Project Documentation

API-Integration

This project aims to integrate the AlphaVantage API with a SQLite database to retrieve and store daily stock market data for analysis and visualization.

Files Overview

1. config.py

- **Purpose:** Extracts information from the **.env** file to use the AlphaVantage API key and other settings in the application.

- **Components:**

  - **return_full_path(filename: str = ".env") -> str**: Returns the full path of the **.env** file using the **os** library.

  - **class Settings(BaseSettings)**: Defines project settings using **pydantic**.

    - **alpha_api_key: str**: API key for AlphaVantage.

    - **db_name: str**: Name of the SQLite database.

    - **model_directory: str**: Directory to store model files.

  - **settings**: Instance of **Settings** class that imports settings from the **.env** file.

2. data.py

- **Purpose:** Contains code to interact with the AlphaVantage API and the SQLite database.

- **Components:**

    - **class AlphaVantageAPI**: Class to interact with the AlphaVantage API.

        - **__init__(self, api_key=settings.alpha_api_key)**: Constructor to initialize the API key.

        - **get_daily(self, ticker, output_size="full", data_type="json")**: Method to retrieve daily time series data for a given ticker symbol.

    - **class SQLRepository**: Class to interact with the SQLite database.

        - **__init__(self, connection)**: Constructor to initialize the database connection.

        - **insert_table(self, table_name, records, if_exists="fail")**: Method to insert DataFrame into SQLite database as a table.

        - **read_table(self, table_name, limit=None)**: Method to read a table from the database.

3. Project.ipynb

Overview

This Jupyter Notebook serves as the main working document for the API integration project. It integrates the functionalities of the **config.py** and **data.py** files to interact with the AlphaVantage API and SQLite database, respectively. The notebook includes sections for importing necessary libraries, setting up the database connection, retrieving data from the API, storing data in the database, and analyzing the data.

Sections

1. Import Libraries

- **Purpose:** Import necessary libraries for the project, including **pandas**, **requests**, and **sqlite3**.

2. Set up Database Connection

- **Purpose:** Use the settings from **config.py** to establish a connection to the SQLite database.

3. Retrieve Data from AlphaVantage API

- **Purpose:** Use the **AlphaVantageAPI** class from **data.py** to retrieve daily stock market data for a specified ticker symbol.

- **Components:**

    - **api_key**: API key for the AlphaVantage API, retrieved from **config.py**.

    - **ticker**: Ticker symbol for the stock (e.g., "AAPL" for Apple Inc.).

    - **output_size**: Size of the data to retrieve ("compact" or "full").

    - **data_type**: Format of the data ("json" or "csv").

4. Store Data in SQLite Database

- **Purpose:** Use the **SQLRepository** class from **data.py** to insert the retrieved data into the SQLite database.

- **Components:**

  - **table_name**: Name of the table in the database to insert the data into.

  - **records**: DataFrame containing the stock market data.

  - **if_exists**: Behavior if the table already exists ("fail", "replace", or "append").

5. Analyze Data

- **Purpose:** Perform basic analysis on the retrieved data, such as calculating daily returns and plotting stock price trends.

- **Components:**

  - Calculate daily returns using the **pct_change()** method.

  - Plot stock price trends using **matplotlib** or other plotting libraries.

6. Conclusion

- **Purpose:** Summarize the findings of the data analysis and provide insights for further analysis or action.

Integration

- The notebook integrates the functionalities of **config.py** and **data.py** by importing them as modules and using their classes and methods.

- Settings from **config.py** are used to configure the API key and database connection.

- Data retrieval and storage are handled by the **AlphaVantageAPI** and **SQLRepository** classes, respectively.

Conclusion

This Jupyter Notebook provides a complete workflow for integrating the AlphaVantage API with a SQLite database for stock market data analysis. It demonstrates the integration of different components of the project and provides a foundation for further development and analysis.