



UNIVERSITY OF OULU

6G Visible - Enhancing Autonomous Driving with Dynamic Traffic Data

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Project background

The project aims to develop advanced solutions for autonomous and semi-autonomous driving while testing the capabilities of 6G network technologies to support real-time, safety-critical services. These solutions aim to provide visibility for objects not visible to drivers or detectable by existing vehicle sensors, even in various weather conditions. This involves creating dynamic, real-time models of the environment, traffic, and weather conditions, as well as detecting obstacles for autonomous or semi-autonomous vehicles.

Furthermore, it involves augmenting human rationality and knowledge with machine rationality and artificial intelligence, while utilizing various data and knowledge sources (e.g. vehicle, sensor, traffic, weather, feedback) to enhance data-driven decision making in (semi-)autonomous driving. The research is conducted through collaboration between software engineering/information systems, the Finnish Meteorological Institute, and leading industry collaborators in AI, digital twins, and autonomous driving.

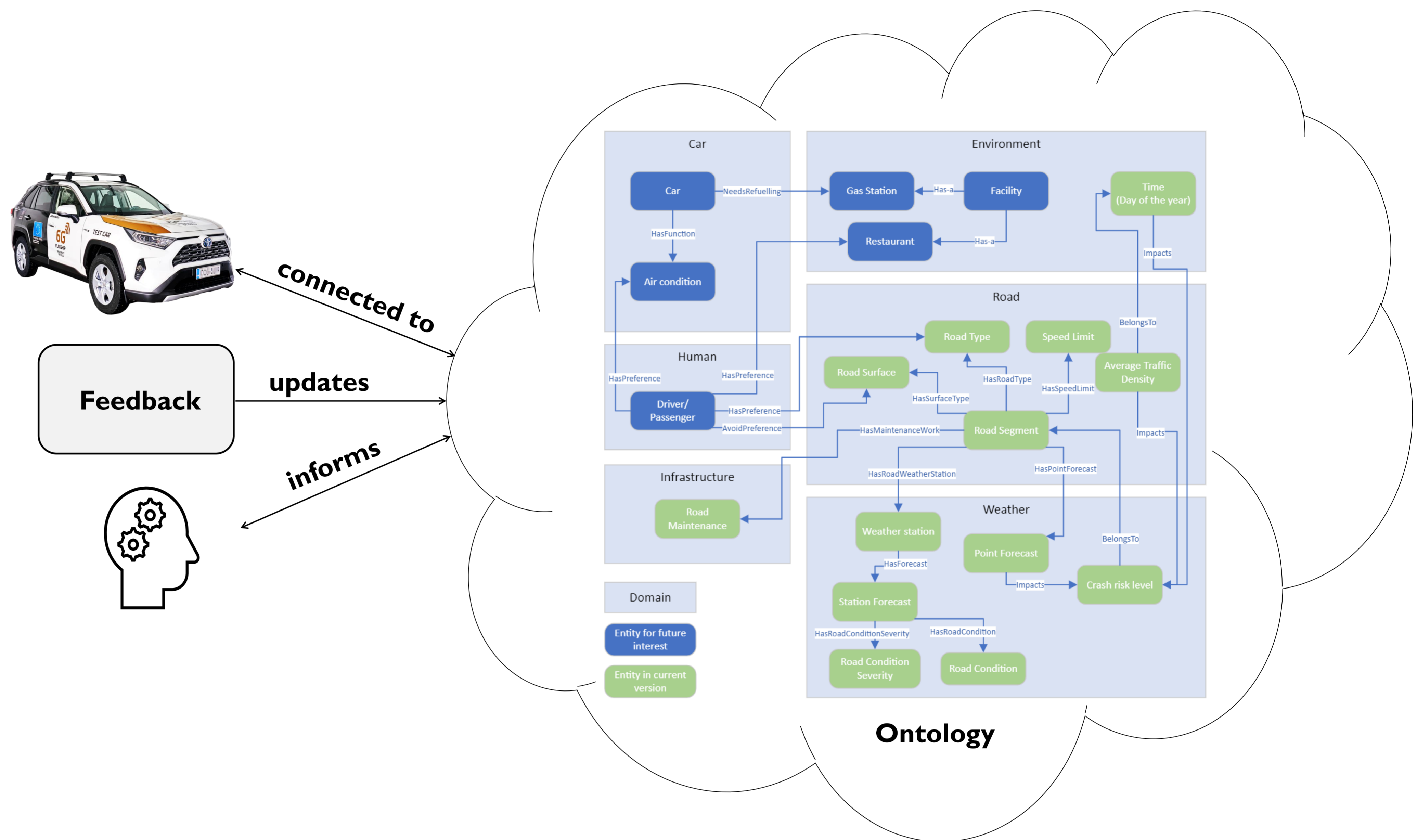


Figure 1. Augmenting human-machine knowledge and feedback in 6G Visible.

Use Cases

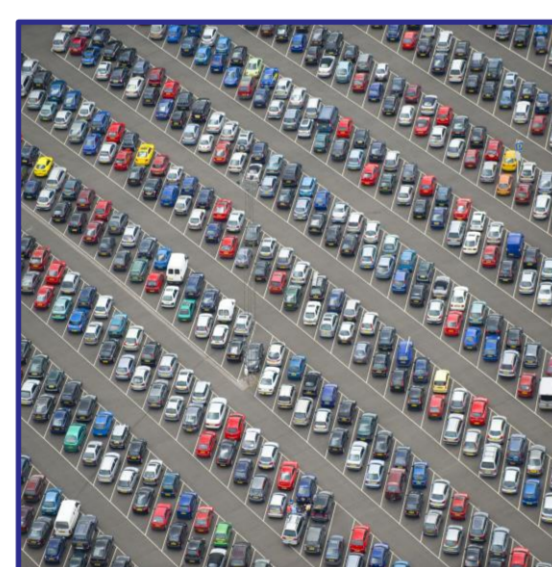


Route planning & change (current focus)

- Determine the optimal route and adapt to complex road situations, and changes in the environment, weather, and traffic.

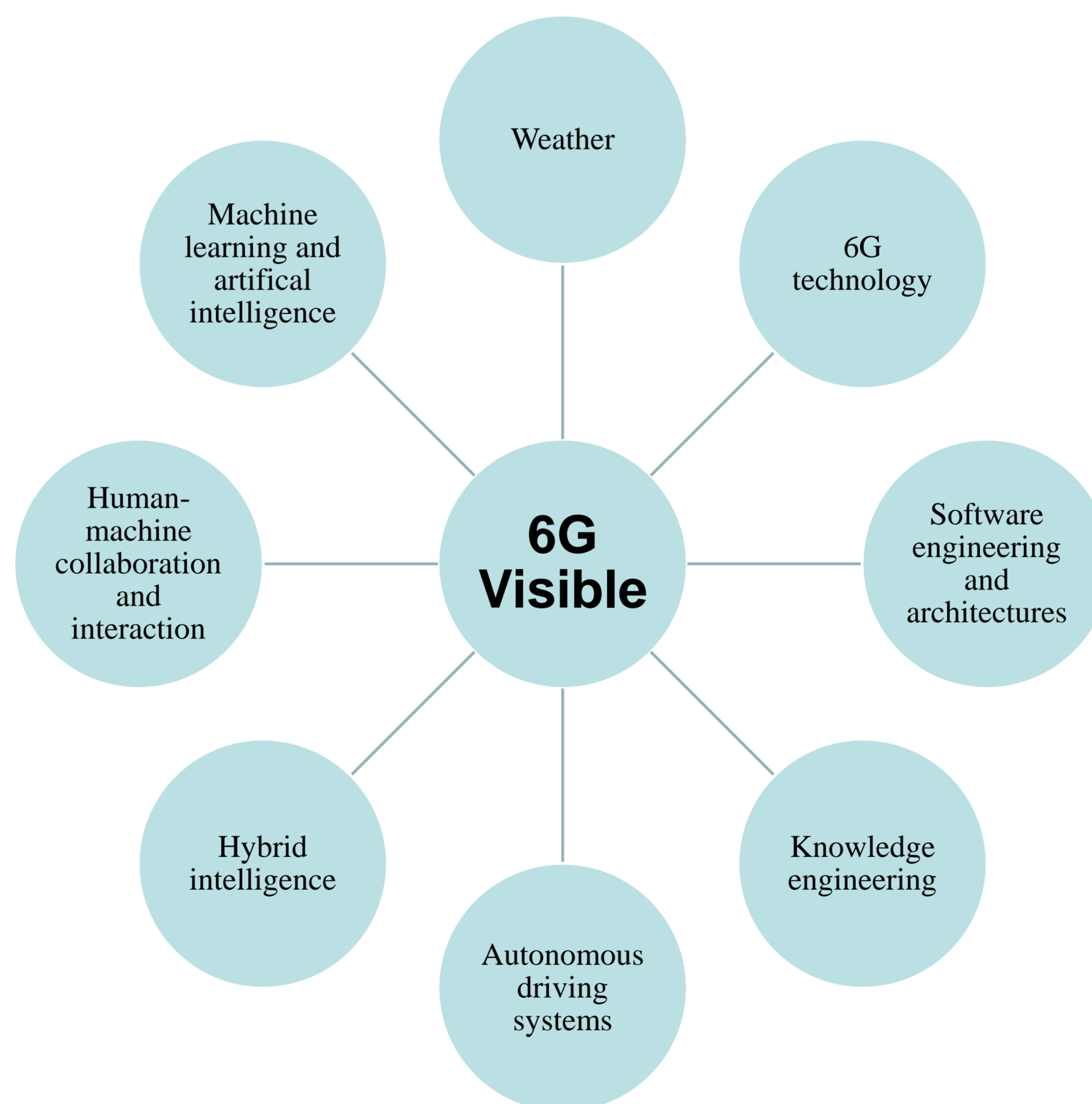
Parking

- Support automating the parking process according to the conditions.



Weather & lighting adaptation

- Adjust to various weather and lighting conditions based on data and the environment.



Research Activities

Ongoing

- Route planning with knowledge modelling and knowledge graphs
- Data-driven decision making and human-machine intelligence augmentation
- Predictive modelling of weather-related crashes
- Road weather forecasts
- Road weather services tailored for autonomous vehicles
- Precipitation nowcasting with weather radars
- Evaluation of sensor sensitivity to harsh weather
- System and software architectures related to traffic and 6G

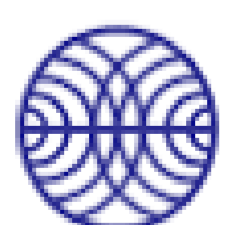
Planned

- Ontology building
- Designing a hybrid intelligence autonomous driving system

Research Consortium



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