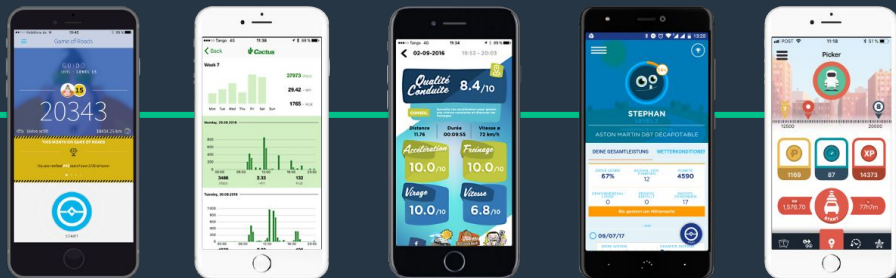Motion·S
AUGMENTING MOBILITY DATA

MOBILITY DATA AUGMENTATION

From Telematics Data to Portable Scores

Dr.-Ing. German Castignani
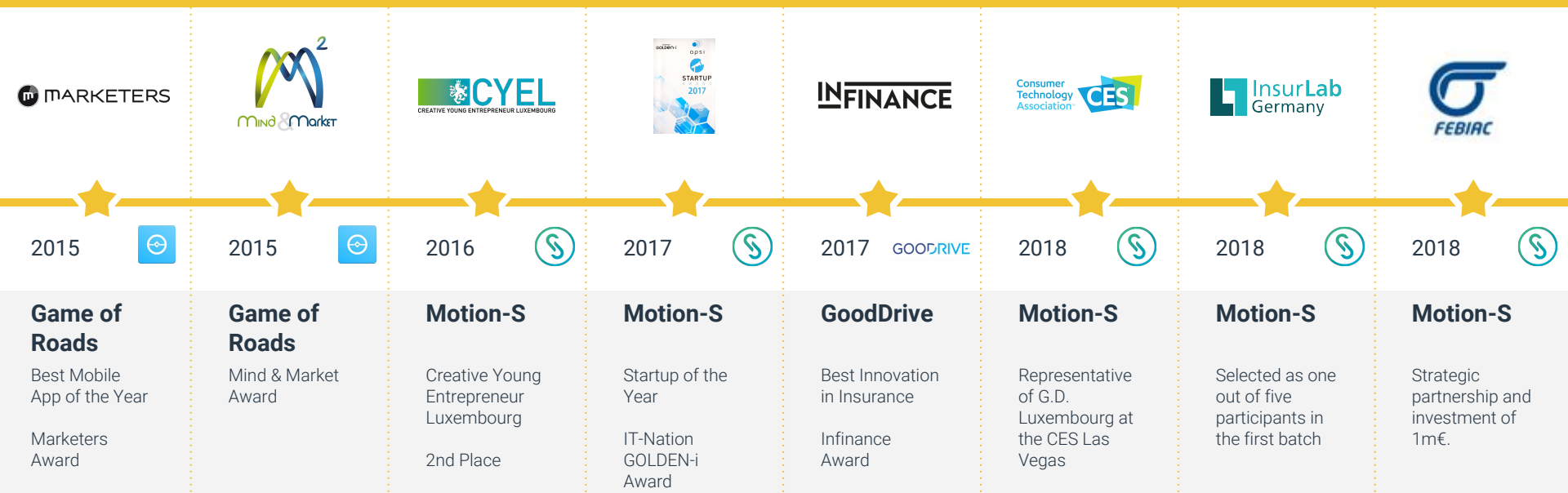CTO / Co-founder
MOTION-S S.A.

Internet of Things
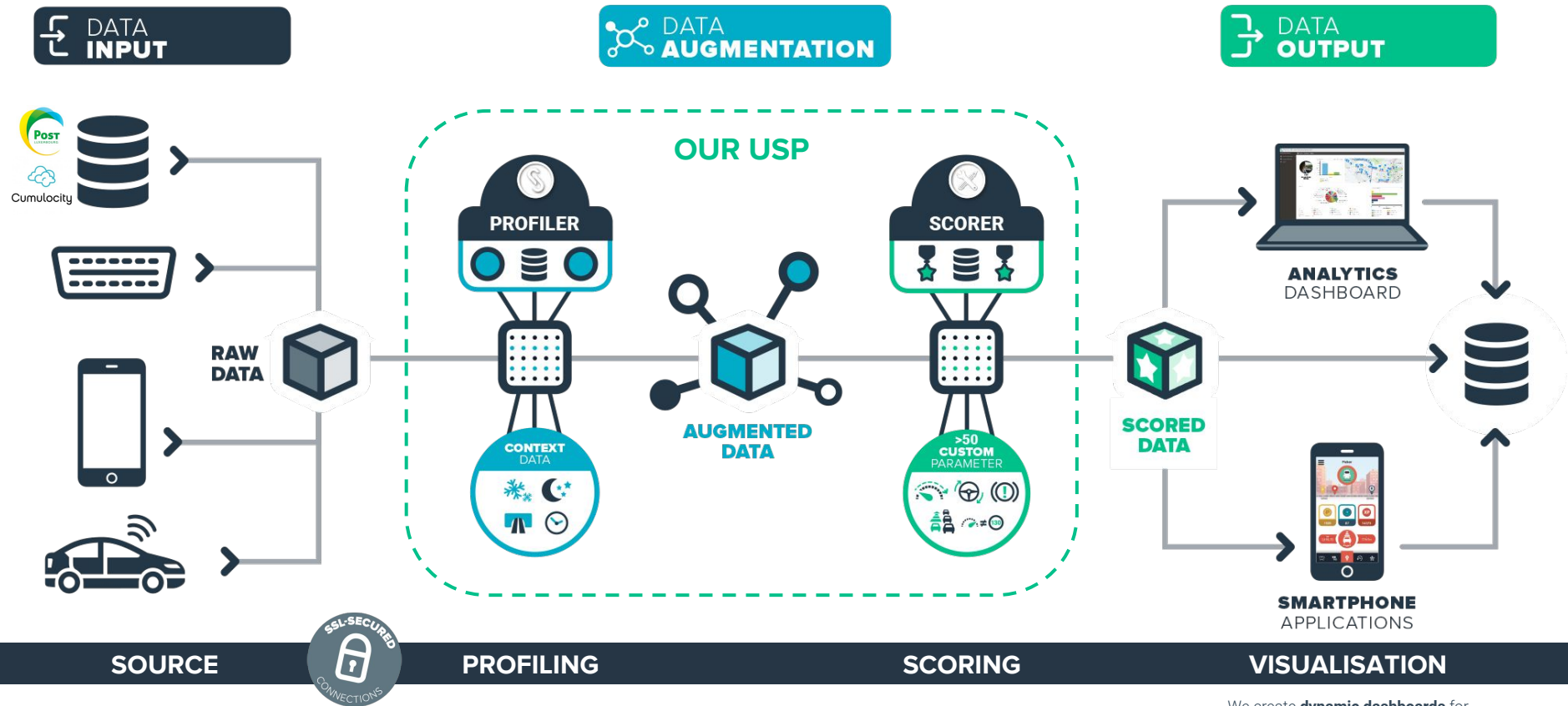September 25th 2018
Chambre de Commerce

ABOUT **MOTION-S**

5 MOBILE APPS LAUNCHED

13.500+ profiles • **1.000.000+** Trips
15.000.000+ km • **EU, US, MEX, UAE**

MARKETERS	Mind & Market²	CYEL CREATIVE YOUNG ENTREPRENEUR LUXEMBOURG	apsi STARTUP 2017	INFINANCE	Consumer Technology Association CES	InsurLab Germany	FEBIAC
2015	2015	2016	2017	2017 GOODRIVE	2018	2018	2018
Game of Roads	**Game of Roads**	**Motion-S**	**Motion-S**	**GoodDrive**	**Motion-S**	**Motion-S**	**Motion-S**
Best Mobile App of the Year	Mind & Market Award	Creative Young Entrepreneur Luxembourg	Startup of the Year	Best Innovation in Insurance	Representative of G.D. Luxembourg at the CES Las Vegas	Selected as one out of five participants in the first batch	Strategic partnership and investment of 1m€.
Marketers Award		2nd Place	IT-Nation GOLDEN-i Award	Infinance Award			

OUR **BUSINESS MODEL**

DATA INPUT

DATA AUGMENTATION

DATA OUTPUT

OUR USP

PROFILER

SCORER

RAW DATA

CONTEXT DATA

AUGMENTED DATA

>50 CUSTOM PARAMETER

SCORED DATA

ANALYTICS DASHBOARD

SMARTPHONE APPLICATIONS

SSL-SECURED CONNECTIONS

SOURCE	PROFILING	SCORING	VISUALISATION
STORED or LIVE GPS, sensor and car data provided by any device (smartphones, dongles, CAN bus)	We **contextualize and profile the data** on our Profiling Platform.	The augmented data gets **correlated with individual risk factors** and **predictive models** on our Scoring Platform.	We create **dynamic dashboards** for advanced data visualisation to assist decision making and **smartphone apps** to provide feedback to drivers

PLATFORM AND METHODOLOGY
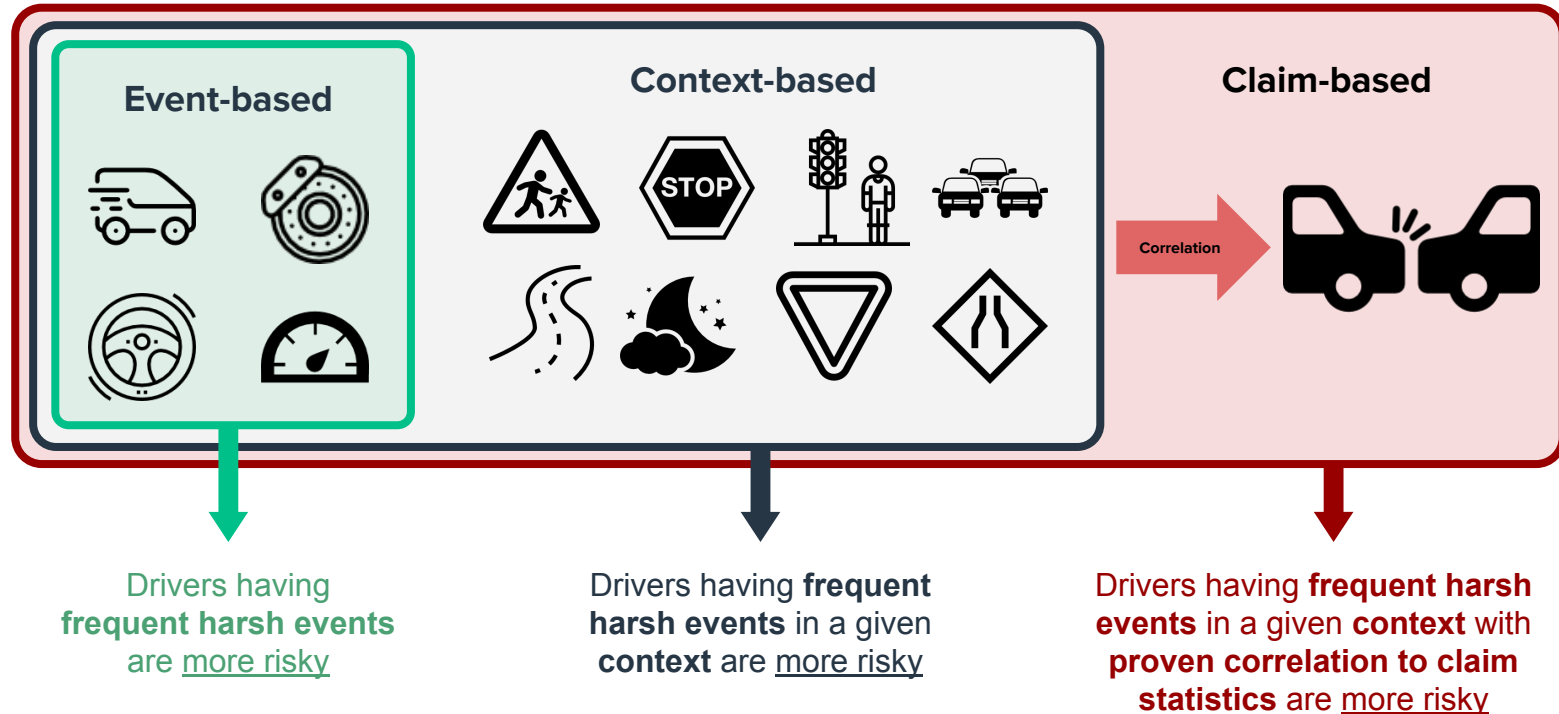
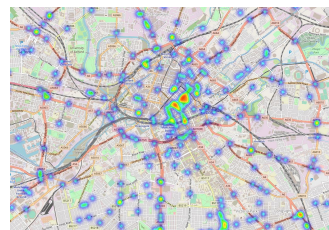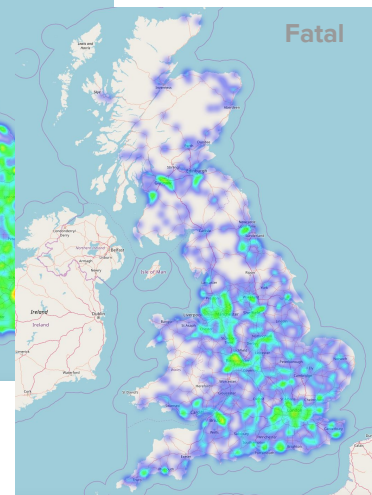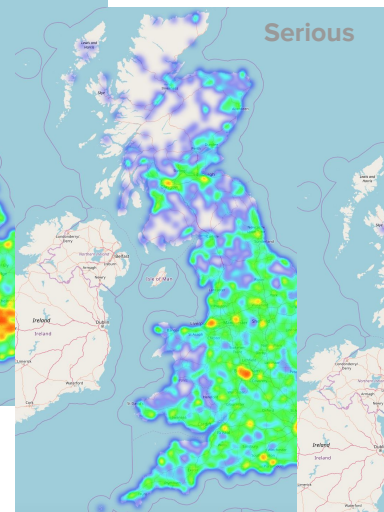|		103	102	101	110	108	107	109	104	105	106
	Road Environment Contributed	Slippery road (due to weather)	Deposit on road (e.g. oil, mud, chippings)	Poor or defective road surface	Sunken, raised or slippery inspection cover	Road layout (e.g. bend, hill, narrow carriageway)	Temporary road layout (e.g. contraflow)	Animal or object in carriageway	Inadequate or masked signs or road markings	Defective traffic signals	Traffic calming (e.g. speed cushions, road humps, chicanes)
		201	202	203	204	205	206				
	Vehicle Defects	Tyres illegal, defective or under-inflated	Defective lights or indicators	Defective brakes	Defective steering or suspension	Defective or missing mirrors	Overloaded or poorly loaded vehicle or trailer				
Driver/Rider Only (Includes Pedal Cycles and Horse Riders)	Injudicious Action	308	306	302	301	307	310	305	304	309	303
		Following too close	Exceeding speed limit	Disobeyed Give Way or Stop sign or markings	Disobeyed automatic traffic signal	Travelling too fast for conditions	Cyclist entering road from pavement	Illegal turn or direction of travel	Disobeyed pedestrian crossing facility	Vehicle travelling along pavement	Disobeyed double white lines
	Driver/ Rider Error or Reaction	405	406	403	408	409	401	402	404	407	410
		Failed to look properly	Failed to judge other person's path or speed	Poor turn or manoeuvre	Sudden braking	Swerved	Junction overshoot	Junction restart (moving off at junction)	Failed to signal or misleading signal	Too close to cyclist, horse or pedestrian	Loss of control
	Impairment or Distraction	501	502	508	503	509	510	505	504	507	506
		Impaired by alcohol	Impaired by drugs (illicit or medicinal)	Driver using mobile phone	Fatigue	Distraction in vehicle	Distraction outside vehicle	Illness or disability, mental or physical	Uncorrected, defective eyesight	Rider wearing dark clothing	Not displaying lights at night or in poor visibility
	Behaviour or Inexperience	602	605	601	603	607	606	604			
		Careless, reckless or in a hurry	Learner or inexperienced driver/rider	Aggressive driving	Nervous, uncertain or panic	Unfamiliar with model of vehicle	Inexperience of driving on the left	Driving too slow for conditions or slow vehicle (e.g. tractor)			
	Vision Affected by	701	703	706	707	708	705	710	702	704	709
		Stationary or parked vehicle(s)	Road layout (e.g. bend, winding road, hill crest)	Dazzling sun	Rain, sleet, snow or fog	Spray from other vehicles	Dazzling headlights	Vehicle blind spot	Vegetation	Buildings, road signs, street furniture	Visor or windscreen dirty, scratched or frosted etc.
	Pedestrian Only (Casualty or Uninjured)	802	808	803	801	806	807	805	804	809	810
		Failed to look properly	Careless, reckless or in a hurry	Failed to judge vehicle's path or speed	Crossing road masked by stationary or parked vehicle	Impaired by alcohol	Impaired by drugs (illicit or medicinal)	Dangerous action in carriageway (e.g. playing)	Wrong use of pedestrian crossing facility	Pedestrian wearing dark clothing at night	Disability or illness, mental or physical

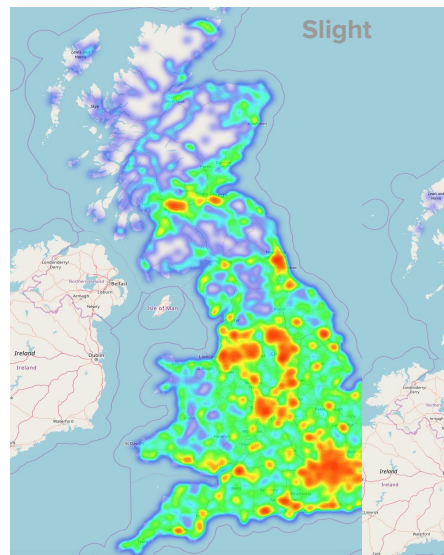**60%**
of reported accidents with 22 CFs
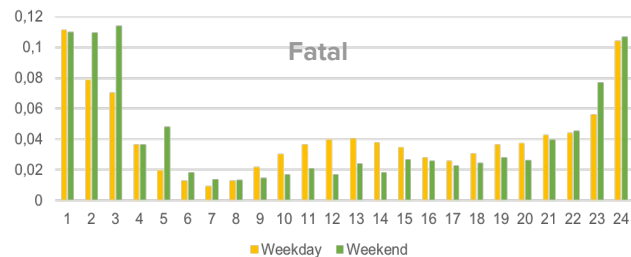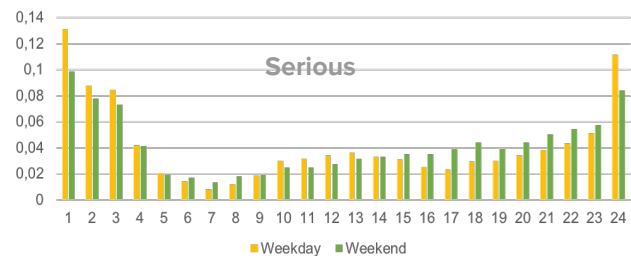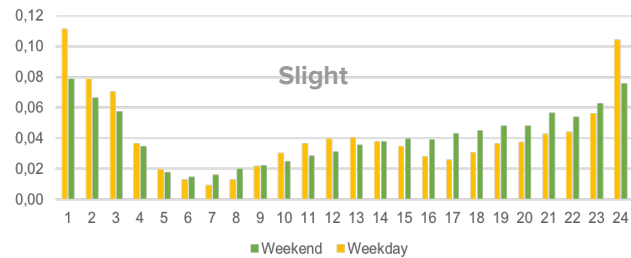
GPS + Augmentation
GPS + Car + Augmentation

- <u>The concept</u>: **Reconstructing the CF form with Telematics**
  - Measure exposure to CF through Telematics Metrics
  - For each trip, calculate Telematics Metrics and decide which CF would have been triggered
  - Use the distribution of accidents per contributory factors to come out with a dist score
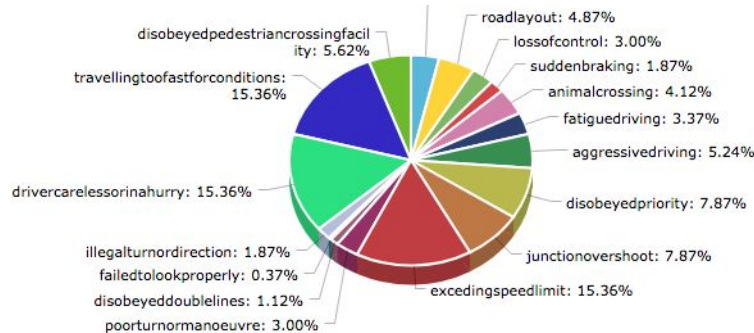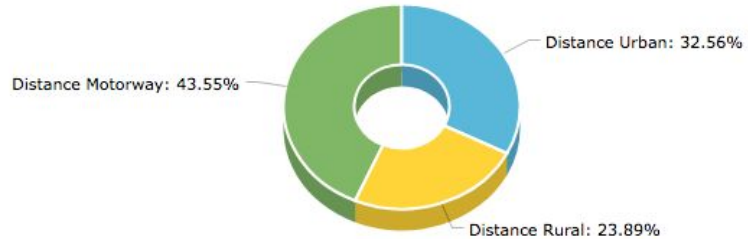

1. Trip Profiling **2. CF Calculation** **3. Scoring**
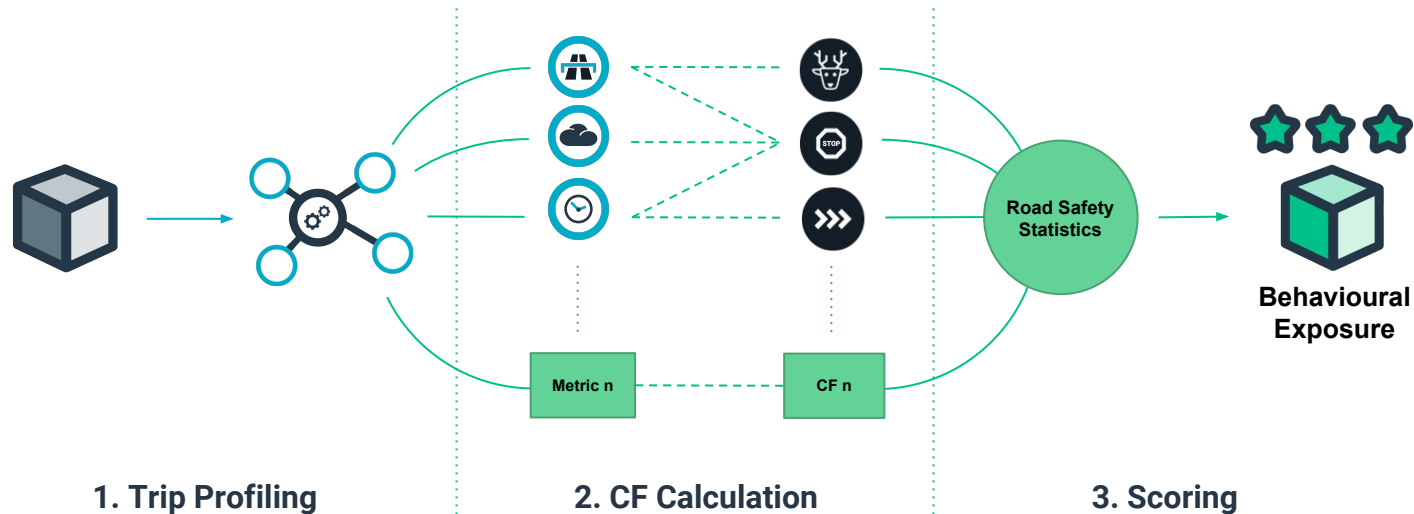
BEST AND WORST DRIVERS

Best participant

-56% from avg fleet risk (1.600 km driven)

Distance Urban: 32.56%
Distance Motorway: 43.55%
Distance Rural: 23.89%

roadlayout: 4.87%
lossofcontrol: 3.00%
suddenbraking: 1.87%
animalcrossing: 4.12%
fatiguedriving: 3.37%
aggressivedriving: 5.24%
disobeyedpriority: 7.87%
junctionovershoot: 7.87%
exceedingspeedlimit: 15.36%
poorturnmanoeuvre: 3.00%
disobeyeddoublelines: 1.12%
failedtolookproperly: 0.37%
illegalturnordirection: 1.87%
drivercarelessorinahurry: 15.36%
travellingtoofastforconditions: 15.36%
disobeyedpedestriancrossingfacility: 5.62%

Worst participant

+136% from avg fleet risk (2.237 km driven)

Distance Motorway: 19.42%
Distance Urban: 29.49%
Distance Rural: 51.09%

disobeyedpedestriancrossingfacility: 1.18%
travellingtoofastforconditions: 7.65%
swerved: 1.76%
roadlayout: 14.71%
lossofcontrol: 14.71%
suddenbraking: 0.59%
animalcrossing: 14.12%
fatiguedriving: 2.35%
aggressivedriving: 2.94%
disobeyedpriority: 6.47%
junctionovershoot: 6.47%
exceedingspeedlimit: 8.24%
poorturnmanoeuvre: 3.53%
disobeyeddoublelines: 1.76%
failedtolookproperly: 4.12%
illegalturnordirection: 1.76%
drivercarelessorinahurry: 7.65%

Difference in **score** is mainly generated by **CF** and **road distribution of Worst Participant** being present in **26% more of fatal accidents**

CLUSTERING OF DRIVING PATTERNS

- Use telematics metrics to find groups of drivers according to their driving patterns
- **1.580** drivers from our DBs- **162.145** trips - **85** trips per driver (median)

Visualization with t-SNE

3,2

1,4,5

Perplexity 40

cl_kmeans ● 1 ● 2 ● 3 ● 4 ● 5
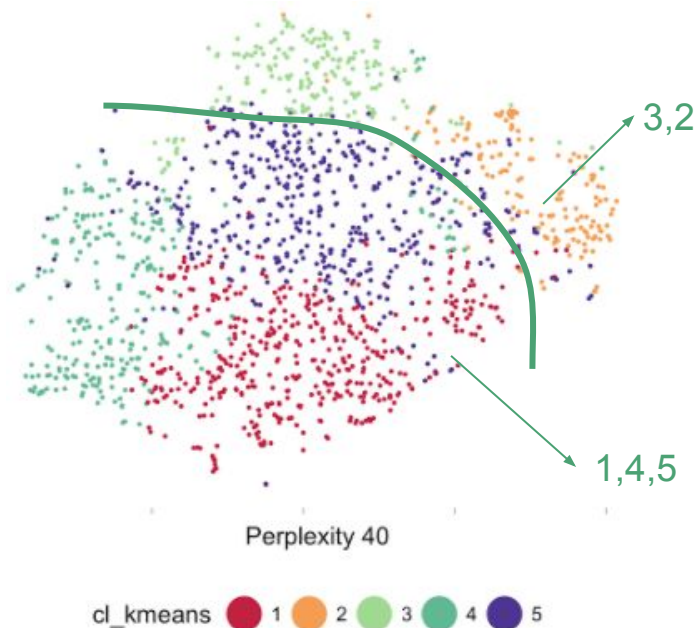
Cluster ID	Number of drivers	Interpretation
1	462	Respect speed limits, soft driving maneuvers.
2	154	Harsh braking close to traffic signs, aggressive driving.
3	186	Disrespect speed limits, sensation seeking (traffic and curves speeding), aggressive driving.
4	284	Soft driving maneuvers, moderate to low values on other TM.
5	446	Do not present extreme values on TM.

We are hiring !

jobs@motion-s.com

Motion•S S.A.
+352 - 26 20 21 56
2a, rue du Belvédère
L-5512 Remich
www.motion-s.com
info@motion-s.com