



Enhancing Road Safety with Innovative Solutions

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What problems do Operators have?

The Problem in Numbers

1.35
MILLION

€8.1
MILLION

1 in 70

+13.3%

What are the available options?

Real Time

- Dispatch Patrol Vehicles
- Change VMS
- Close / Open lane
- Divert Traffic

Long Term

- Optimise Existing Roadside Infrastructure
- Install new Sensors
- Develop new Safety Features

Data Challenges

VOLUME

PARTIAL

NOISY

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Imagine these options

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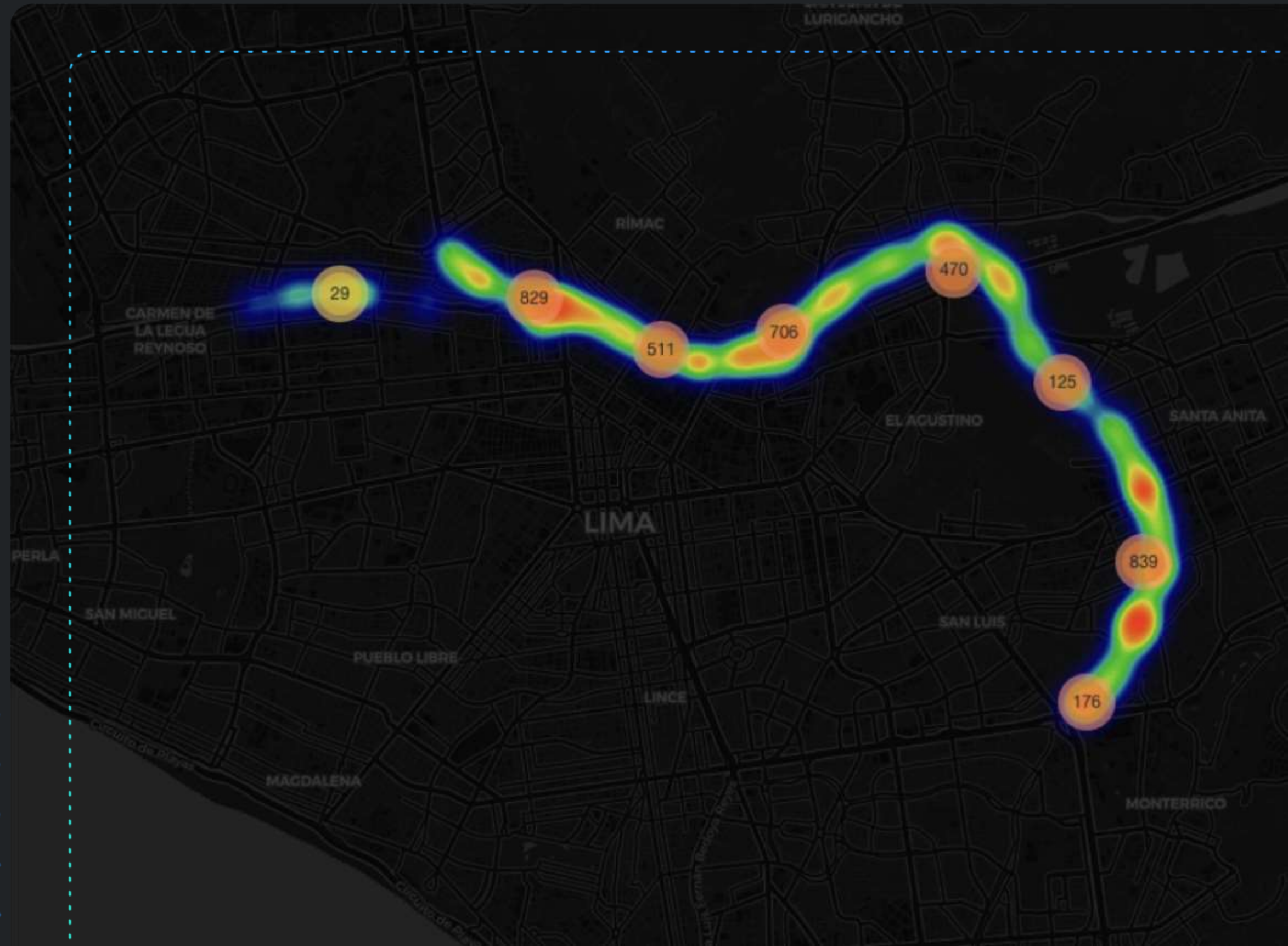
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Tool #1: PREDICT RISK



Predict Risk

- Day one risk model
- Draws immediate insights from millions of historical incidents





Ensemble Approach

- Machine Learning Models
- Expert Model
- Fusion Model

“I know from experience that an Easterly crosswind in this bridge makes accidents more likely.”

“Historically, this bridge is associated with a high number of collisions on Friday rush hours in December.”

Elevated Accident Risk at PK24 between 5pm and 6pm

The dashboard displays a list of events on the left side, including SVD, ELEVATED ACCIDENT RISK, and PEDESTRIAN ON ROAD. The main view shows a map with a detailed event popup for an ACCIDENT. The popup includes a 'REPLAY VIDEO' tab, a 'RISK FACTORS' tab, and a 'WEATHER' tab. The 'RISK FACTORS' tab is highlighted, showing a 'RISK RATING: 0.6' and a color-coded scale from Low to High. Below the rating, several risk factors are listed with their respective severity levels and values:

- RAIN: Heavy - 100mm/ph
- ROAD CURVATURE: Medium - [val]
- CONGESTION: Medium - [val]
- HISTORICAL ACCIDENT RISK: Low - [val]

Other factors shown include Bridge near, Weekday, Rush Hour, and Speed extreme 123.83 - km/h. The 'WEATHER' tab is also visible, showing a 'RISK RATING: 0.312' and a color-coded scale from Low to High.

Easy to understand
risk factors in plain english

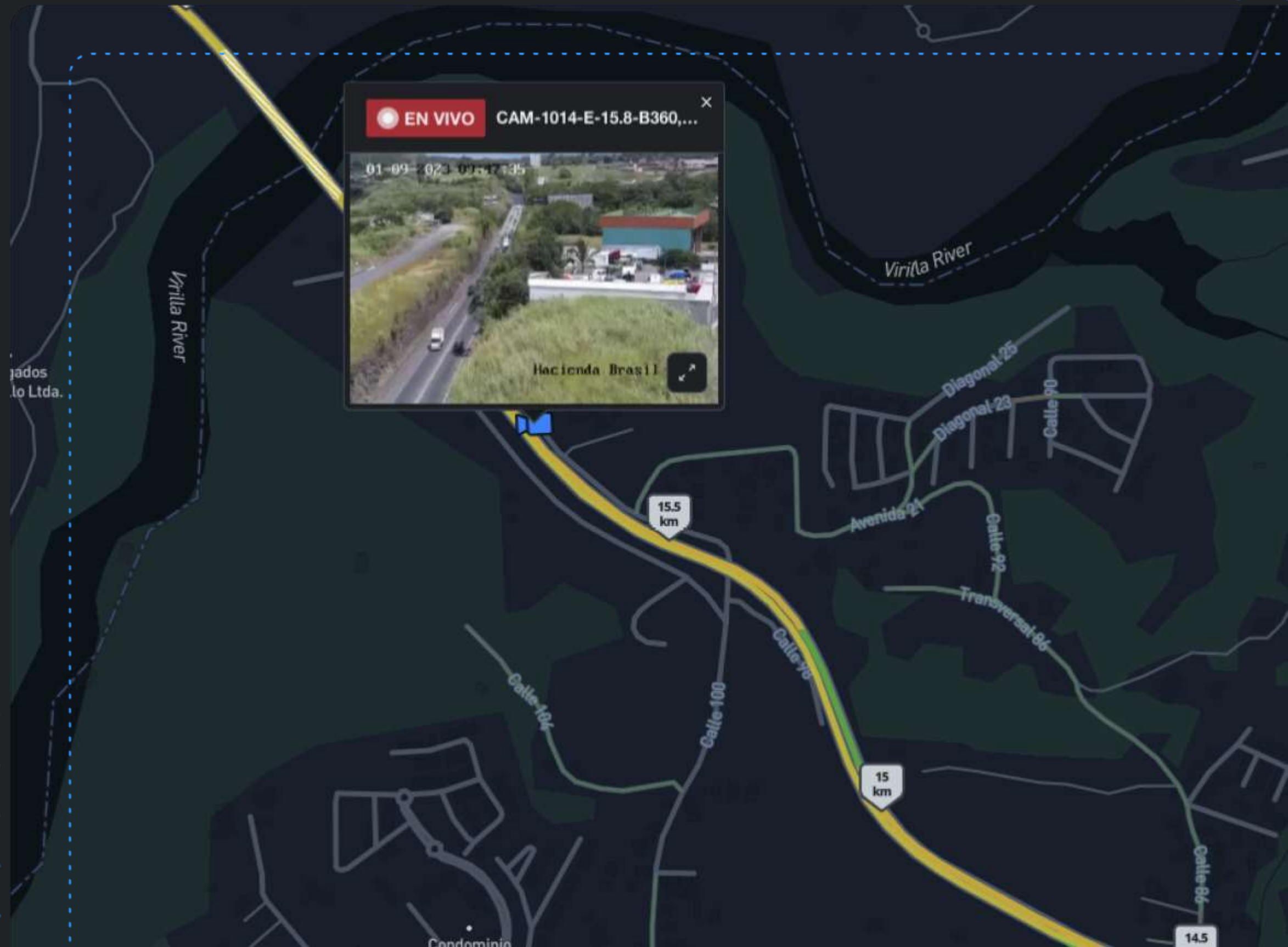


Tool #2: **PROVIDE CONTEXT**



Provide Context

- Severity of an accident is context dependent
- Traffic flow and weather are highly localised





Weather Fusion

- Visibility from Cameras
- Integration with Weather Station
- Integration with APIs

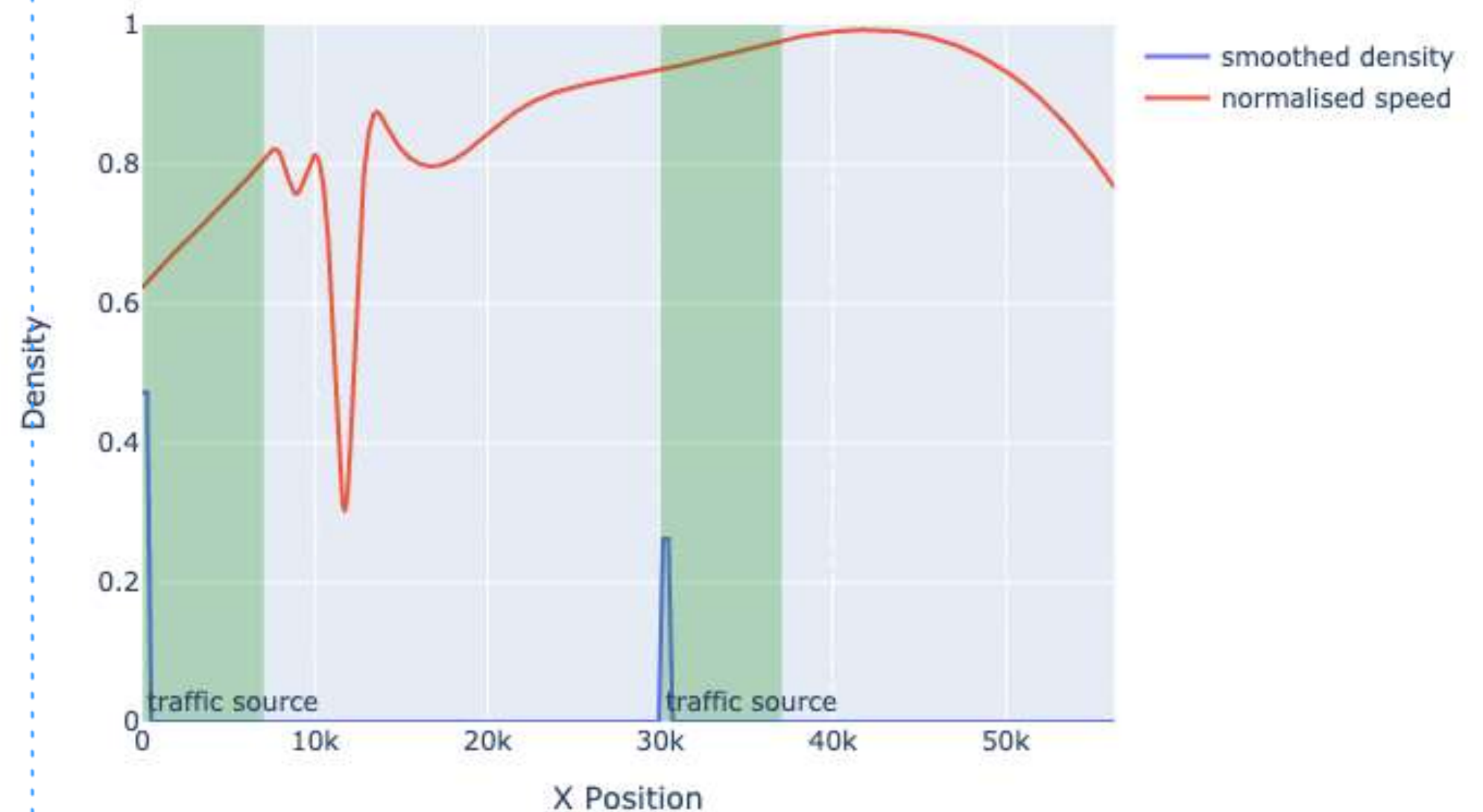
Trigger Warning:
High Speed Car Crash



Traffic Fusion

- Vehicle counts from Loops and Cameras
- Local speeds from APIs
- Fill in blind spots

Flow Propagation at Time: 15.0 seconds



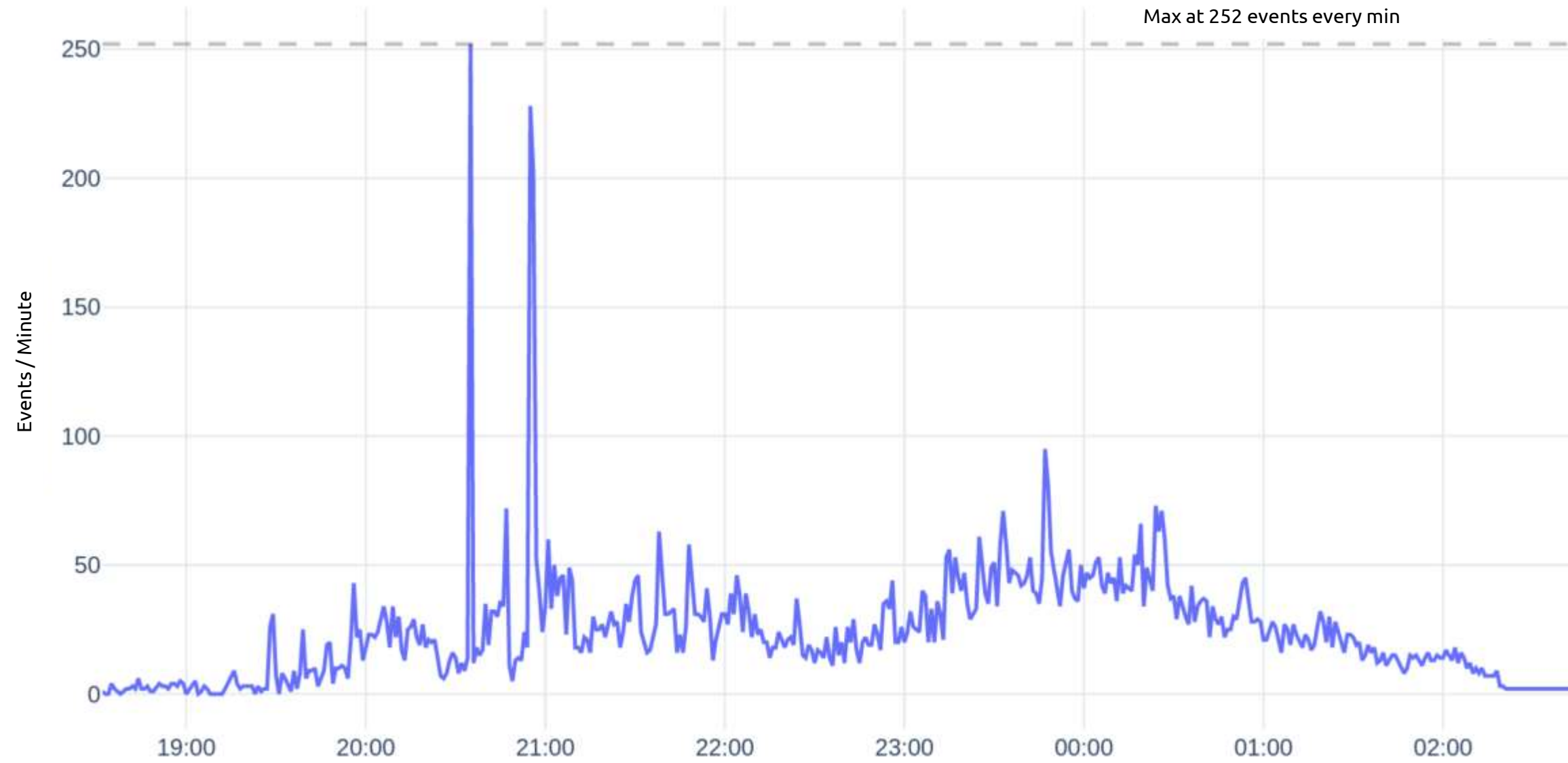


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Tool #3: REDUCE NOISE

Big data has led to information overload & alert fatigue

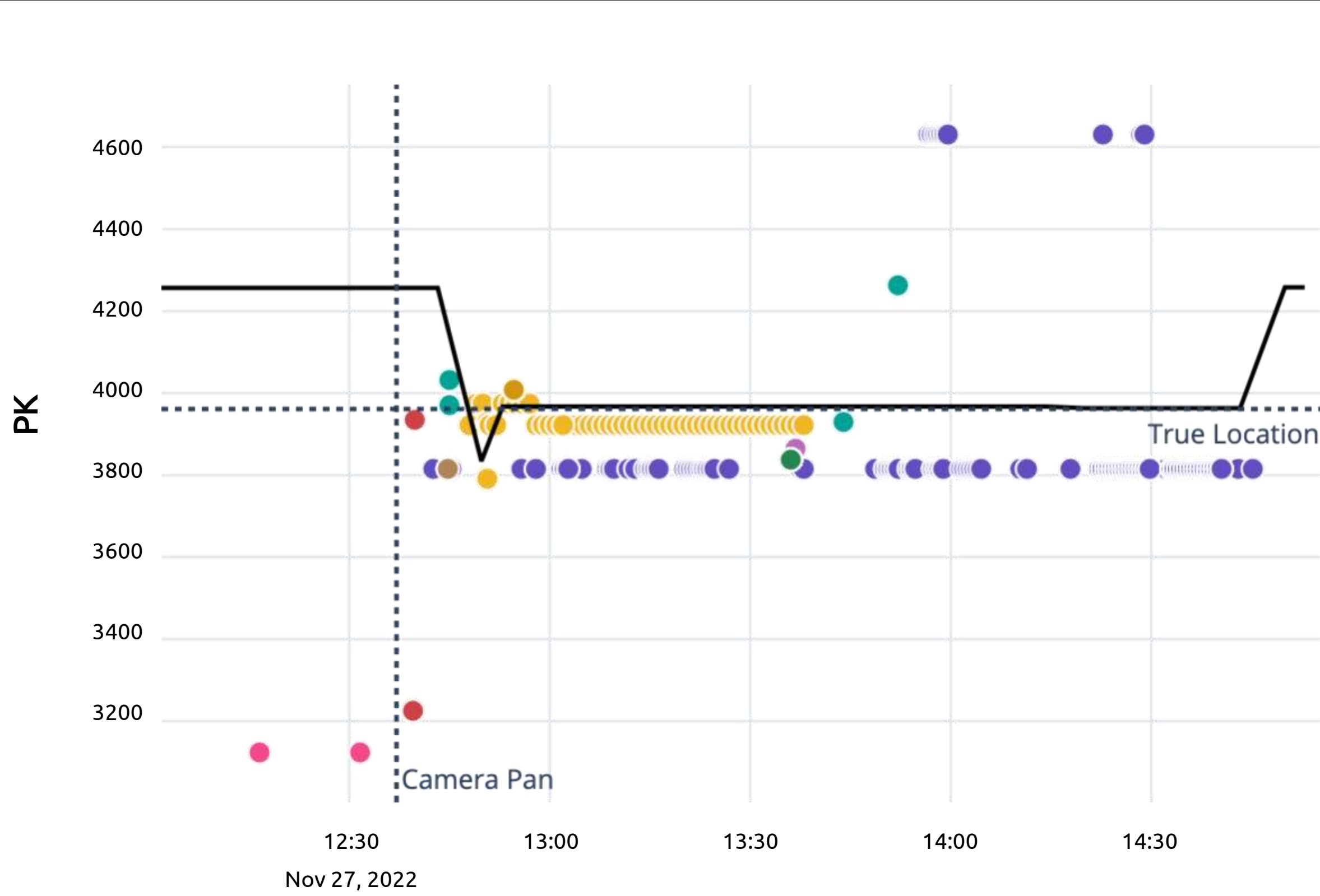




200+ peak events per minute, nearly **1 events every second** sustained over hours.
Information overload without Fusion

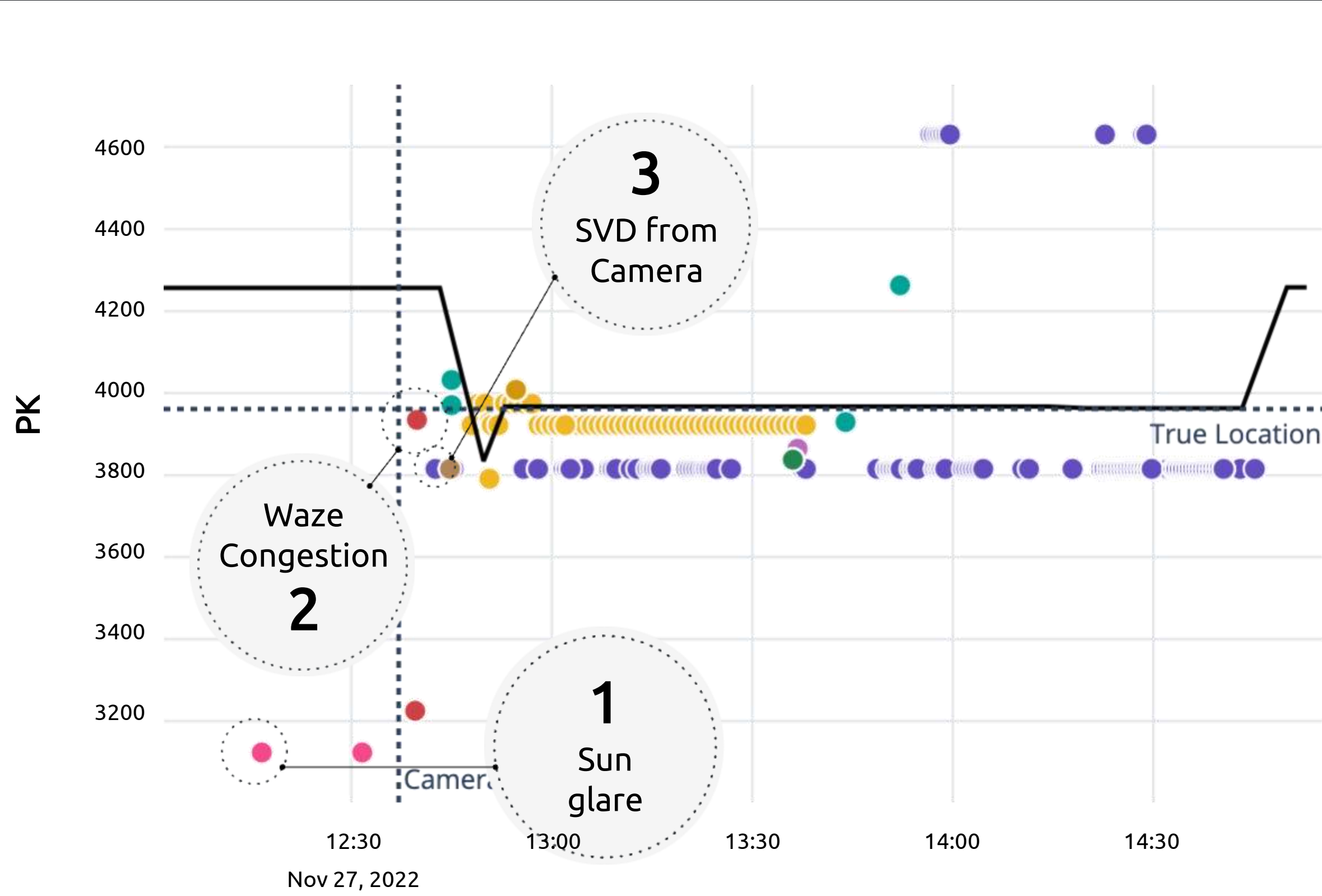
Trigger Warning: High Speed Car Crash





- Camera SVD
- Waze Major Accident
- Waze Congestion
- Waze Road Work
- Waze Accident
- Waze Severe Congestion
- Waze Undefined Interference
- Camera Potential Reduced Visibility
- Camera Pedestrian On Road
- Ambulance





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- Camera Pedestrian On Road
- Ambulance





The screenshot displays a comprehensive monitoring interface. On the left, a vertical sidebar lists various events with their respective icons and status. The main area is divided into several sections: a top map view showing the location of an accident, a central video replay from a nearby camera, and a bottom-right chart showing traffic flow data.

Distance	Event Type	Status
19 km	ACCIDENT	EXPIRED
56 km	ACCIDENT	EXPIRED
48 km	ACCIDENT	EXPIRED
25 km	ELEVATED ACCIDENT RISK	EXPIRED
0 km	ELEVATED ACCIDENT RISK	EXPIRED
64 km	ELEVATED ACCIDENT RISK	EXPIRED
65 km	HEAVY RAIN	EXPIRED
5 km	ELEVATED ACCIDENT RISK	EXPIRED
4 km	ELEVATED ACCIDENT RISK	EXPIRED

Map View: Shows an accident location on a map with a 'View event' popup. The popup includes the date and time '27/11 06:39' and a temperature of '20° C'. The map also shows various landmarks and roads.

Video Replay: A 'REPLAY VIDEO' section with a 'FROM NEARBY CAMERA' dropdown menu. The video shows a multi-lane highway with a visible accident scene. The timestamp '2022-11-27 06:36:36' is visible at the bottom of the video frame.

Traffic Flow Chart: A 'CARRIAGEWAY TRAFFIC-FLOW' chart showing 'AVG. Speed km/h' (left y-axis, 0-80) and 'Vehicles/Hour' (right y-axis, 0-400) over time (x-axis, 02:30-08:30). A vertical line marks the 'Accident 06:39'. The chart shows a significant drop in both speed and vehicle count at the time of the accident.



Reduce Noise

- 93% compression mitigates alert fatigue
- Fuzzy logic Fusion Engine allows infinite customisation



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Results



A LANTERNN BY VALERANN™ USER:

“By having early road incidents notifications, we are able to shorten our response time, also on parts of the road where we don't have ITS infrastructure”

88%

**Improvement
in response
relevance**

25%

**Improvement
in response
time**

95%

**Incidents raised to
Operator within 5
minutes**



THANK YOU

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