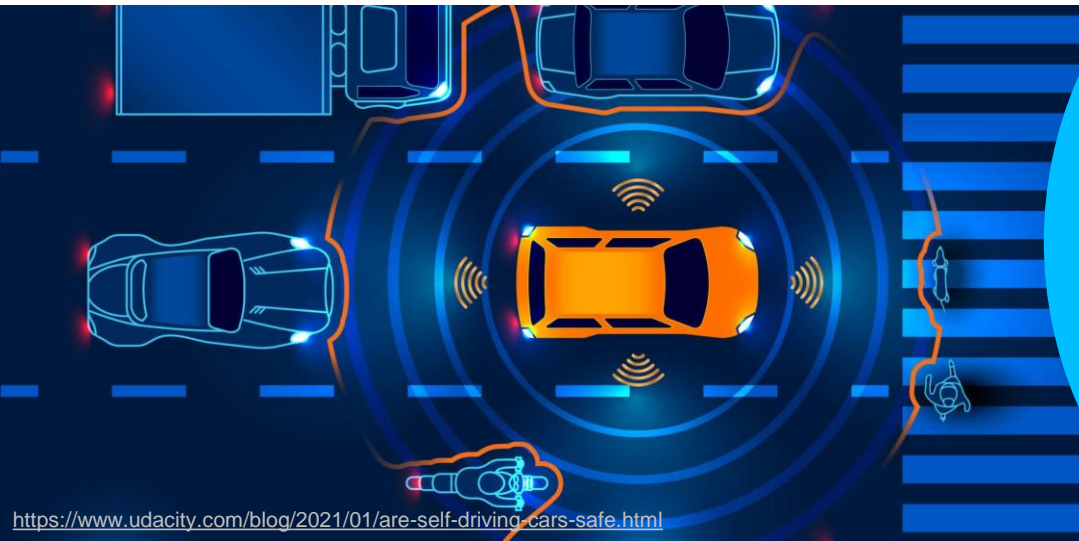


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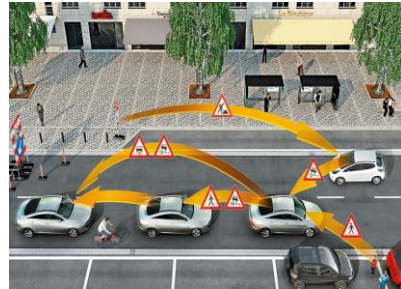
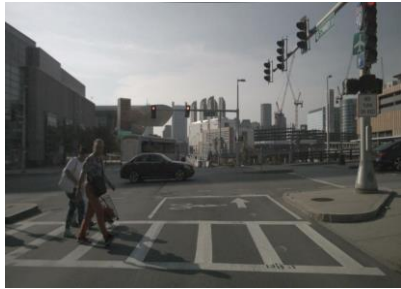
Dynamic situation-based selection of relevant sensor data in connected vehicles

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M.Sc., INFOTECH



Motivation

Why selection of relevant data?



- Limited FoV of sensors
- Blind spots due to occlusions
- V2X → object lists → position, speed
- Partial redundant transmission
- **V2X → necessary**
- **Large amount of data generated**
- **Channel efficiency reduces**

Objective

Situation-based

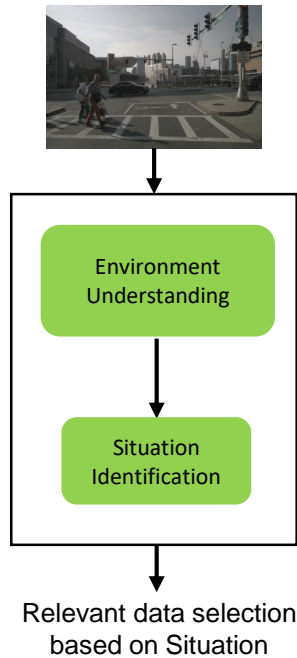
Selection of Relevant Data



- Development of a framework for intelligent selection of relevant sensor data based on the traffic situation of the vehicle
- Develop a prototype and evaluate it using metrics defined in the evaluation specification.

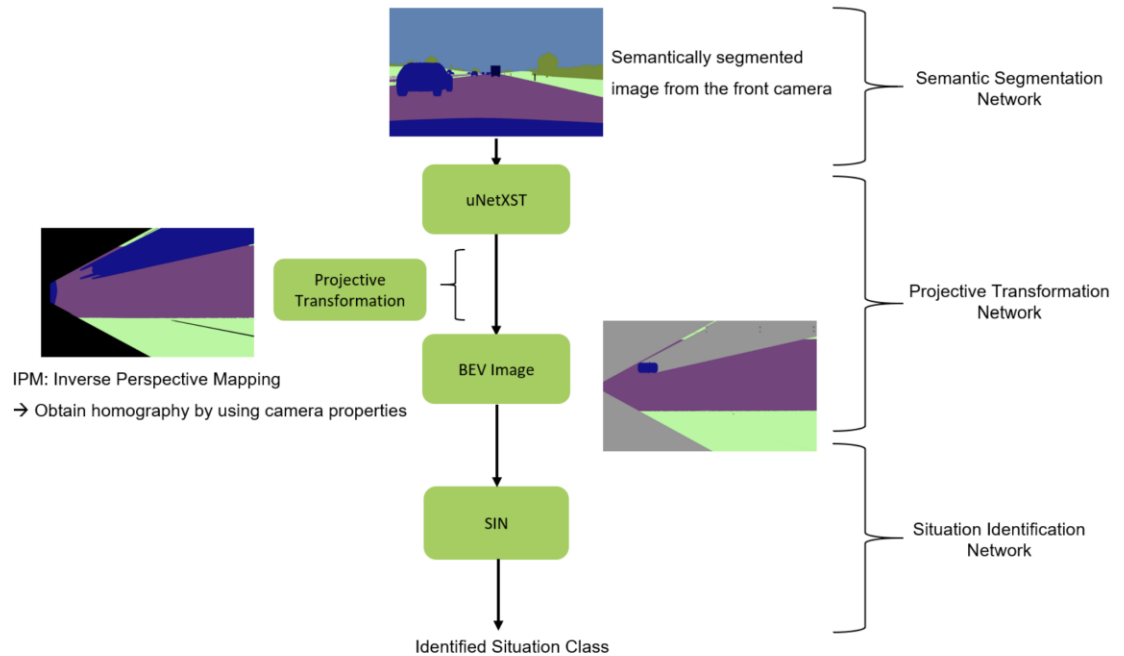
Concept

What does the system do?



Low Runtime essential to be within the upper limit of ETSI CPM rules

How does the system do it?



Evaluation and Results

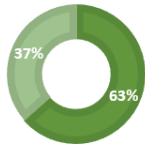
Evaluation Methodology

- Correct Situation Inference
 - Low inference time during the situation inference
- Evaluating the simulation reality gap for the same software
- Evaluation for selection of relevant data as per ETSI CPM rules

CARLA Simulation

SIMULATION RESULTS WITH RGB CAMERA

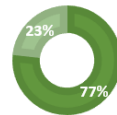
■ Correct Inferences ■ Incorrect Inferences



Inference Time: 0.5s
→ able to exchange CPM based on the situation at the rate of 2 Hz

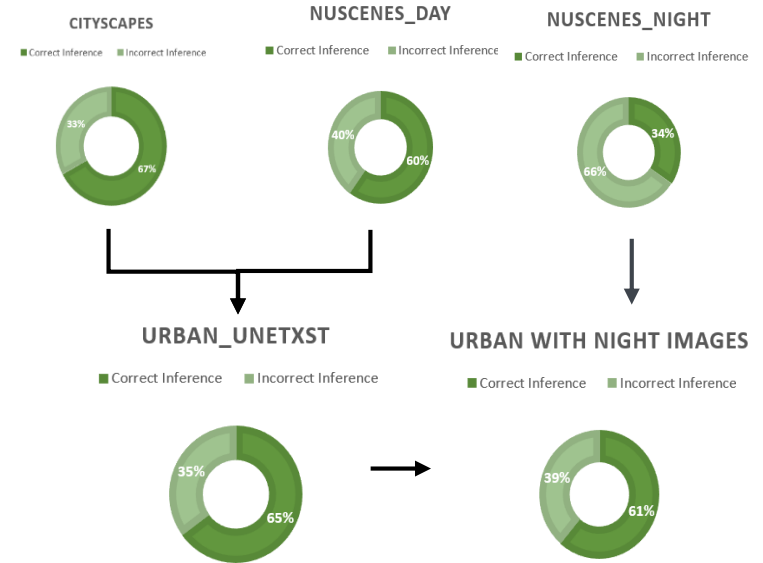
SIMULATION RESULTS WITH SEMANTIC SEGMENTATION CAMERA

■ Correct Inferences ■ Incorrect Inferences



Inference Time: 0.26 sec
• BEV generation → 0.16 sec
• SIN → 0.1 sec

Real-World Scenarios



- Average Inference Time: 0.37 sec - 0.38 sec
 - Semantic seg. → 0.19 sec
 - BEV generation → 0.13 sec
 - SIN → 0.06 sec
- CPM generation is now possible at 2 Hz, along with occlusion/blind spot data

CONCLUSION

- Dynamic Situation Identification enabled with low inference time and good efficiency
- Efficient blind spot/occlusion detection
- Functioning software prototype
- Simulation-reality gap not observed

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Thank you!



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