

# An Intelligent Personal Assistant with Proactive Behavior for Occupants of an Autonomous Car



Technical University of Munich

## Background

Intelligent algorithms not only help automated vehicles to drive safely, but artificial intelligence (AI) will be making its way into many aspects of a functional vehicle design and occupants comfort with the advent of Intelligent Personal Assistants (IPA). Nowadays, a nearly-perfect IPA inside a car is considered to be a car advisor on different situations, wellbeing coach of the occupants regarding their needs and health factors and acting as a chauffeur in absence of driver position for autonomous cars. One of the important features for an IPA is to provide the desired services in advance (real-time) although the development of suitable context prediction methodologies to provide the proactive behavior for such intelligent applications, is still a challenge.



Faculty of Informatics  
Chair of Robotics and  
Embedded Systems

## Description

The first objective of this project is to develop a basic Intelligent Personal Assistant (IPA) for the cabin of an (semi)autonomous car, which will cover a limited set of main factors of the occupants' comfort like their health (drowsiness detection), personal needs (appointments, cabin situation) and driving (finding the shortest path). The second objective of this project is to provide a set of services developed based on the applications on top of the aforementioned comfort factors, in a proactive manner in order to achieve a minimum level of user satisfaction according to his/her personal preferences. The core base of proactiveness, based on Reinforcement Learning, in IPA system must implement and cover the pre-defined use cases. Validating the implemented infrastructure would be the final goal of this project.

## Tasks

This student project consists of the following tasks:

- Extracting the in-cabin comfort factors
- Designing and developing a RL based algorithm
- Implementing the developed algorithm for proactive behavior
- Testing the pre-defined scenarios and validating the implementation
- Testing and documenting the developed system on a production car

## 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](#)
- Automotive Assistant for the Connected Car: [Use Case](#)

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**Supervisor:**

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**Advisor:**

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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 (NN),  
Embedded Devices (e.g. RPi)

**Language:**

Englisch

**Date of submission:**

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