The new traffic landscape: Modern traffic data to manage uncertainty

07 December 2021

Intelematics
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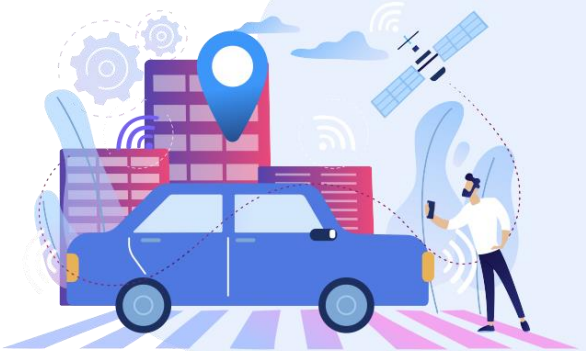
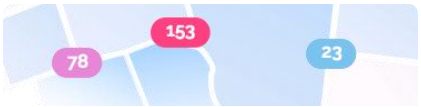
Intelematics

Australia's leading provider of real-time traffic information who through innovation and collaboration has kept people, assets, and vehicles moving for more than 20 years.



Speed

High-quality, high-resolution, historical traffic speed and congestion information, in both directions, by suburb

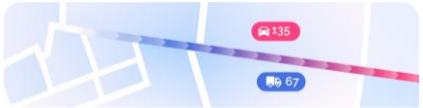


Volume

Traffic count/queues in both directions and at all arms of an intersection, including turning points

Origin & Destination

A bird's eye view of where traffic has come from and where it's going across the transport network



Vehicle class

Traffic distribution by vehicle type; heavy and light

Coming 2022

Case Study

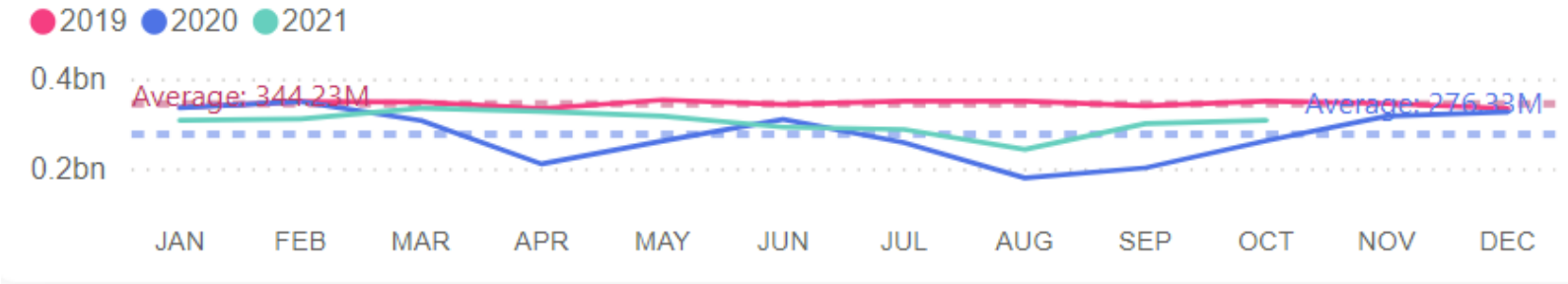
Melbourne Traffic before and after Lockdown 6.0

Melbourne Lockdown 6.0

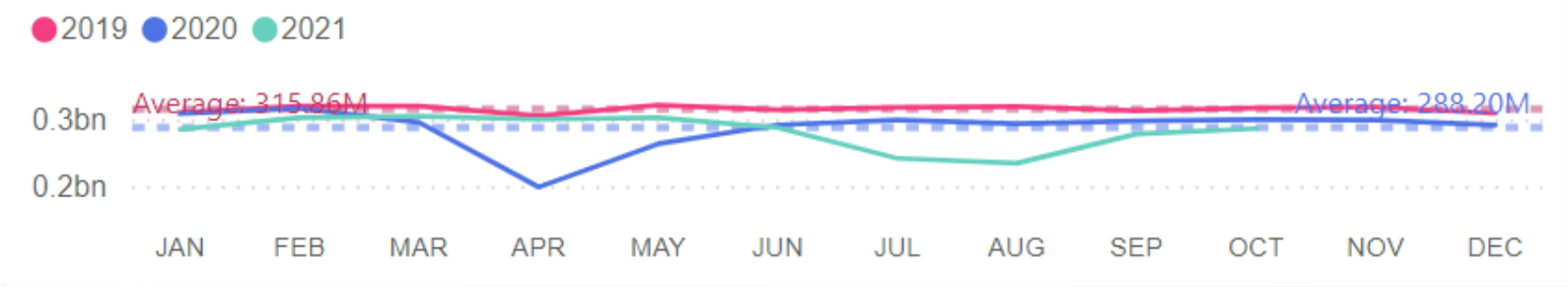
	Comparing the lockdown period (5 Aug – 29 Oct, 2021, 9am to 5pm) to the first weekend out of lockdown (30 – 31 Oct 2021, 9am to 5pm)
Melbourne metro overall	Sat: 20% increase, Sun: 17% increase
Melbourne CBD	Sat: 26% increase, Sun: 19% increase
Princes Fwy, Southwest Bound, Point Cook	Sat: 33% increase, Sun: 30% increase
West Gate Fwy, West Bound, Spotswood	Sat: 24% increase, Sun: 39% increase
Nepean Hwy, Southeast Bound, Moorabbin	Sat: 21% increase, Sun: 20% increase
Hume Fwy, Northwest Bound, Epping	Sat: 23% increase, Sun: 20% increase

Lockdown vs. Coming Out of Lockdown

Vic Overall Daily Volume



NSW Overall Daily Volume



The scale

We cover **680,000 kilometers of roads**, going to the Moon and back, updated every 15min

We ingest **600 million IOT data points** per day

Our total data footprint of almost **2 trillion data points**

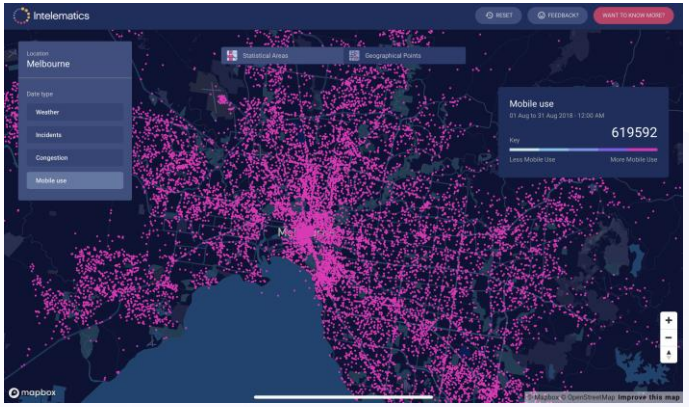
We make available in INSIGHT **13 billion rows of data** per year

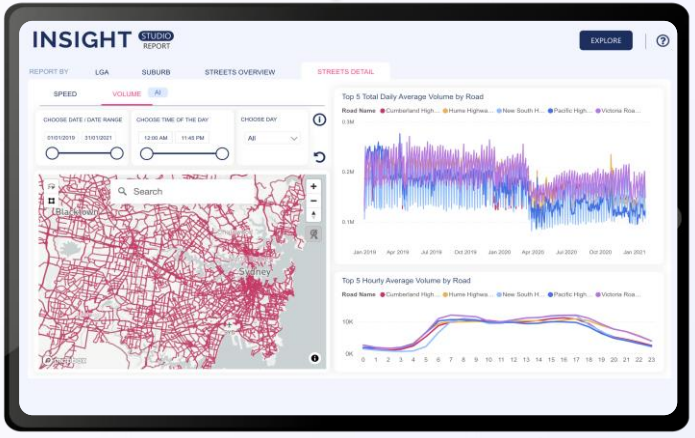
Our total data size for INSIGHT is **500GB**

Data Methodologies

- Small coverage and high frequency = Noise
- Multiple schemas and features = Disparate
- Really large volume = Inaccessible

80% of the effort is on data preparation





Volume Model Development

Overview

Technical Motivation

- Inductive loops data is not available on all roads
- Inductive loops are prone to outages (networking and infrastructure)

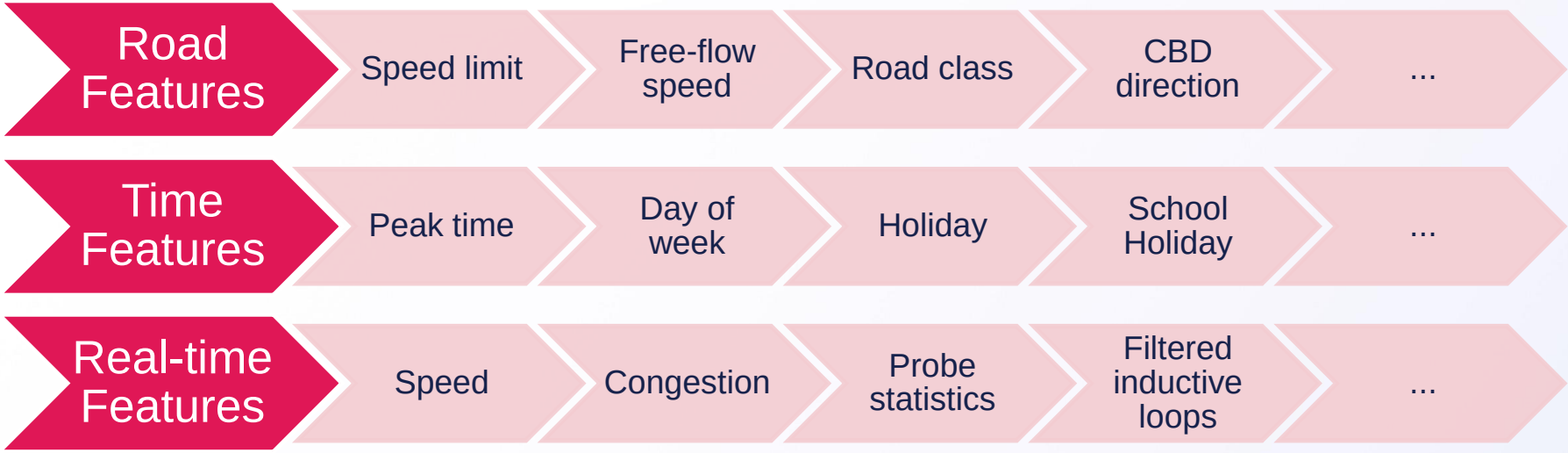
Methodology

- Separate geographical projection and timeseries forecast
- Gradient-boosted trees (xgboost)
- Additional validation

Data

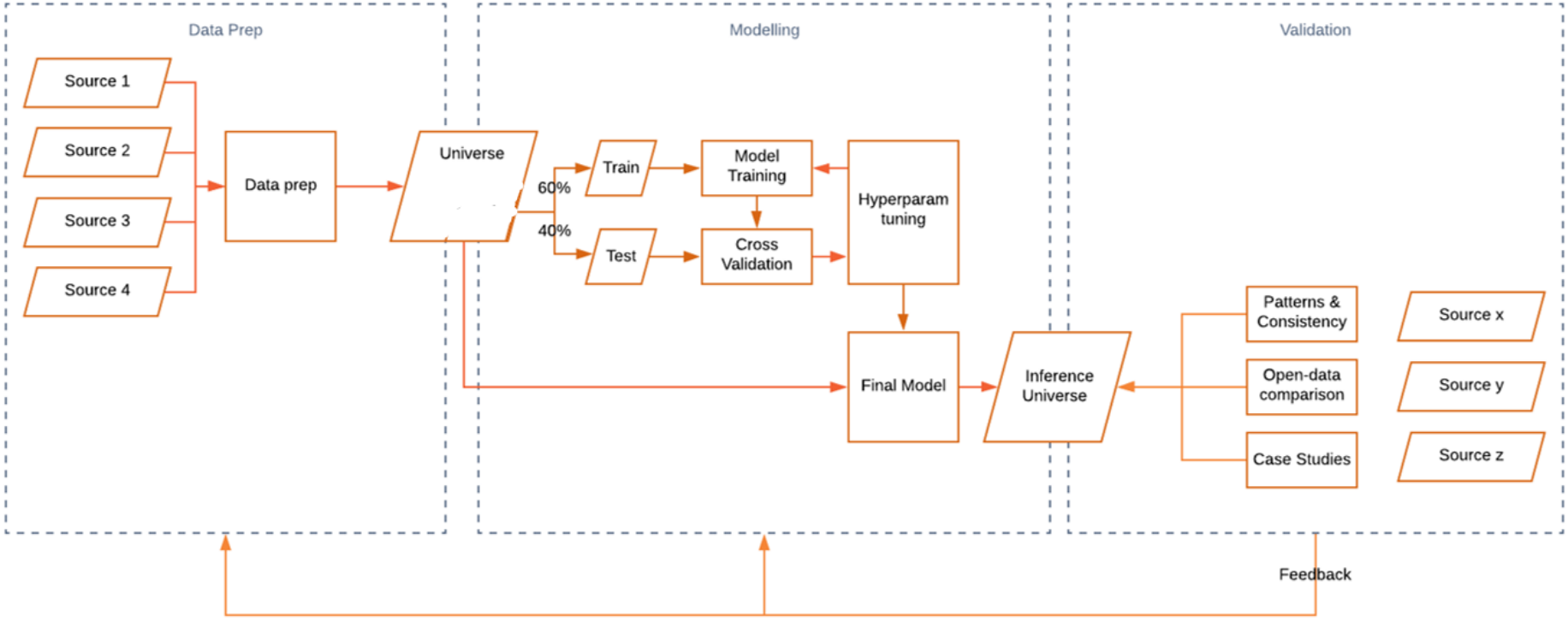
- Road link properties
- High granularity speed
- Vehicle probes (private + commercial)

Model Features



Volume Model Development

Workflow



Volume Model Development

Validation Methodology

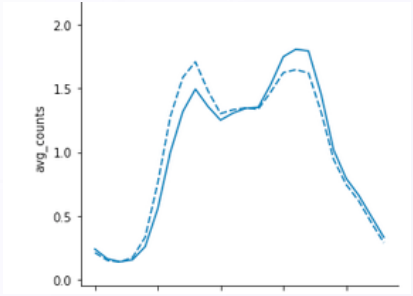
- We need to find out how close our predictions are to reality.
- We got some open some sources that we can compare against (Toll way data, gov open data, cameras, tube data)
- We need to capture insights of typical volume patterns in time (Daily, weekly, monthly, yearly).
- Data should also be consistent against itself.

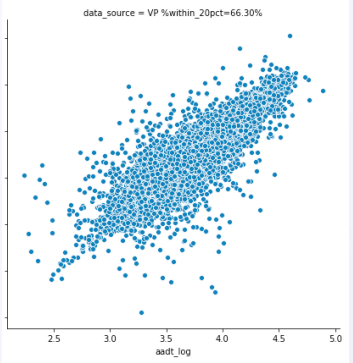
Open Data Sources

NSW Government Transport for NSW

vicroads

NSW Toll Road Data





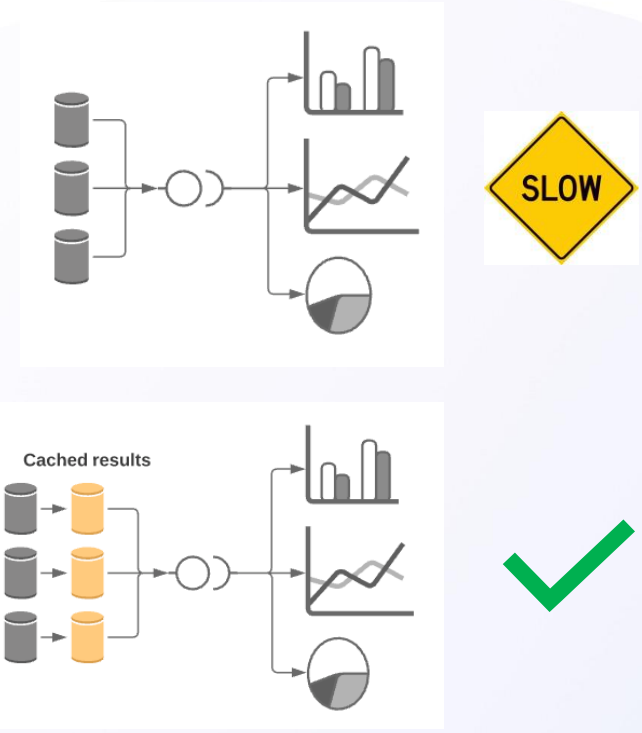
Volume Model Development

1. Validation Challenges

Diversity in data formats and validation themes.

2. Validation Challenges

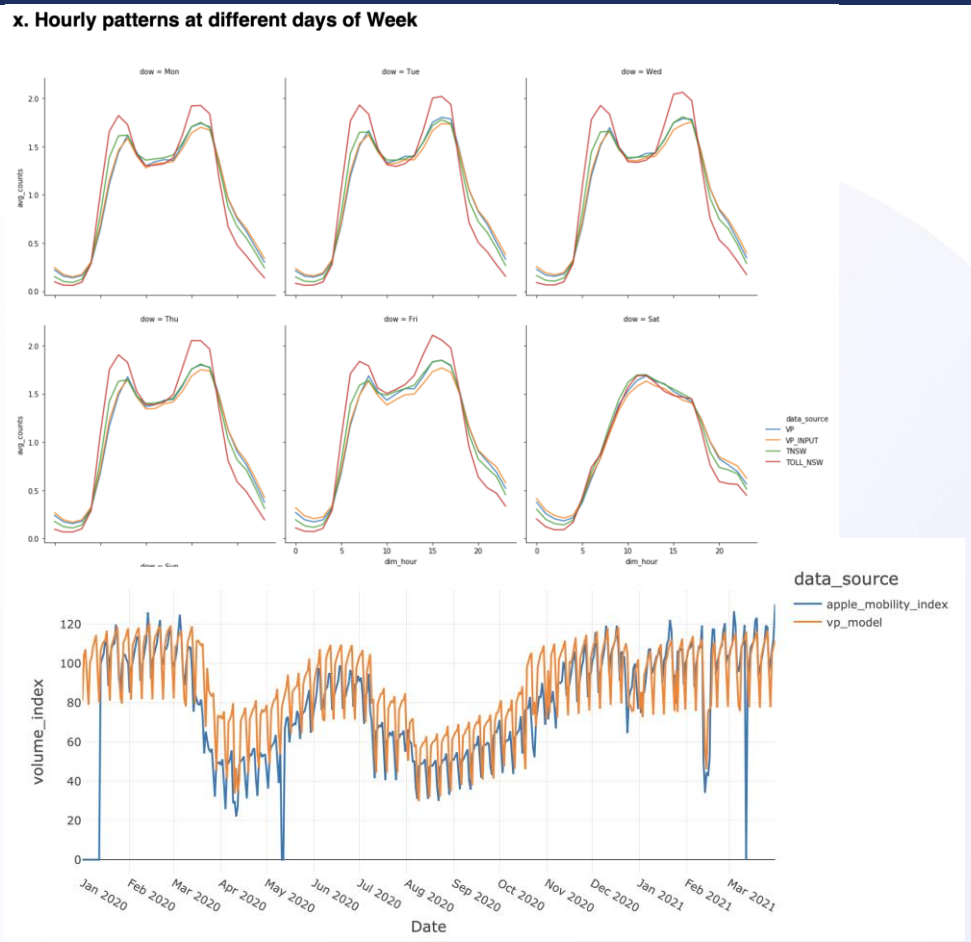
Development workflow.



Volume Model Development

Results

- Accurate reproduction of daily, weekly & COVID-mobility patterns
- >85% of predictions within +/- 20% of filtered loop data
- Better consistency than filtered loop data when comparing opposite links and consecutive links
- Typical model $r^2 > 0.95$



Questions?

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