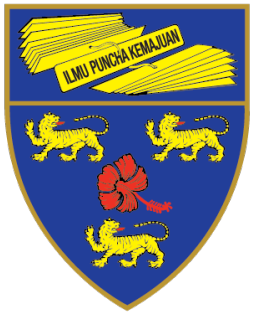

UNIVERSITI MALAYA

Forecasting with Hybrid Numerical Integration and Deep Learning

Group CSBS1

Supervisor: Dr. Suzan J. Obaiys

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Introduction

- Fields applying forecasting:
  - Healthcare
  - Weather
  - Traffic
- Challenges in forecasting.
- Limitations of traditional models
  - ARIMA
  - SARIMA
  - Z-scores
  - Moving Average
- Contribution of numerical integration to forecasting.

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Problem Statement

The study addresses the accuracy and efficiency of forecasting time-series data using hybrid numerical integration and deep learning models.

Objectives

- To develop and evaluate LSTM models with numerical integration.
- To compare model using metrics like MSE, MSLE, R^2, IA, MAPE, and sMAPE.
- Tp leverage time-series datasets for enhanced forecasting.

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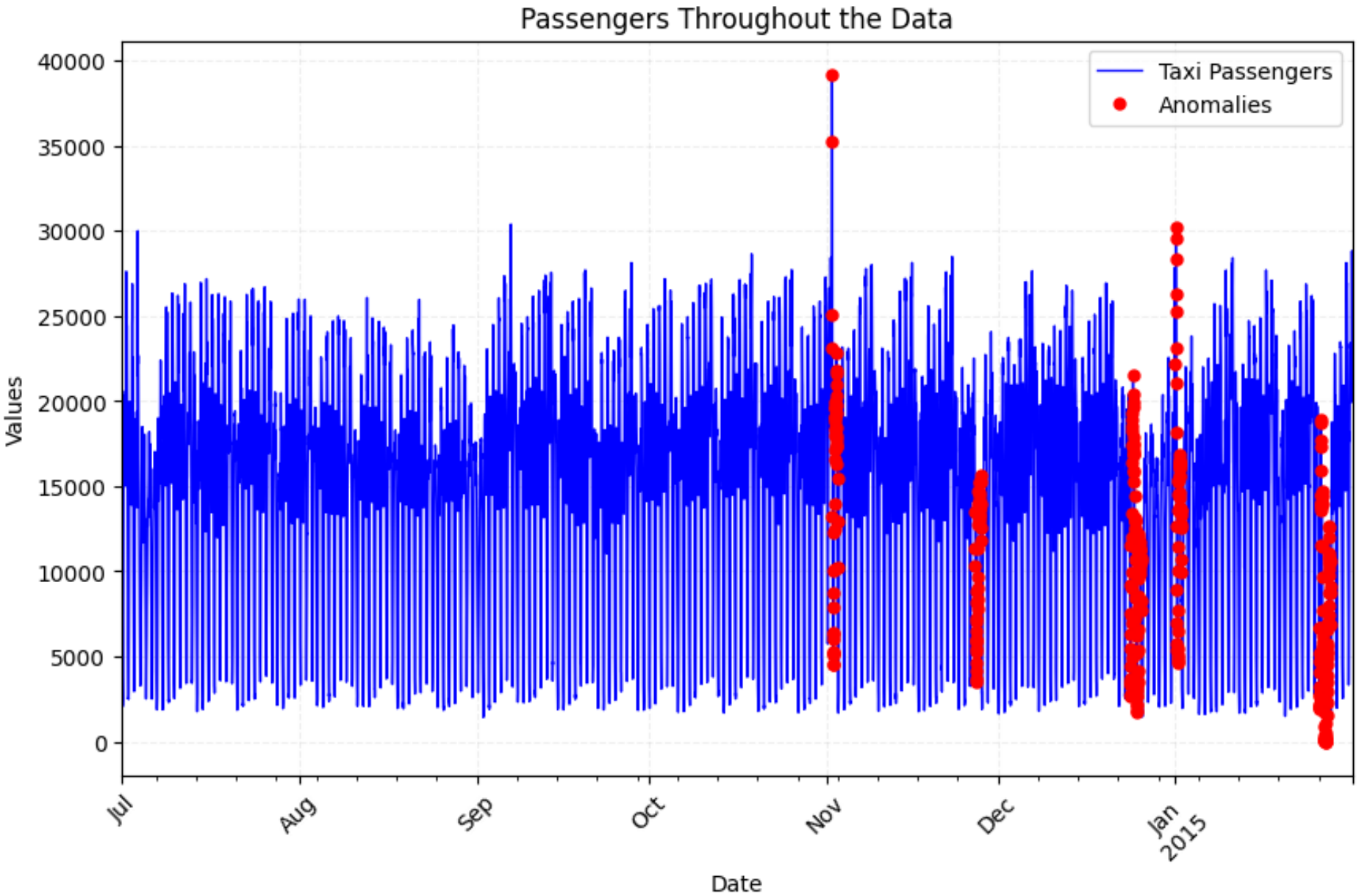
Methodology Overview

- Dataset collection
  - Type
  - Properties
  - Relation to other course assignment
  - Anomalies
- Numerical integration methods:
  - Trapezoidal Rule
  - Monte Carlo
- Preprocessing
  - Trend extraction
  - seasonality analysis
  - Normalize/standardize data
  - dataset splitting
- Deep learning model: LSTM / Linear Regression.
- Hybrid model design: KIV
- Performance metrics.

Dataset Visualization



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Results and Discussion

- Comparative analysis: Numerical Integration, Deep Learning, Hybrid models.
- Visualization: Bar charts, line plots, confidence intervals.
- Discussion of hybrid model performance.

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Conclusion

- Hybrid models improve forecasting accuracy.
- Trade-offs: Computational cost vs. accuracy.

Future Work

- Explore real-time forecasting applications.
- Apply to larger datasets.
- Investigate anomaly detection.

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Bibliography

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Appendix

Appendix content.

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References

- Reference 1: ?
- Reference 2: ?
- Reference 3: ?
- Reference 4: ?
- Reference 5: ?
- Reference 6: ?