

Integration of Trade Tariff Reporting with UN Comtrade API for Model.Earth

Objective:

Identifying and demonstrating an open-source solution to:

1. Include reporting on changing trade tariffs.
2. Fetch data related to consumer products, prices, and tariff rates by country.
3. Allow the assembly of a basket of goods using industry sector or commodity codes.
4. Ensure the solution integrates with Model.Earth workflows.

Summary of Work Completed:

I identified and demonstrated solutions to achieve the objectives using the **UN Comtrade API**:

1. **Selected API:** UN Comtrade API (Public Version).
2. **Key Features Implemented:**
 - ⇒ Fetching trade and tariff data by country, partner, year, and product using Harmonized System (HS) Codes.
 - ⇒ Processing and aggregating data for insights.
 - ⇒ Visualizing trade flows, tariff impacts, and trends.
 - ⇒ Supporting integration with Model.Earth by providing reproducible and clear outputs.

Key Steps Undertaken:

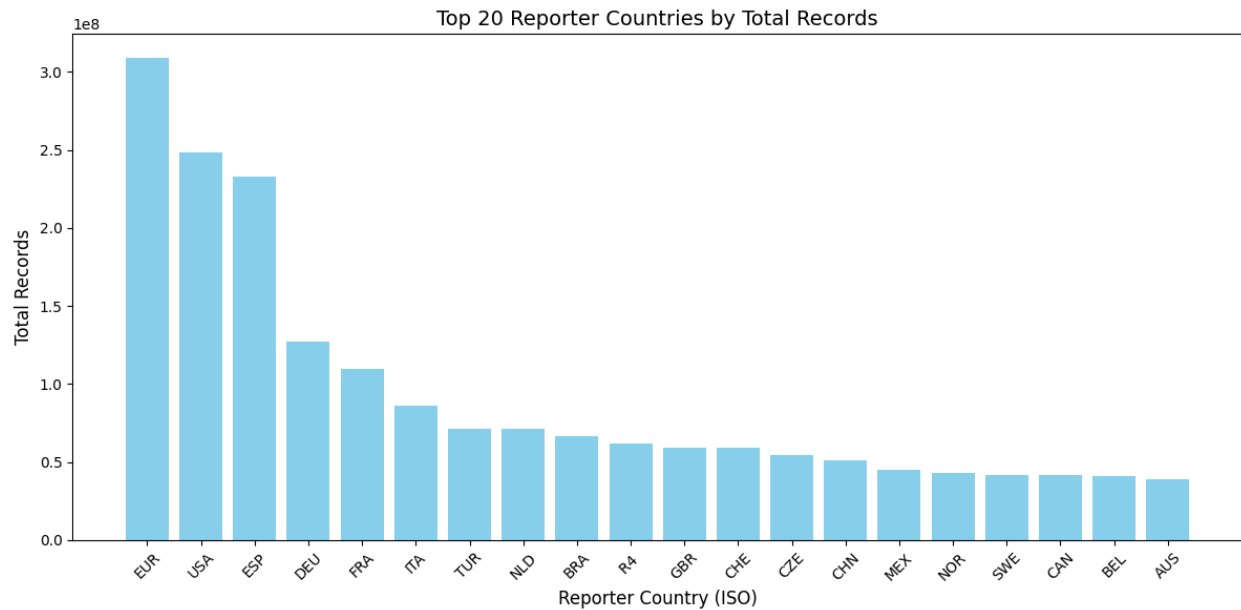
1. **Explored Open-Source Options:**
 - ⇒ Evaluated UN Comtrade API and WITS API.
 - ⇒ Selected UN Comtrade due to its extensive trade and tariff data, including support for HS codes and flexible API queries.
2. **Implemented Data Retrieval:**
 - ⇒ Developed Python Jupyter Notebook to query the UN Comtrade Public API.
 - ⇒ Sample query parameters include:
 - a. **Reporter:** USA (or any other country ISO code).
 - b. **Partner:** World, or specific trading partners (e.g., China).
 - c. **Year:** Historical data from 2000 onwards.
 - d. **Product:** Specific HS codes or all products.
3. **Processed and Cleaned Data:**
 - ⇒ Removed unnecessary columns like metadata flags.
 - ⇒ Transformed period into a datetime format for easier time-series analysis.
 - ⇒ Aggregated total records by reporter country, partner, and period.
4. **Generated Visualizations:**
 - ⇒ **Bar Plot:** Top countries by total trade records.
 - ⇒ **Line Chart:** Trade trends over time.
 - ⇒ **Heatmap:** Relationships between countries and time periods.

5. Exported Processed Data:

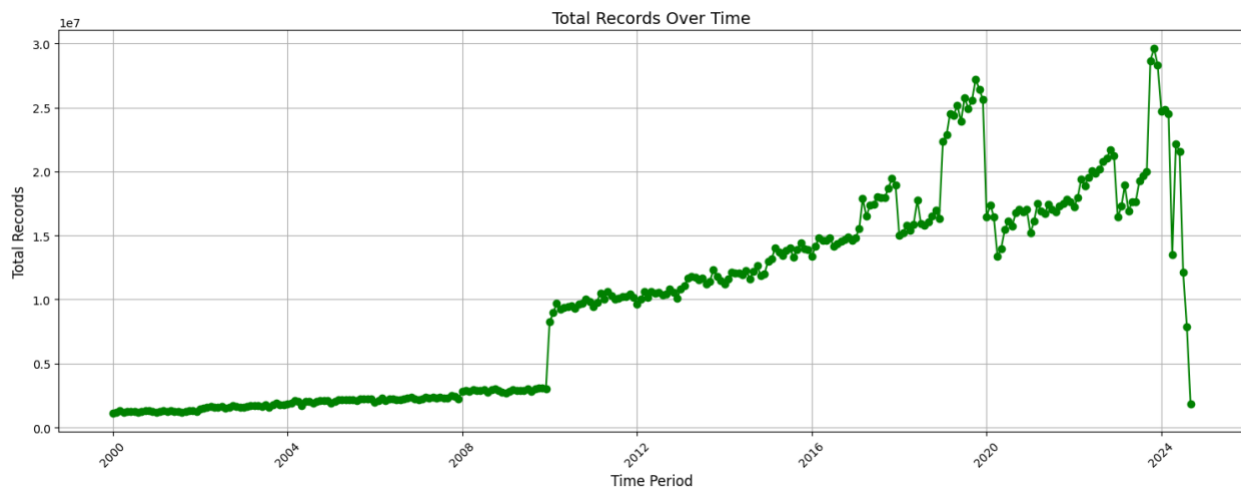
- ⇒ Provided clean and ready-to-use datasets in CSV format.
- ⇒ Output files are suitable for further analysis or integration into Model.Earth.

Demonstration Outputs:

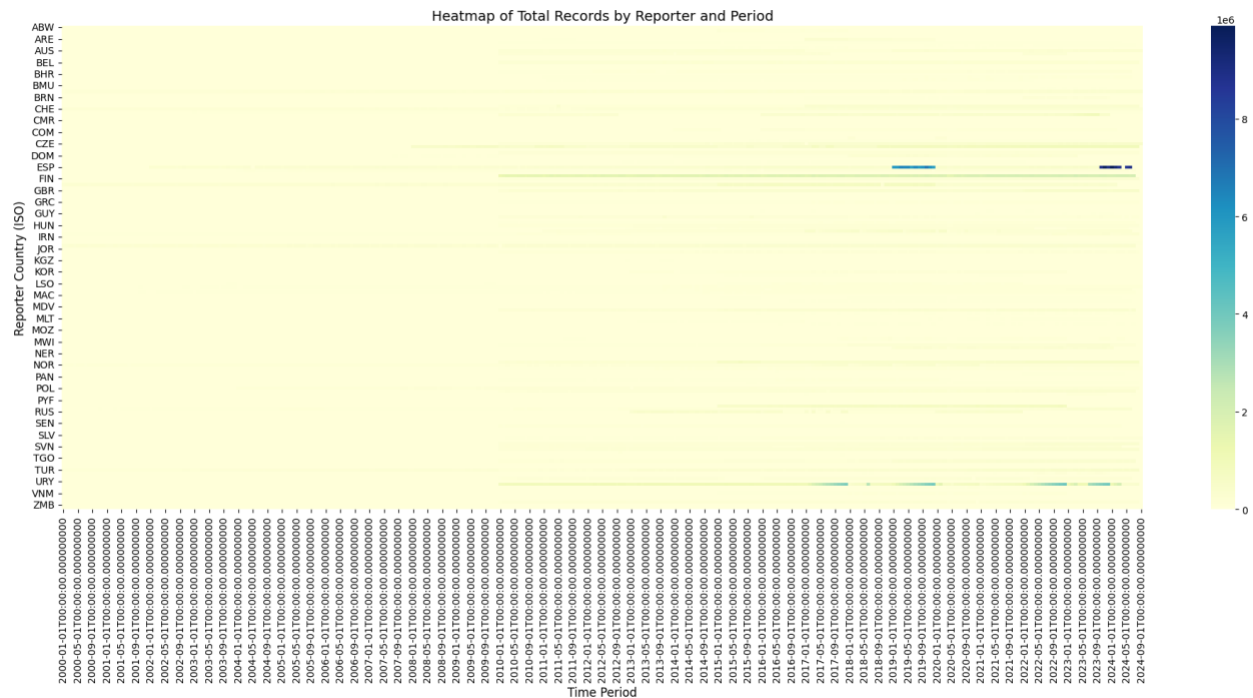
1. Bar Chart: Shows the top 20 countries by total trade records.



2. Line Chart: Displays total trade records over time, highlighting trends.



3. Heatmap: Illustrates trade flows between countries and periods.



Next Steps:

1. **Feedback Integration:** Incorporate feedback from the Model.Earth team on the deliverables.
2. **Further Customization:** Add more advanced visualizations if required (e.g., product-specific trends).
3. **Deployment:** Prepare the scripts and notebooks for cloud deployment or API integration.

Conclusion:

1. The UN Comtrade API provides robust trade and tariff data.
2. The delivered scripts, data, and visualizations enable Model.Earth participants to analyze trade patterns and tariffs effectively.
3. The solution is reproducible, adaptable, and ready for further integration into Model.Earth workflows.

Attachments:

1. Jupyter Notebook (`modelEarth.ipynb`).
2. Processed dataset (`processed_trade_data.csv`).