IRF World Road Meeting

How to use Artificial Intelligence & Data Science to improve safety on motorways ?

18th WORLD ROAD MEETING
IRF
14-17 NOVEMBER 2017
DELHI NCR, INDIA

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ROAD (UN)SAFETY IN FIGURES

1.2 Million

People killed on highways in the world in 2013

Global Health Observatory, 2013

20 Minutes

Life expectancy of a pedestrian on french highways

5 Millions

Road injuries in the world in 2016

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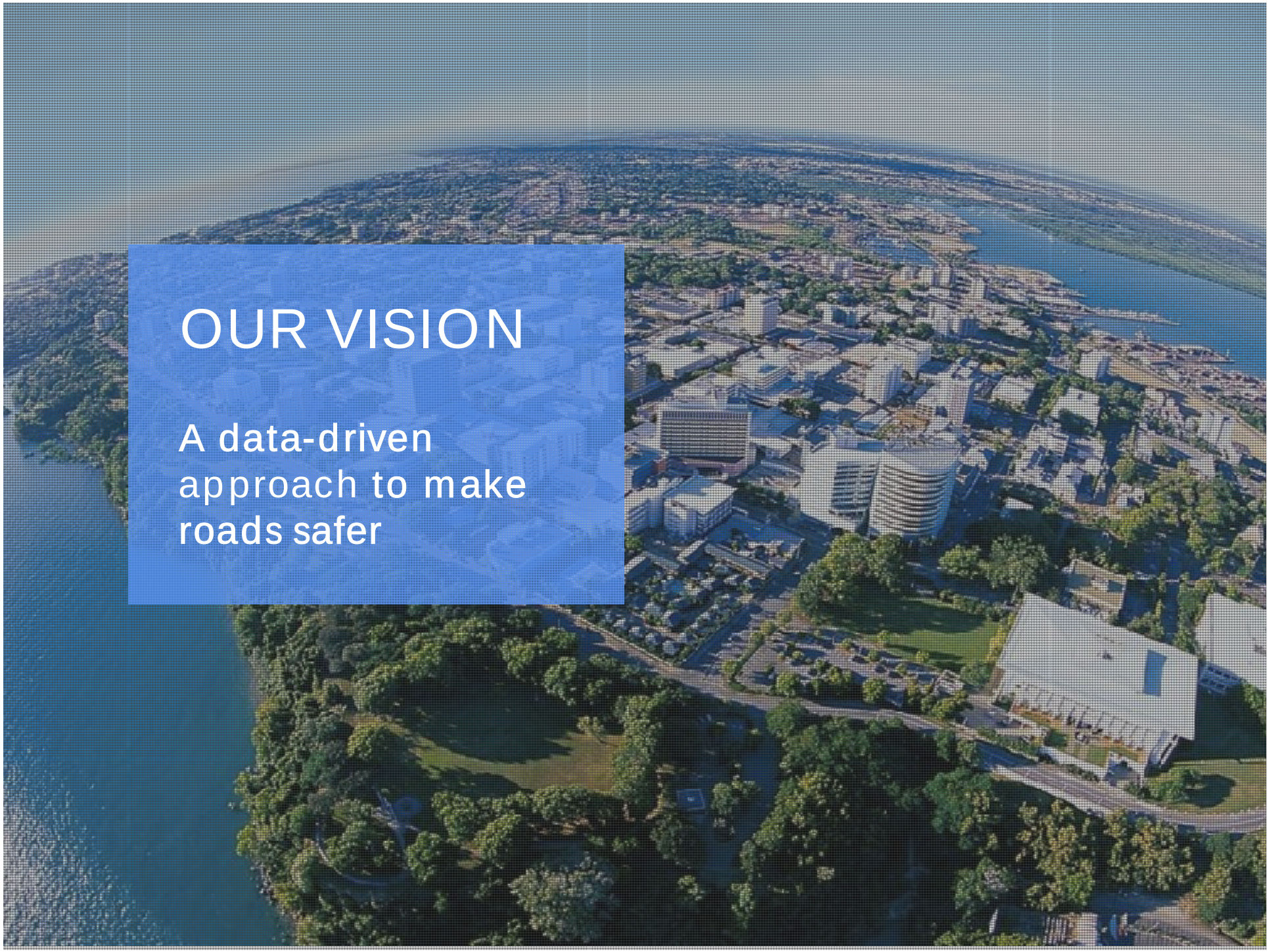
OUR VISION
A data-driven approach to make roads safer

PHASE 1: DATA COLLECTION

Digitalize a highway

Aggregate static data

- Calendar (holidays, week…)
- Urban structure (surfacing, roads, rest zones),

Aggregate dynamic data

- Events
- Weather forecast
- Pollution
- Connected vehicles

Aggregate calibration data

- Historic of the phenomena to predict

We enrich historical data with contextual data flows

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PHASE 2: PROCESSING DATA

Contextual machine learning to get predictions

Automatic
cleaning of data

Automatic analysis &
selection of models

Predictions

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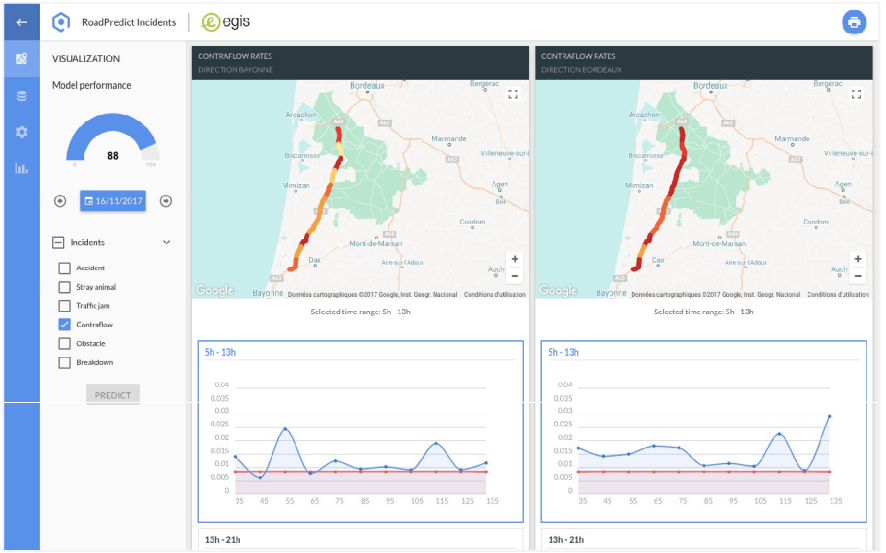
PHASE 2: PROVIDING PREDICTIONS

Provision & Vizualisation

Optimization of patrols
Dashboard, simulators & mobile app to optimize daily operations



USE CASE

Improving road safety on the A63 in France

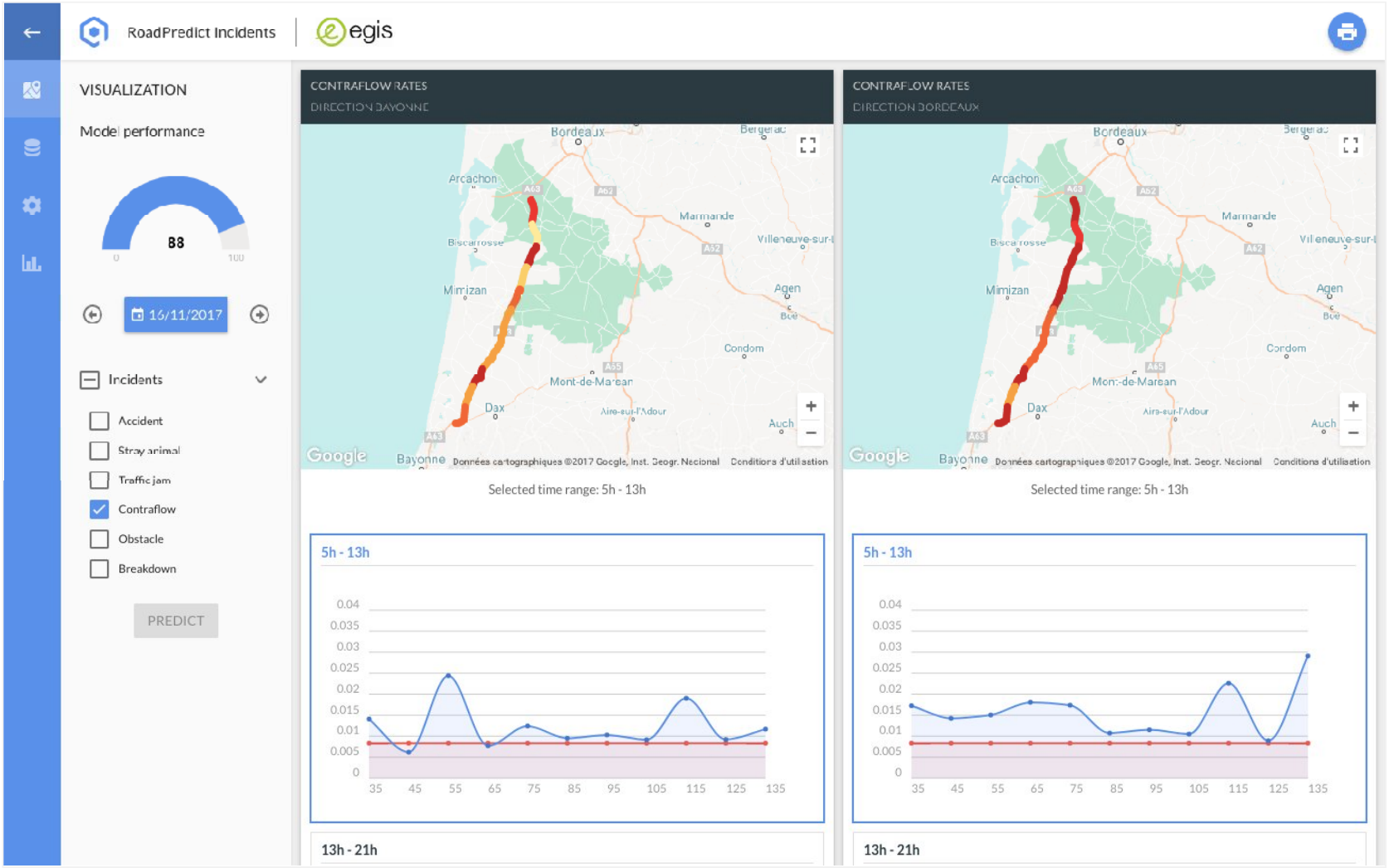
ROADPREDICT ON THE A63

Targets :

- Accidents
- Breakdowns
- Stray animals
- Wrong ways
- Trafic jams
- Obstacles

"Our Goal is to optimize our responsiveness to improve the safety of customers and patrollers".

Richard Lengrand, Director
Of Egis Exploitation Aquitaine


RoadPredict Incidents
egis
VISUALIZATION
Model performance
88
16/11/2017
Incidents
Accident
Stray animal
Traffic jam
Contraflow
Obstacle
Breakdown
PREDICT
CONTRAFLOW RATES
DIRECTION BAYONNE
CONTRAFLOW RATES
DIRECTION BORDEAUX
Bordeaux
Arcachon
Marmande
Mimizan
Agen
Condom
Mont-de-Marsan
Dax
Auch
Bayonne
Selected time range: 5h - 13h
Selected time range: 5h - 13h
5h - 13h
5h - 13h
13h - 21h
13h - 21h

RESULTS

	Reality	RoadPredict A63	Benchmark
Total of incidents	518	529	713
% Difference	0.00%	2,04%	37,73%
False negatives	0	83	35
False positives	0	95	214
% False negatives	0.00%	16,02%	6,76%
% False positives	0.00%	18,34%	41,31%
Performance	100,00%	65,64%	51,93%

- Models trained on a 8 months period
- Tests made on a 2 months period

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RESULTS

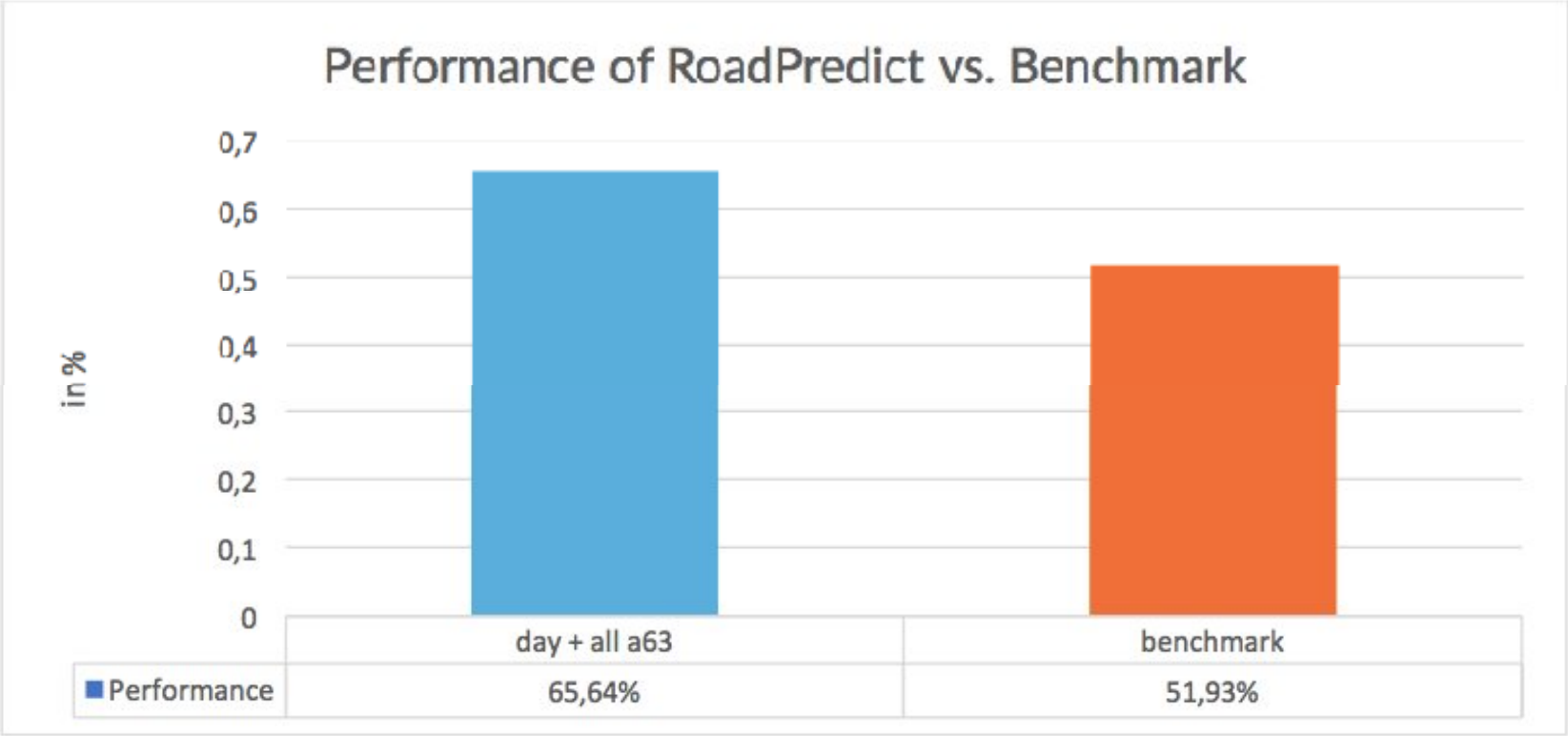

Figure 1 Performance of RoadPredict vs. Benchmark

Why contextual models vs. historical models for highways?

- ✓ No need for tremendous historical data anymore. Contextual data enrich historical data.
- ✓ Models learn continuously from new incoming data. One experience on a highway can benefit another one
- ✓ IA is able to handle a lot of combinaisons and a massive amount of data
- ✓ Fast to implement and easy to replicate.

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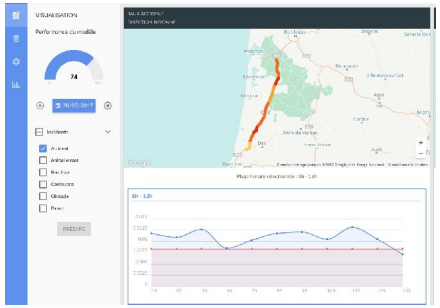
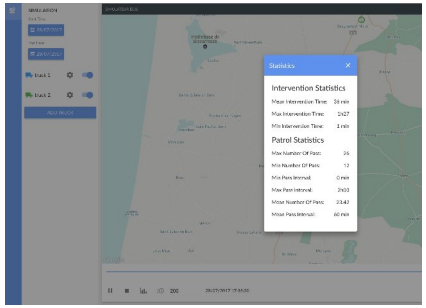
WHAT'S NEXT?



RoadPredict Information

A dashboard to predict the time & location of any incidents



RoadPredict Simulation

A simulator to test patrol organization on historical & predictive incidents

RoadPredict Safety Patrols

A module to optimize logistics for patrollers

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