

Weekly Progress Report

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Domain: **Data Science and Machine Learning**

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I. Weekly Activities & Progress

This week, I focused on moving from simple forecasting models to more advanced machine learning approaches, and deepened my theoretical understanding:

1. Machine learning study:

- Started referring to a machine learning book to learn about supervised learning, regression, and time series forecasting methods.
- Read about how ML models like Random Forest and Gradient Boosting can handle tabular time series data.

2. Continued data exploration:

- Continued refining forecasting models built in previous weeks.
- Tried adding new features (e.g., moving averages, traffic lag variables) to improve prediction accuracy.
- Tested ML-based regressors as an alternative to classical time series models.

3. Result Tracking :

- Began comparing model outputs using error metrics (like MAE and RMSE).
- Saved baseline vs. ML model results for later presentation.

II. Milestones Achieved

1. Completed first version of ML-based forecasting model.
2. Added more engineered features to the dataset.
3. Collected error metrics to evaluate and compare models.
4. Continued connecting machine learning theory with real data.

III. Challenges & Hurdles

- Choosing which features truly help the model vs. adding noise.
- Handling traffic spikes during holidays and weekends that ML models may not learn well..
- Tuning hyperparameters without overfitting to historical data.

IV. Lessons Learned

- Learned how adding historical lag features can improve forecasting.
- Realized model performance depends heavily on data quality and feature design.
- Understood trade-offs between classical time series methods and machine learning

V. Next Week's Goals:

- Finish comparing ML models vs. time series baselines in detail.
- Select the most reliable model for final report.
- Prepare initial visualizations and explanation slides for project summary.

VI. Additional Comments:

Nothing extra this week — focused mainly on trying ML models and reading about machine learning concepts.