Mobilidata

How can data science contribute to analyze and monitor mobility public policies?

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- Bogotá is **the most congested city in South America.**
- It has around **2'400.000 registered vehicles**, which 50% are cars, 20% motorcycles, and 14% trucks.
- In 2019, **average time travel by car was 56 minutes** (11% total travels)
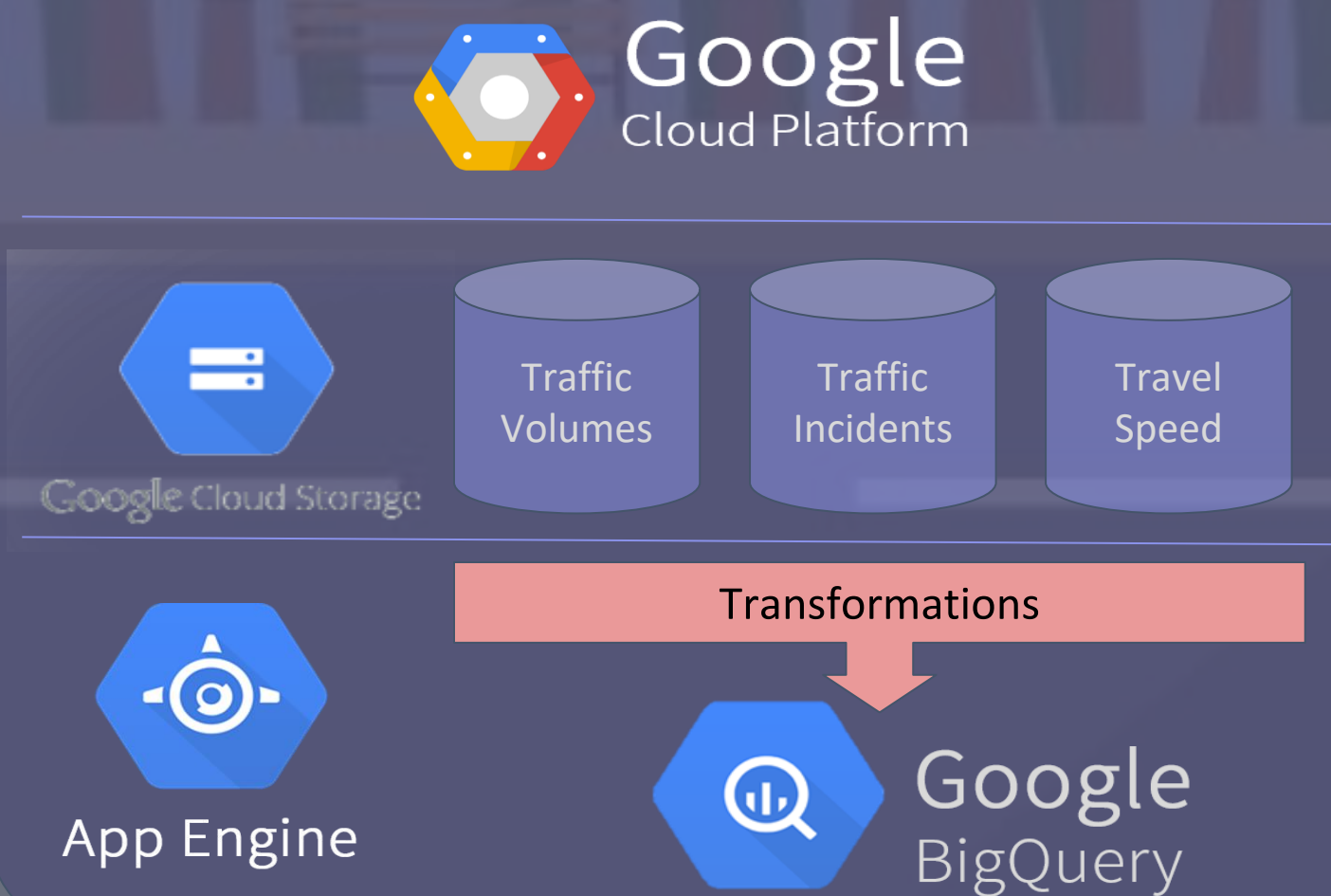
BACKGROUND

The mobility office created the District Traffic Management Center and contracted different technological services based on innovative wireless machine-to-machine (M2M) and Internet-of-Things (IoT) technologies for data capture in real-time.

ABOUT DATA

Traditional
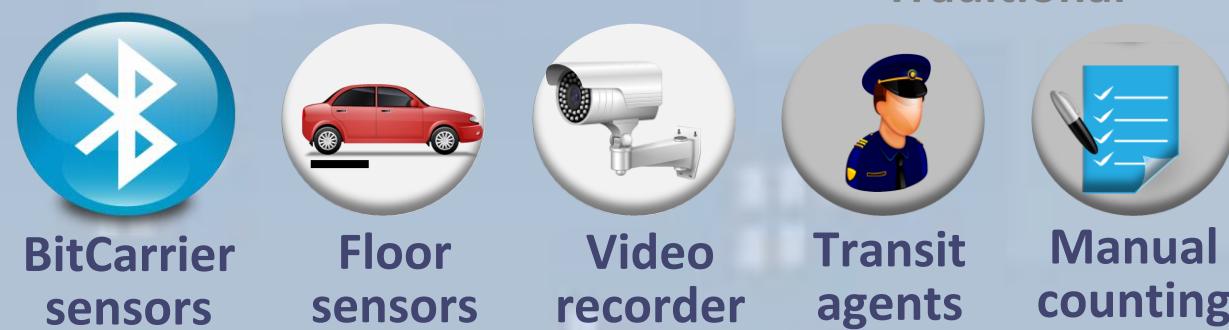
	BitCarrier sensors	Floor sensors	Video recorder	Transit agents	Manual counting
Travel Speed	✓	✓			
Traffic volumes	✓	✓	✓		✓
Traffic incidents				✓	

Data transformation and infrastructure

Google Cloud Platform

Google Cloud Storage

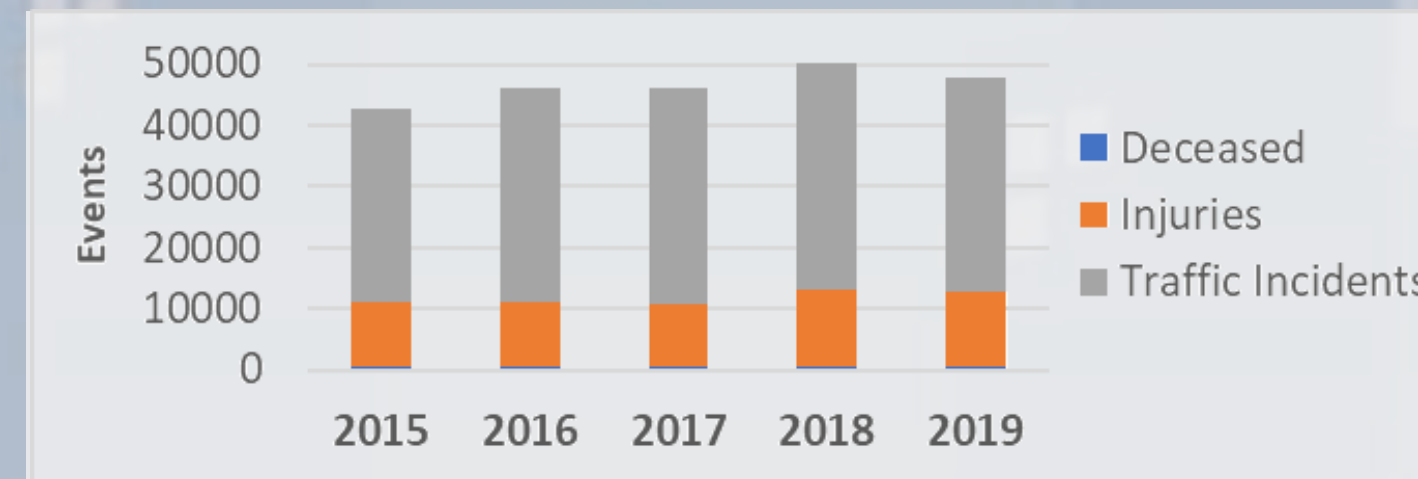Traffic Volumes | Traffic Incidents | Travel Speed

App Engine

Transformations

Google BigQuery

EXPLORATORY ANALYSIS

Traffic incidents

Traffic incidents are the second leading cause of violent death in the city, after homicides. Only in 2019 there were 34.990 traffic incidents, 18.469 injured, and 507 deceased people.
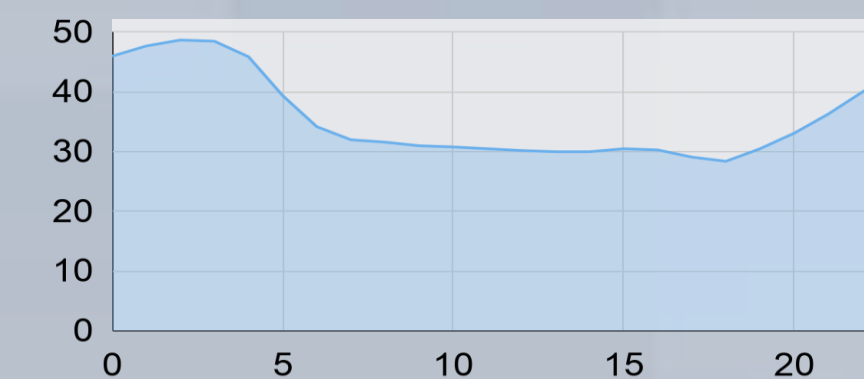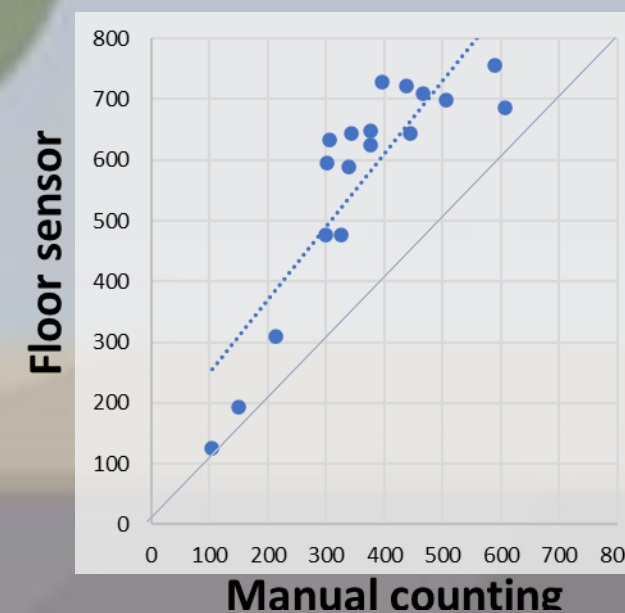

Travel Speed

Peak period 06:00 - 19:00

SLOW **30,6 km/h**

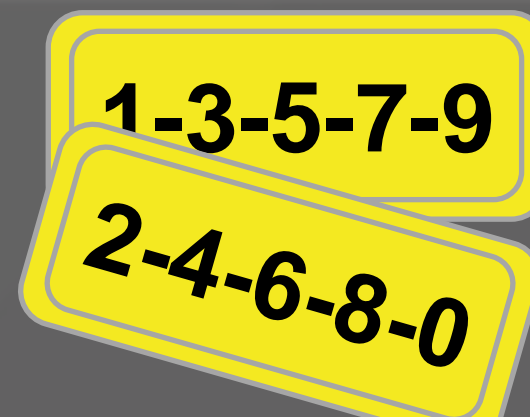Off-peak period 19:00 - 05:00

**FAST** **42,9 km/h**

Speed vs Hour

Traffic volumes

The algorithm that transforms the data from the floor sensor to the number of vehicles shows differences between its data and results obtained by manual counting . Particularly those vehicles with two or more axles.

1-3-5-7-9
2-4-6-8-0

"Pico y placa" is a policy focused on reducing the number of vehicles that can travel during peak hours on business days. Improvements in travel speed and counting vehicles were identified after strict quarantine.

MODEL

We created a tool that allows the mobility office making predictions of the number of daily traffic incidents, in order to support decision-making processes such as evaluating the impact of the implemented policies, setting goals for reducing traffic incidents, reducing damages, economic loss and most important… **saving lives**!

Dic 2019 Forecast vs Actuals

Train: 700 registers
Test: 30 registers
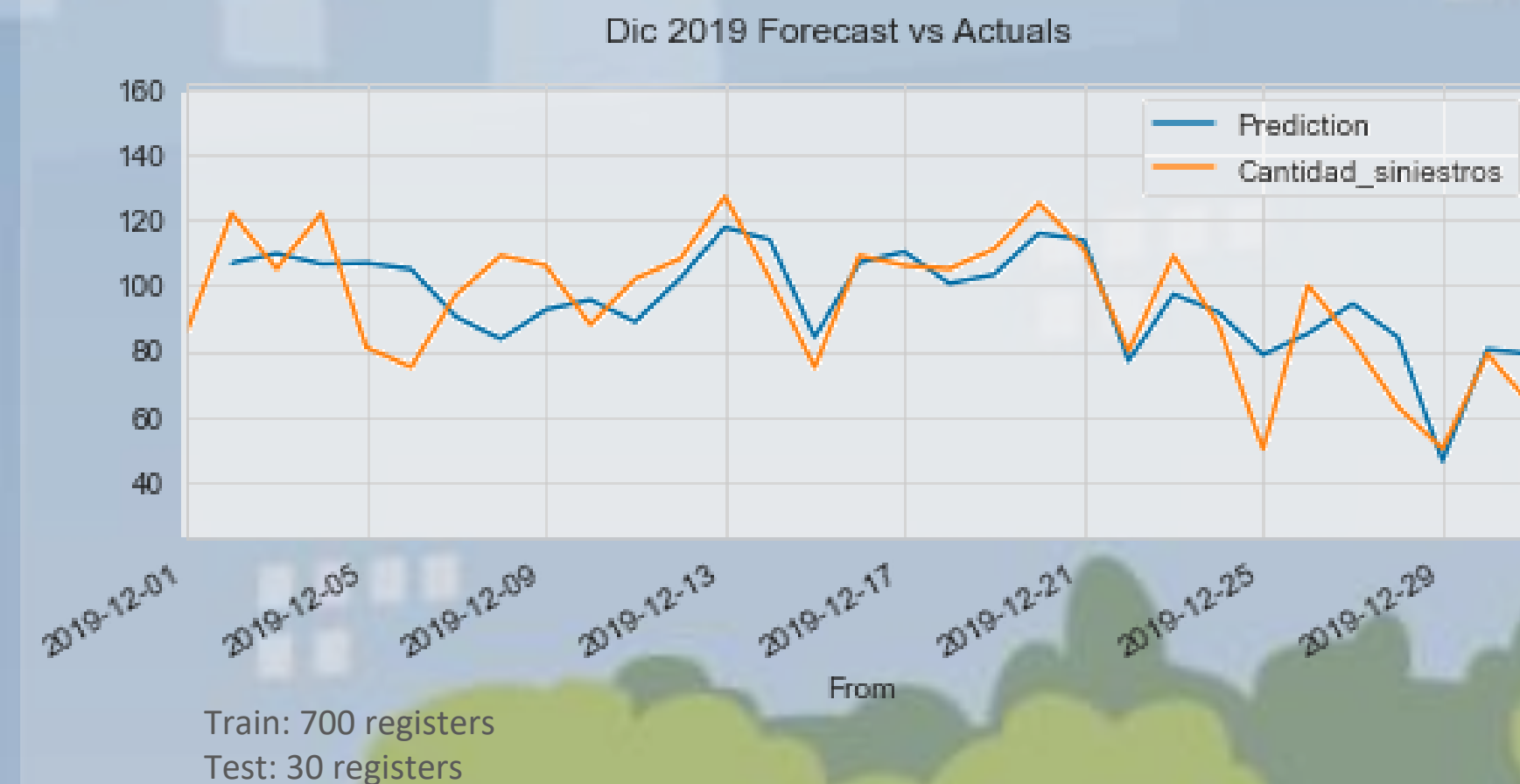
We applied different models and experiments. Finally, XGboost method generated the best results. Final prediction was calculated by daily number of traffic incidents in Bogotá.

CONCLUSIONS

- Identified segments of 14 main roads may require management traffic measures.
- Improvements in travel speed and counting vehicles were identified with the re-implementation of *"Pico y Placa"*.
- Specific recommendations were made to validate the accuracy of the automatic classification performed by the vehicles detected with the floor sensors.
- The prediction model allows future evaluation of public policies focused on general reduction of traffic incidents.