

Weekly Progress Report

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Domain: **Data Science and Machine Learning**

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Week Ending: 01

I. Overview:

This week, the primary focus was on understanding the **Forecasting Smart City Traffic Patterns** project, exploring the provided datasets, and performing initial data analysis using Python. Additionally, efforts were made to enhance skills in data preprocessing and visualization to prepare for upcoming modeling tasks.

II. Achievements:

1. Project Familiarization:

- Explored project documentation and requirements.
- Understood the goal: forecasting traffic patterns at four city junctions to help government traffic planning.

2. Dataset Exploration:

- Loaded two CSV files (file1.csv and file2.csv) into Python.
- Converted DateTime columns to datetime objects for analysis.
- Inspected data types, sample rows, and checked for missing values.

3. Initial Data Analysis & Feature Engineering:

- Visualized traffic volume trends by junction over time.
- Added time-based features: day of week, month, hour, for deeper analysis.

III. Challenges:

1. Understanding Dataset Differences:

- Clarifying the purpose of each file and how they relate.

- Deciding which file to use for forecasting.

2. Handling Missing or Inconsistent Data:

- Some DateTime entries missing or irregular.
- Need to clean or interpolate data in later weeks.

IV. Learning Resources:

1. Python Libraries:

- Practiced using pandas, matplotlib, seaborn for data loading and visualization.

2. External Learning:

- Followed online tutorials and documentation to better understand time series analysis and feature engineering.

V. Next Week's Goals:

1. Deeper Data Analysis:

- Perform advanced exploratory data analysis.
- Identify holiday effects and special days impacting traffic.

2. Modeling Preparation:

- Research suitable time series models (ARIMA, Prophet, LSTM).
- Prepare dataset for model training (train/test split, normalization).

VI. Additional Comments:

Successfully completed initial setup and data understanding. Excited to explore forecasting models in coming weeks and contribute to creating actionable insights for smart city traffic management.