

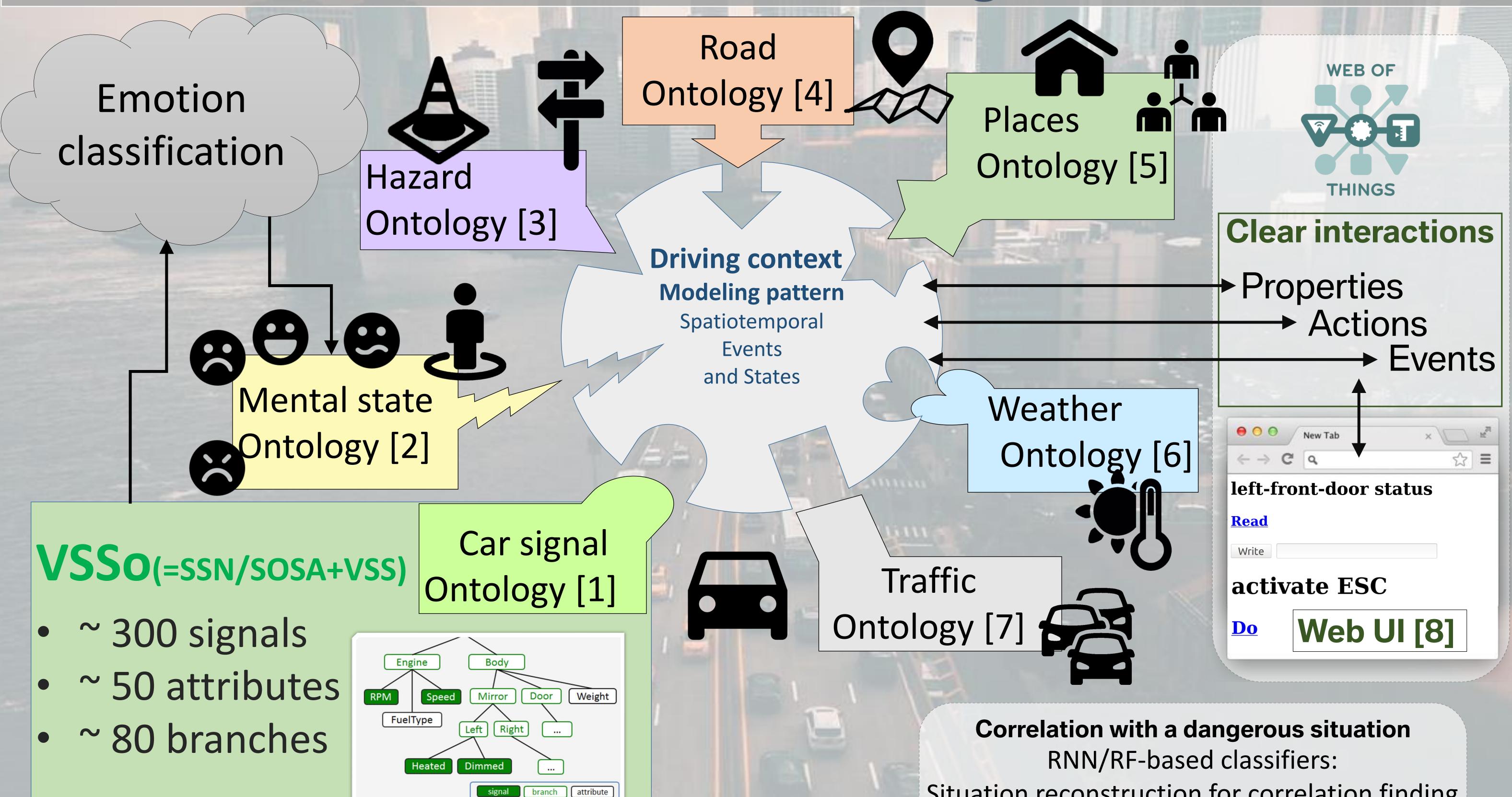
Benjamin Klotz^{1,2}, Raphaël Troncy¹, Daniel Wilms², Christian Bonnet¹ ¹ EURECOM, Sophia Antipolis, France, ² BMW Group Research, New Technologies, Innovations, Garching, Germany benjamin.klotz@eurecom.fr



We propose a car signal ontology named VSSo that provides a formal definition of the numerous sensors embedded in car regardless of the vehicle model and brand, re-using the work made by the GENIVI alliance with the Vehicle Signal Specification (VSS). We observe that recent progress in machine learning enables to predict a number of useful information using the car signals and environmental factors such as the emotion of the driver or the detection of dangerous situation on the road. However, there is a lack of a central modeling pattern for describing the dynamic situation of a vehicle, its driver and passengers, moving in an evolving environment. We propose a driving context ontology relying on a patterns composed of events and states to glue together automotive-related vocabularies.

How can a modular central modeling pattern for a driving context enable expressive interactions and complex queries?

A driving context ontology for making sense of cross-domain driving data



Competency questions

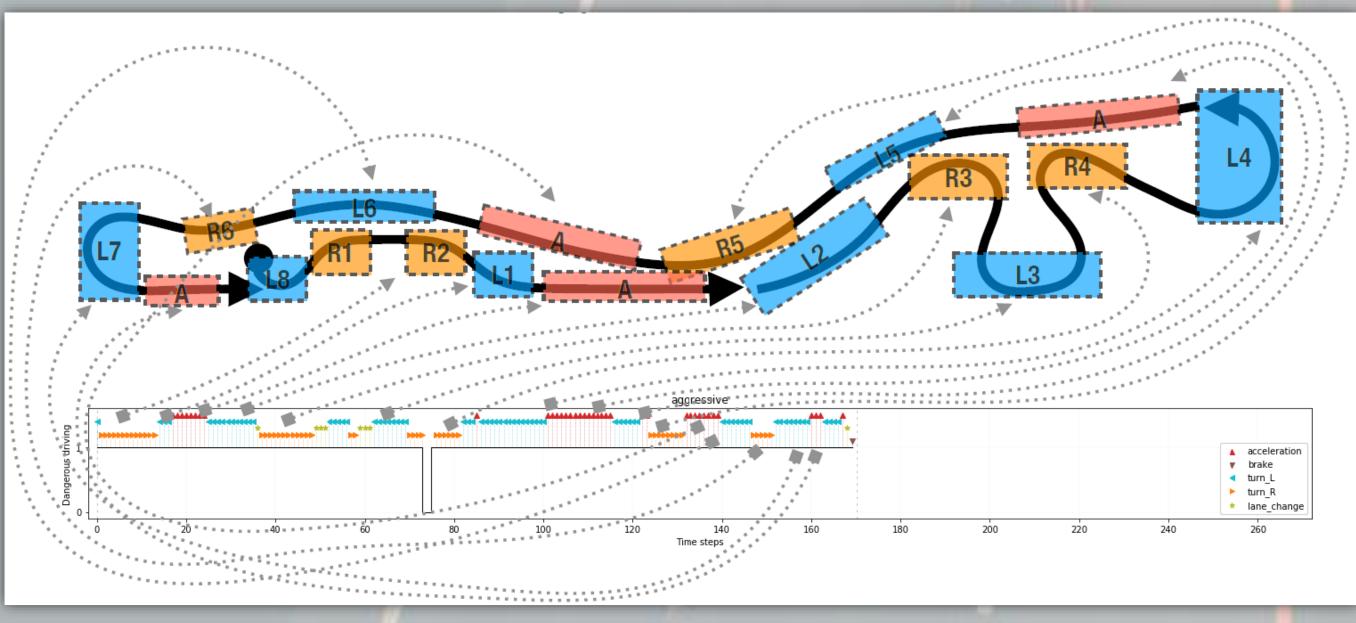
"Is this car overspeeding?" "What is the mood of the driver?" "What happened around this car the last time a dangerous situation was detected?"

Situation reconstruction for correlation finding Mental Diagnosis Controls Weather Hazard state Binary classifier **Dangerous situation** Triggér Signals

Evaluation

Implementation: context reconstruction with controls

RNN and RF (mean, standard deviation, median, trend) from 9 signals, with a dataset of 183 maneuvers, from 2 drivers in dangerous situations.



References:

[1] B. Klotz, R. Troncy, D. Wilms, and C. Bonnet. Generating Semantic Trajectories Using a Car Signal Ontology. In The Web Conference (WWW), Lyon, France, 2018. <u>http://automotive.eurecom.fr/vsso</u> [2] https://bioportal.bioontology.org/ontologies/MFOEM [3] <u>https://transportdisruption.github.io/</u> [4] <u>http://ci.emse.fr/opensensingcity/ns/sca/vocabulary</u> 81/ [5] <u>http://mapserv.kt.agh.edu.pl/ontologies/osm.owl</u> [6] https://ci.mines-stetienne.fr/seas/WeatherOntology [7] http://vocab.datex.org/terms/ [8] Benjamin Klotz, Soumya Kanti Datta, Daniel Wilms, Raphael Troncy, and Christian Bonnet. A car as a semantic web thing: Motivation and demonstration. In 2018 Global Internet of Things Summit (GIoTS) (GIoTS'18), Bilbao, Spain, June 2018.