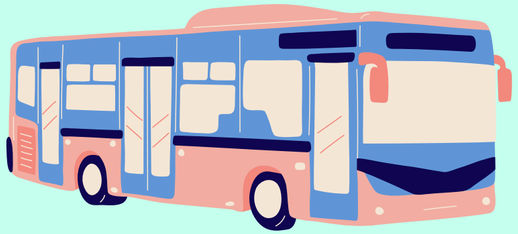


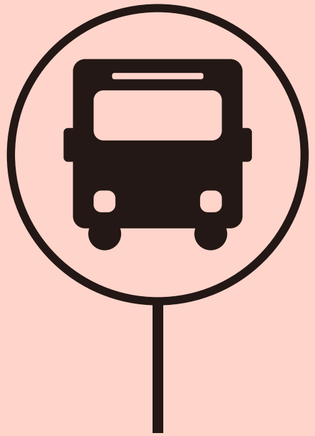
Bus Arrival Time Prediction

Sharipkhanova Dariya BDA-2201

Introduction

- Improving reliability of public transportation.
- Reducing waiting times with accurate bus arrival predictions.
- Integrating real-time GPS, traffic, and weather data.

Goals and Objectives



Goal:

Develop and evaluate models for accurate predictions.

Objectives:

- Integrate various data sources.
- Implement machine learning models.
- Evaluate model performance.

Methods and metrics

Data Sources:

- GTFS schedules
- GPS data
- Traffic & weather data

Models:

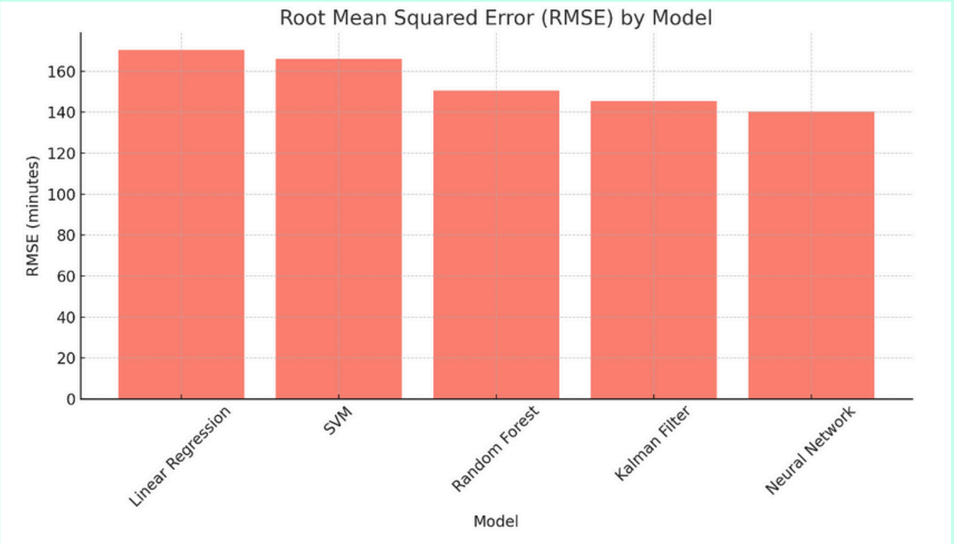
- Linear Regression
- SVM
- Random Forest
- Kalman Filter

Evaluation Metrics

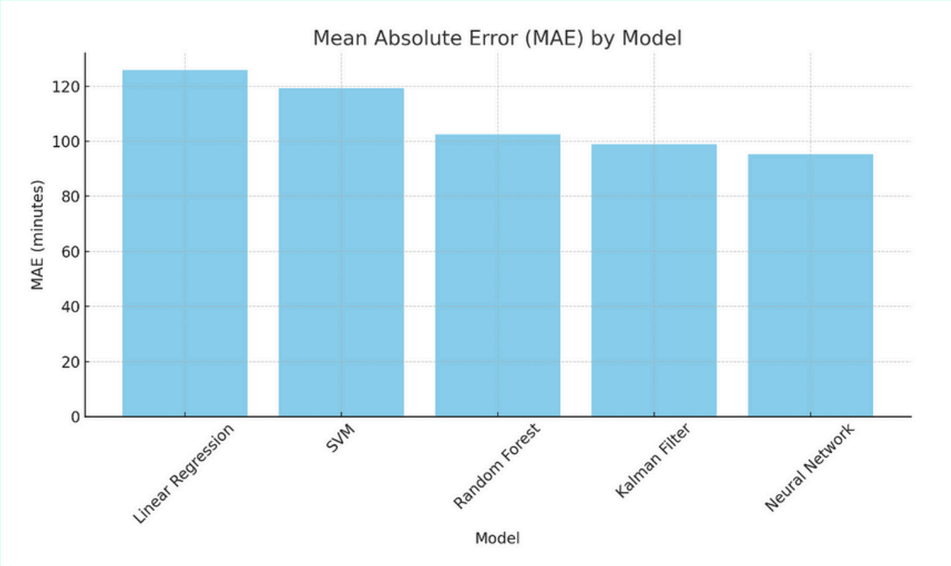
- Mean Absolute Error (MAE): Measures average prediction error.
- Root Mean Squared Error (RMSE): Penalizes larger errors.

Results

- Neural Network achieved the lowest error.
- Kalman Filter improved sequential estimations.
- Random Forest captured non-linear patterns effectively.



RMSE by Model



MAE by Model

Discussion and Conclusion

- Neural Networks provide the most accurate predictions.
- Kalman Filtering improves real-time accuracy.
- Future work:
  - Hyperparameter tuning
  - Real-time deployment
  - Weather and traffic data integration

References

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Thanks for your attention!