
Toronto Weather, Pedestrians, Vehicles, and Ai Quality Web Maps
Amr Shalaby

Air and Traffic Data ETL Design Data Sources

1. Canada Environment Air Quality and Weather Data

1: Best to **11: Worst** from **February 1, 2023 – Today**

2. City of Toronto Open Data Portal

Traffic Volume January 18 , 1984 – December 19, 2023

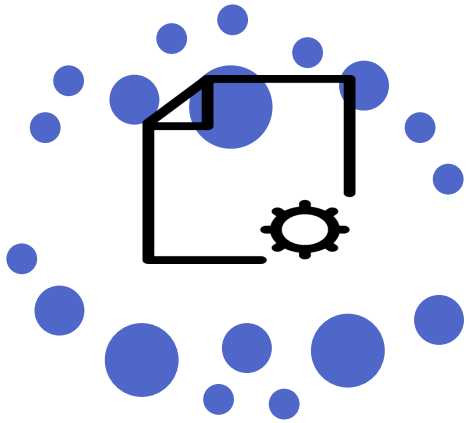
3. ArcGIS Data Portal

Pedestrians and **Vehicles Counts Dec 1, 2003 – September 7, 2016**

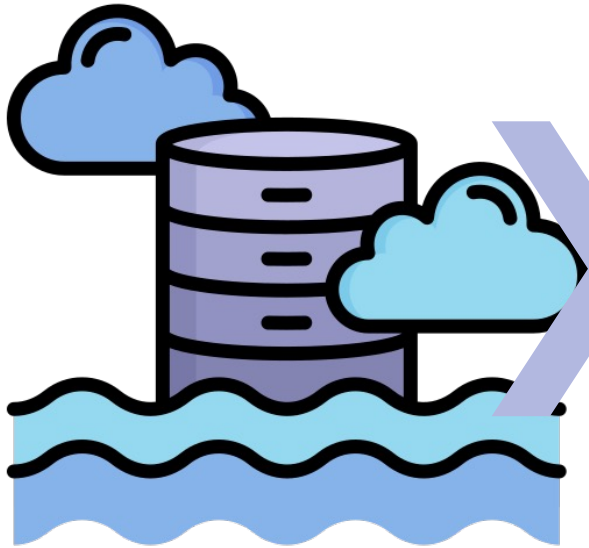
4. Canada Natural Resources

Geo Stations Meta Data from **Jan 1, 1850 – March 5, 2024**

Air and Traffic Data ETL Design Code Structure



Configuration Object



Data Frames Object

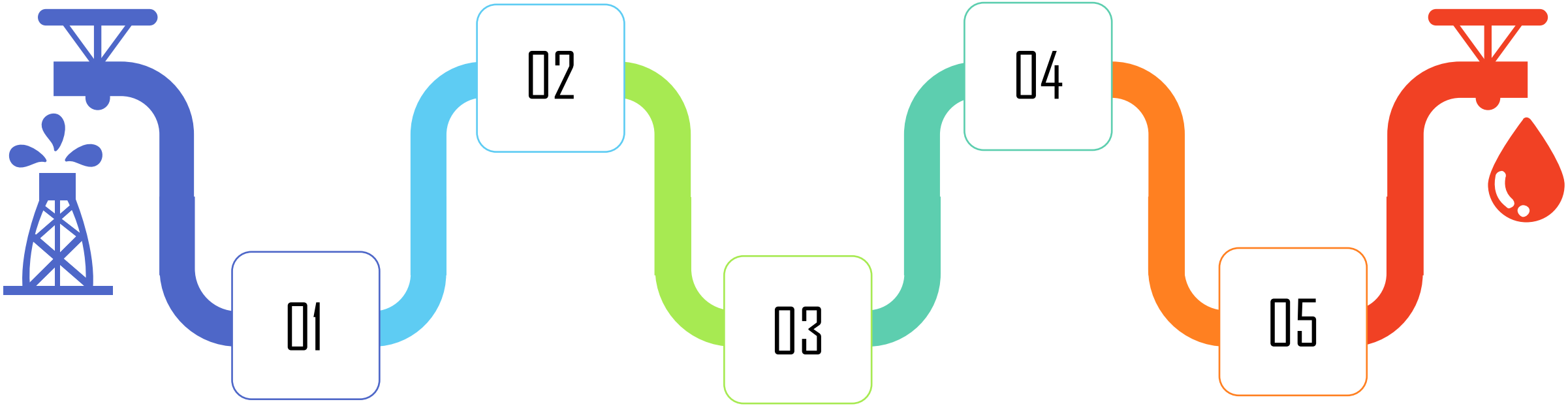
Config.ini

Data Ingestion

User Requirements
DB Credentials, Auto ML Duration, Forecast Horizon

Extremely Efficient (DB Connections Bypassed)

Air and Traffic Data ETL Design Air and Traffic Data Pipeline



01

Extraction

Web Scraping Data and Saving to **Stage** Schema

02

Transform

Air Data Transposed From Column to Rows in **Stage** Schema

03

Load

3:1 Duplicates-to-Unique Records Eliminated and Stored in **Public** Schema

04

WGS 26917

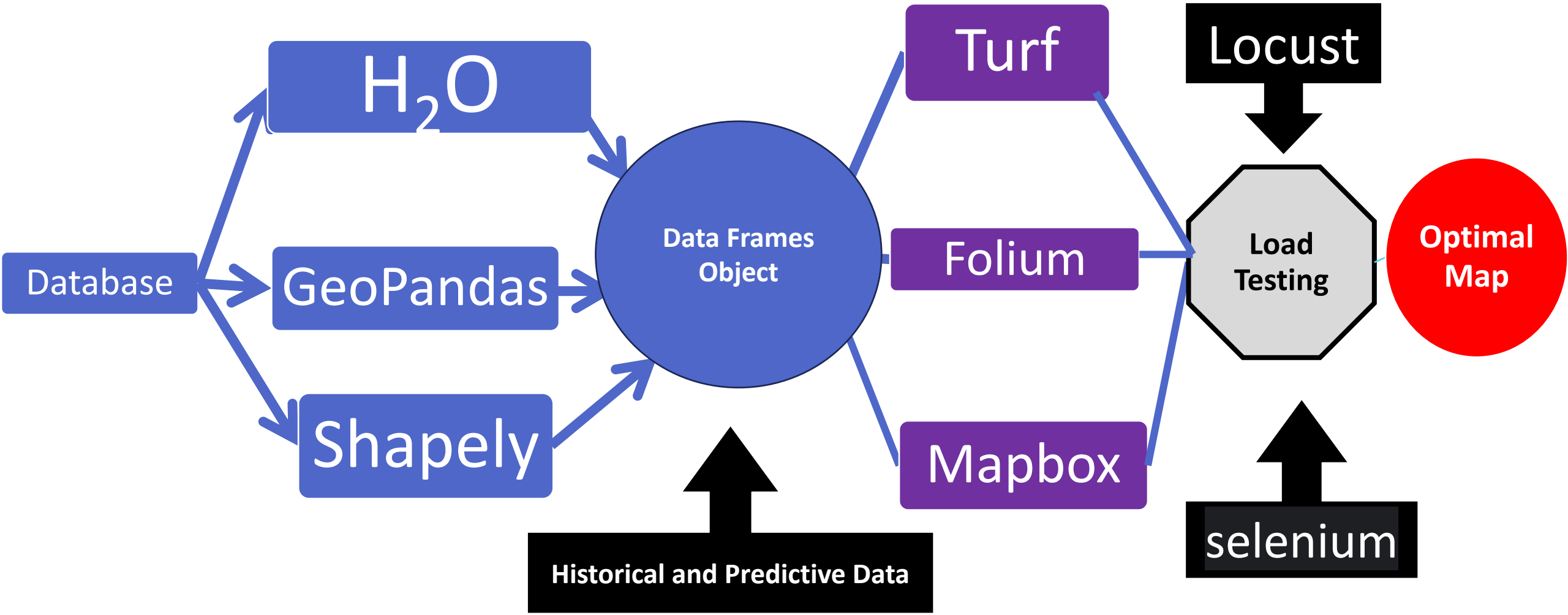
Tables are Projected to WGS:26917 in Production **Public** Schema

05

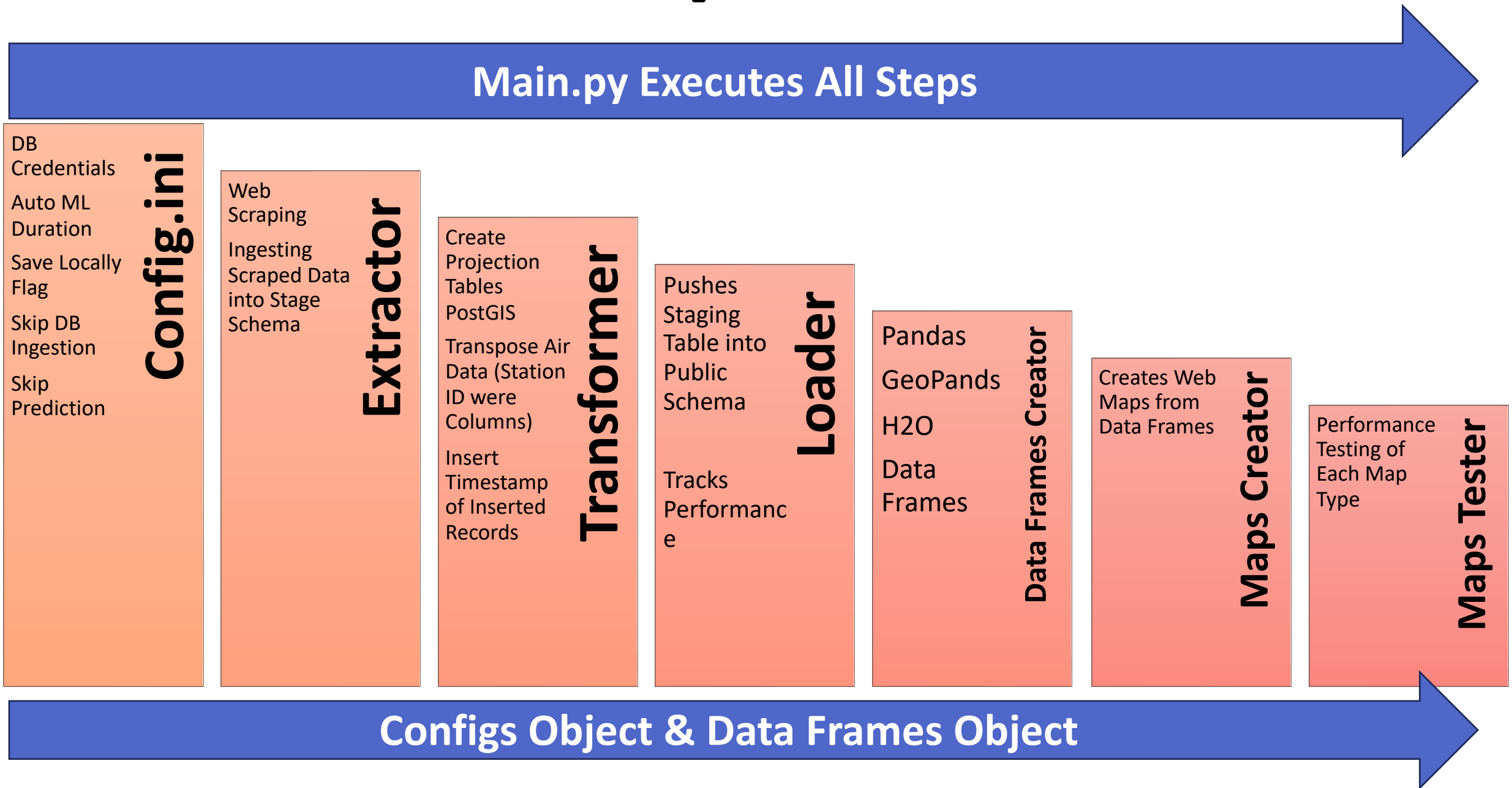
Aggregation

Weekly, Daily, and Lifetime Calculated Avg in **Public** Schema

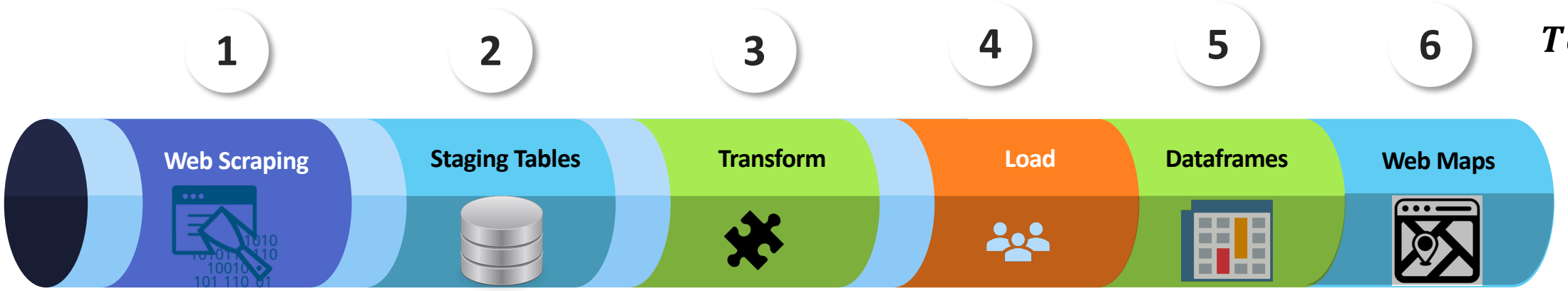
Air and Traffic Data ETL Design Auto ML Layer and Load Testing



Air and Traffic Data ETL Design Execution Phases



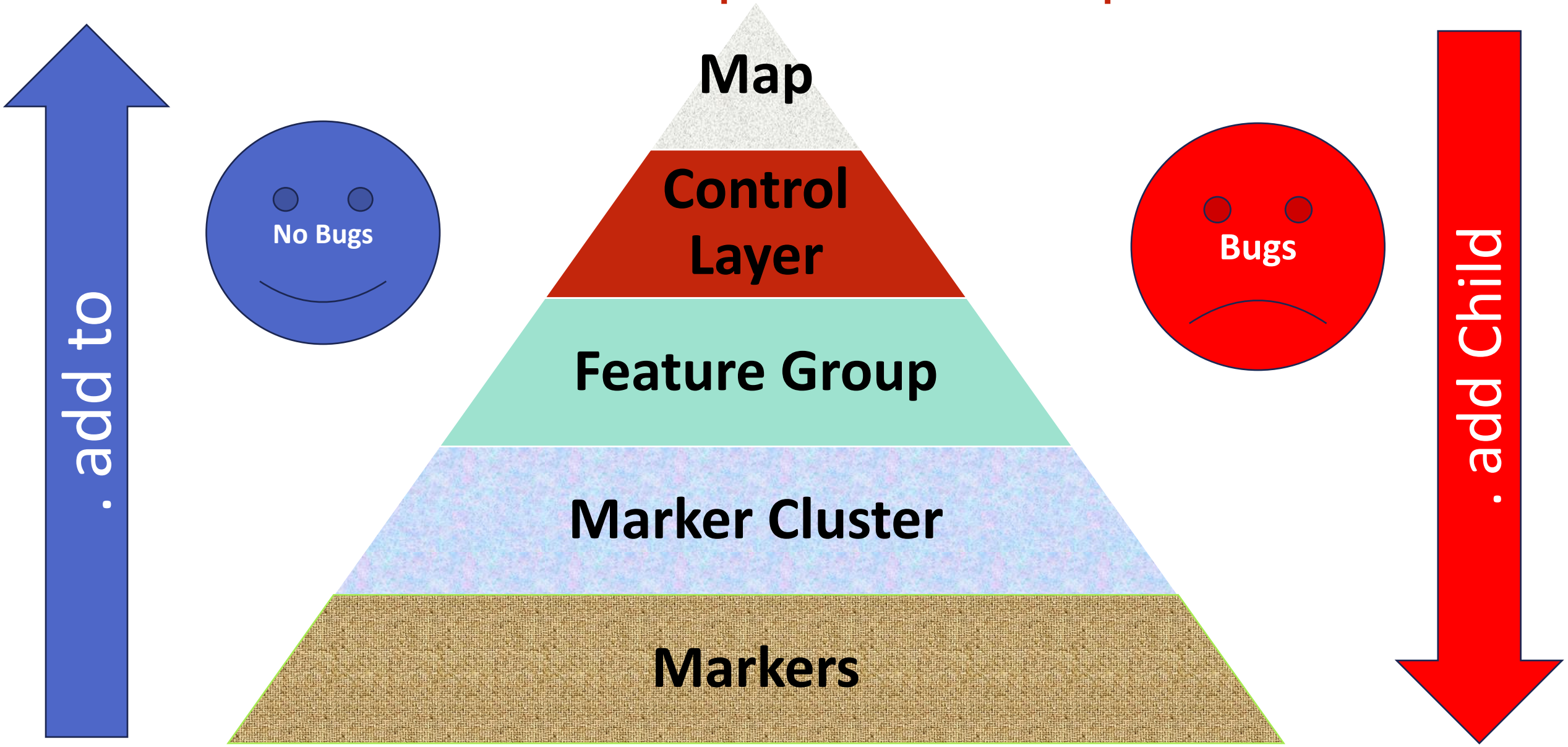
Air and Traffic Data ETL Design Pipeline Execution Time



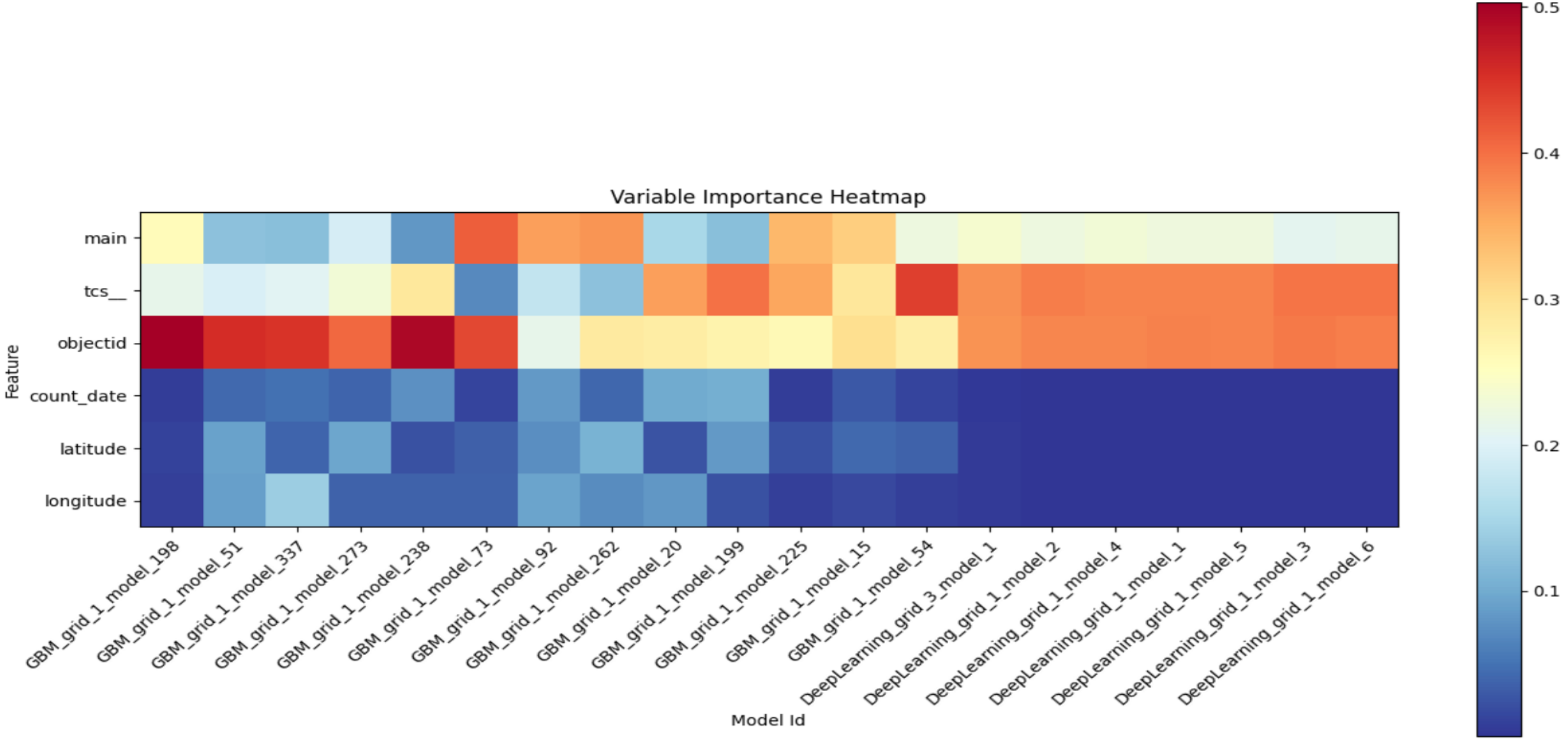
$$Total\ Runtime = \sum steps =$$

279.1 Seconds	64 Seconds	1.9 Seconds	55 Seconds	7.1 Seconds	3.8 Seconds	411 Seconds
68%	16%	0.48%	13.4%	1.7%	0.9%	

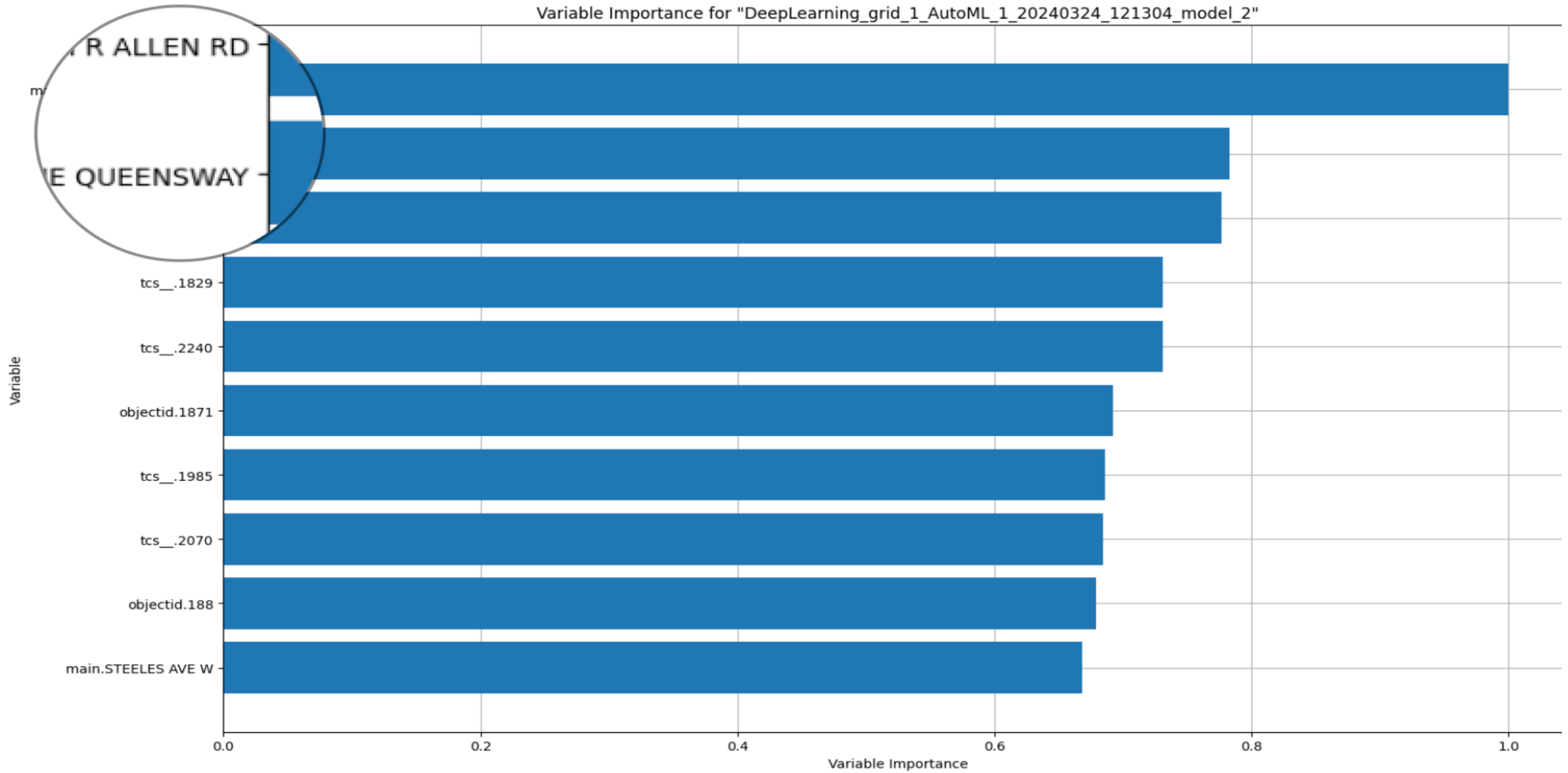
Air and Traffic Data ETL Design Maps Efficient Implementation



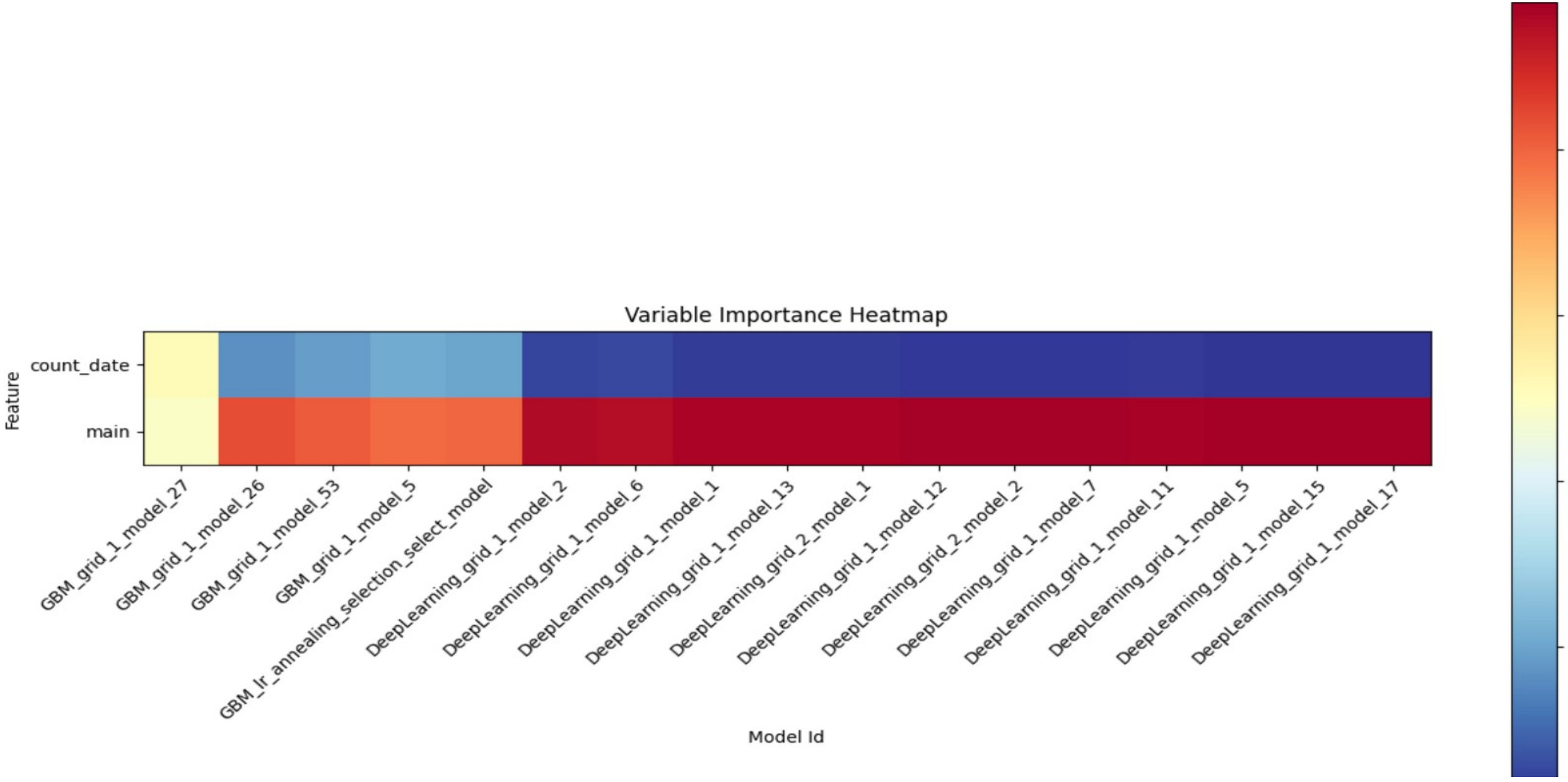
Air and Traffic: H_2O Traffic More **Spatial** Less **Temporal**



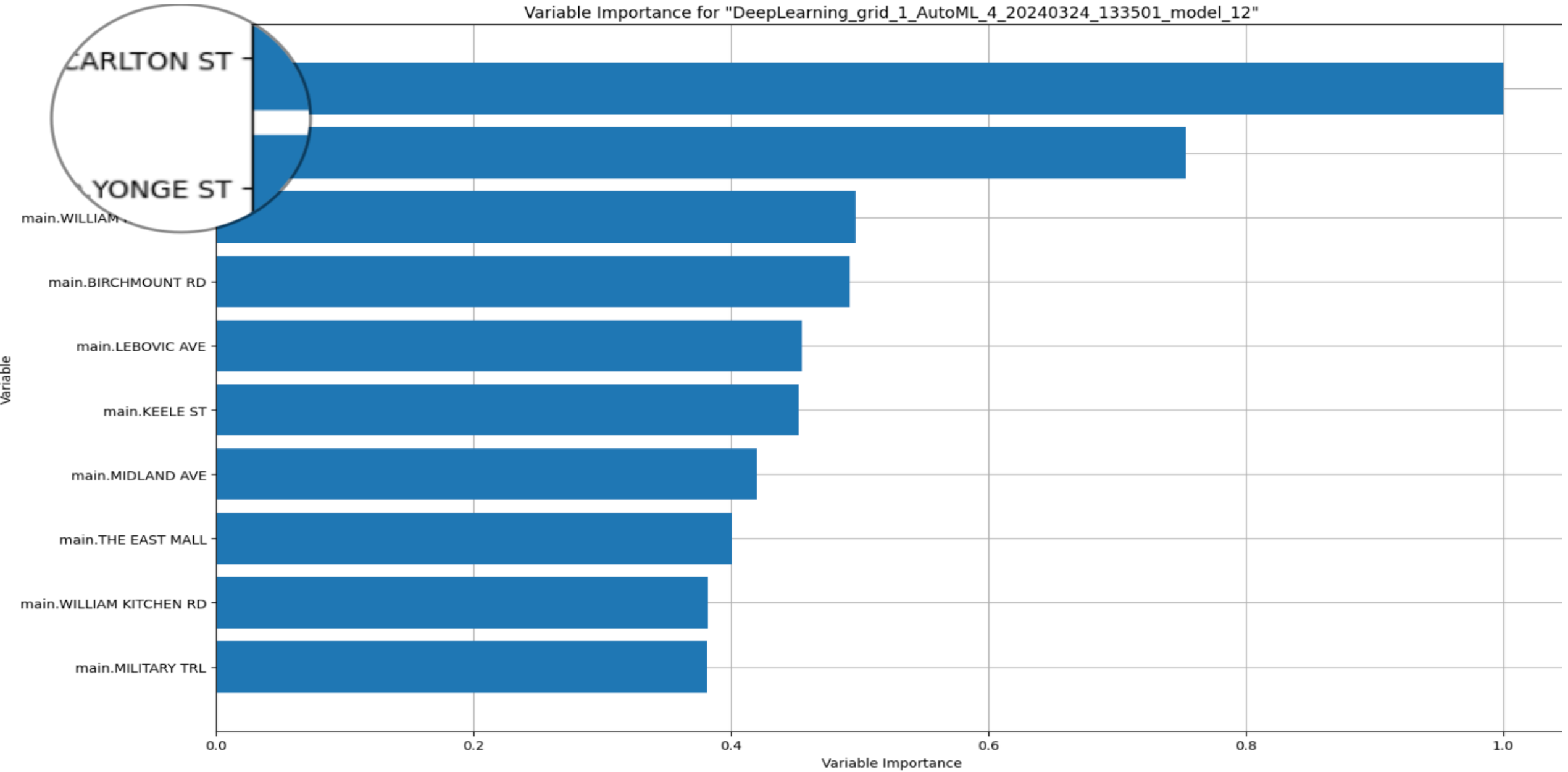
Where is: H_2O Traffic More Spatial Less Temporal



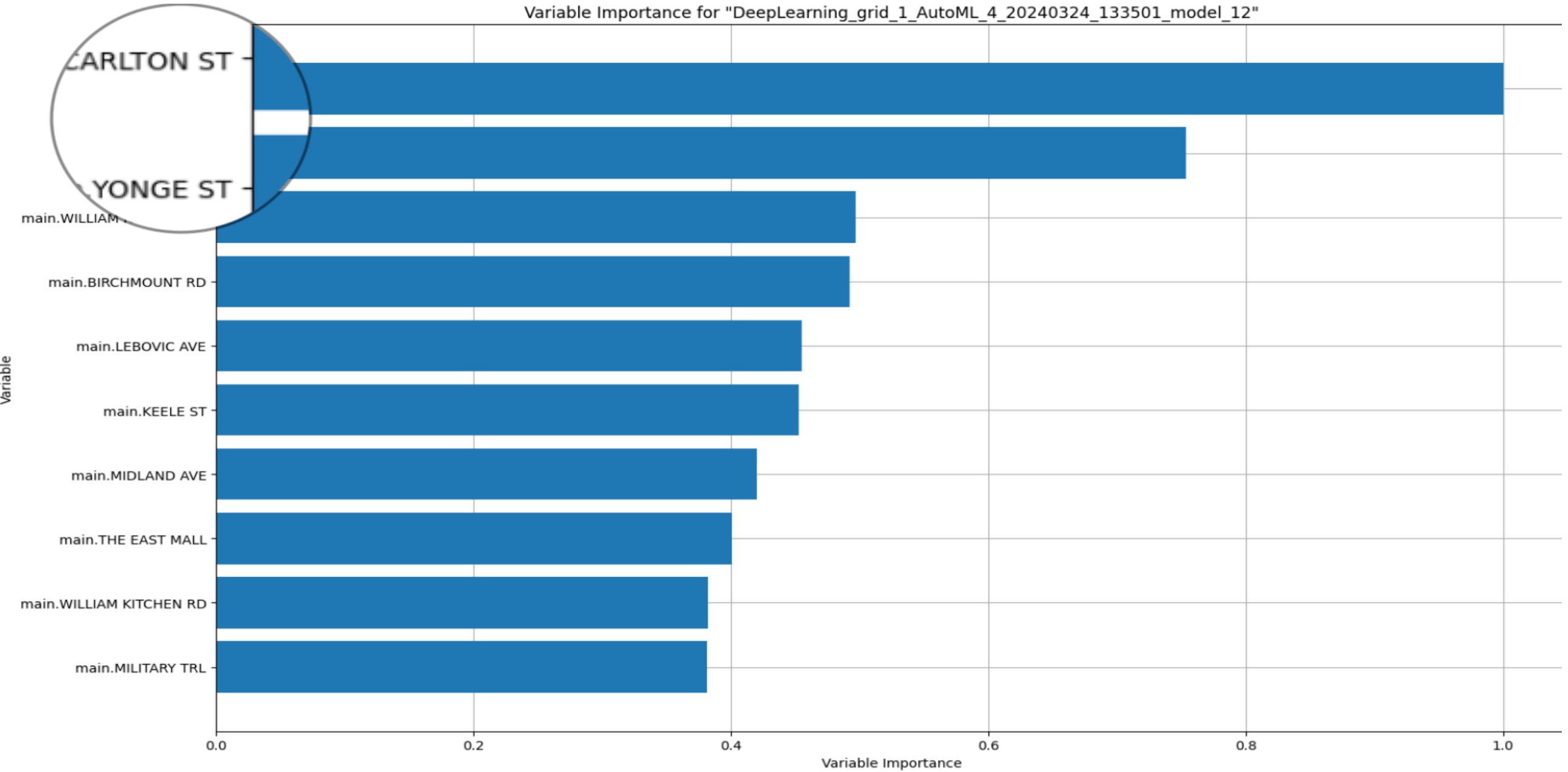
Air and Traffic : H_2O Pedestrains More Spatial Less Temporal



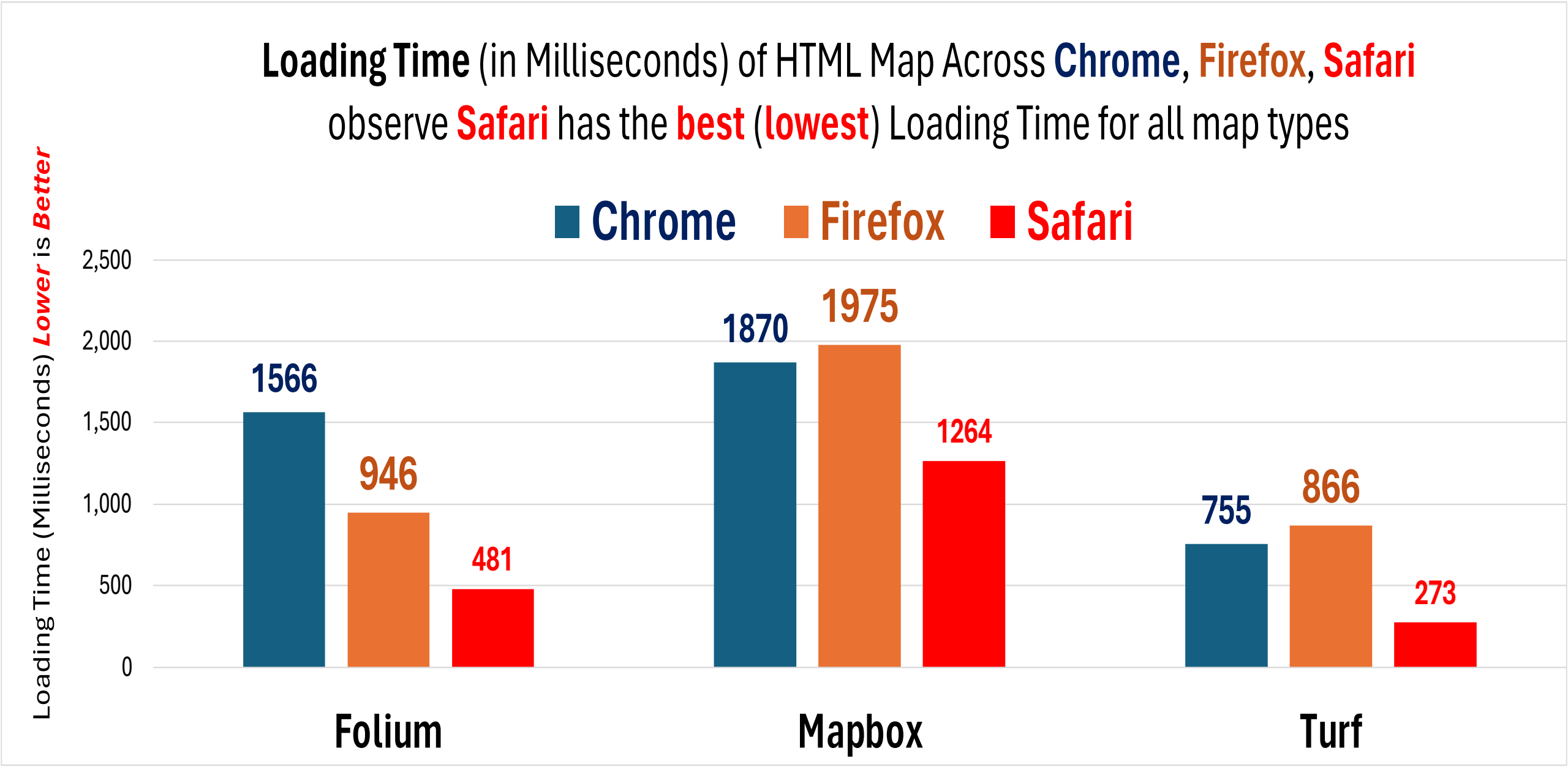
Where is: H_2O Pedestrains More Spatial Less Temporal



Where is: H_2O Pedestrains More Spatial Less Temporal



Air and Traffic: Optimal Maps (Loading Time)



Finally: The Map

https://amr-y-shalaby.github.io/ggr_472_project/

https://github.com/amr-y-shalaby/ggr_472_project