

DATA 534: Project Notebook

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My teammates and I collaboratively analyzed the project problem statement to clearly define the overall objective of the study. Based on this analysis, tasks were systematically delegated among team members to identify suitable existing APIs and technologies required for the successful implementation of the project.

Based on the evaluation of available data sources, the following APIs were selected for use in the project:

- Open-Meteo API – for retrieving historical and forecasted weather time-series data
- FRED API – for accessing economic indicators and macroeconomic time-series data
- GDELT API – for obtaining global event and news-based time-series data

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I developed four modular functions to retrieve time-series data from three different external APIs. These functions handle data extraction, basic preprocessing, and alignment of temporal indices. The processed outputs are then merged into a single, consolidated dataframe to enable integrated time-series analysis. Each function is responsible for retrieving or aggregating time-series data from a specific source, enabling a clean and reusable pipeline. The implemented functions include:

`get_daily_weather()` for daily weather time-series retrieval

`get_daily_economic_data()` for economic indicator data

`gdelt_timeline_daily()` for event-based and news-related timelines

`get_macroeconomic_data()` for combining multiple macroeconomic indicators

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- The `get_macroeconomic_data()` function was enhanced with comprehensive error handling to address potential API-related issues, including failed requests, empty responses, and missing data. This improvement ensures greater reliability and stability of the data retrieval pipeline.
- I created a dedicated folder structure to support unit testing, enabling systematic validation of individual functions and improving the maintainability and reliability of the codebase.
- I developed structured documentation in the form of a README and a vignette (`Vignette.Rmd`) to explain the project workflow, data sources, and function usage, ensuring clarity and reproducibility.

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- I deployed the final package to CRAN after ensuring it met all required checks, documentation standards, and submission guidelines, enabling public access and reproducibility.