

A Context Prediction Architecture to Increase the Driver Comfort with Neural Networks



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Background

Challenged by the increasing complexity of today's software and physical environments specially in the domain of autonomous driving, new technologies are required which seamlessly integrate with driver and other occupants needs. The development of suitable context prediction methodologies to provide the proactive behavior for the intelligent applications, is however a challenge. The reason is that future context information, hidden in the raw context traces left by users in the real world, is not immediately accessible to applications. Therefore, sophisticated context prediction approaches are required that are able to discover and mine patterns (e.g. of a driver's behavior) from observed context history.

Description

The major challenge of a context prediction approach is in the prediction accuracy and prediction expressiveness. Neural Networks along with deep learning methods have shown noticeably better performance in comparison with their ancestors regarding the accuracy of the outcomes but it also issues more complexity and interpretability (Human Readability) problems and hence, arises serious challenges regarding the certifiability of these approaches. In this project the main objective would be on accuracy rather than human readability.

Tasks

This student project consists of the following tasks:

- Investigating the driver/occupants comfort factors and use cases inside the car
- Designing of a context prediction architecture for In-cabin comfort of the occupants
- Implementing the architecture with a Neural Network-based approach
- Validating the proposed approach beside identifying the limitations and challenges
- Testing and documenting the developed architecture for one of the use cases (@1)

References

- An Architecture for Context Prediction: <https://www.pervasive.jku.at>
- A survey of Prediction Approach in Pervasive Computing: [International Journal of Sci. & Eng. Research, May 2015](#)
- Learning Context Sensitive Behavior Models from Observations for Predicting Traffic Situations: [Bayesian Model for Estimating and Predicting Traffic Situations](#)

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Research project:

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Type:

Master Thesis, Guided
Research

Research area:

Autonomous Driving, Machine
Learning

Programming language:

Python

Required skills:

Python, Machine Learning,
Neural Nets, Modeling

Language:

Englisch

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