

## Student Assistant Position (HiWi)



Figure 1: Example of a vectorized map with road boundaries, lane boundaries and traffic signs

## Software Engineering: Development of a Map Deprecation Framework for Vectorized HD Maps

Modern HD map construction methods, such as MapTRv2<sup>1</sup>, use sensor data from 360° surround-view cameras and LiDAR to generate detailed, high-definition vector maps. These methods extract features from sensor data, transform them into a Bird's Eye View (BEV) representation, and produce maps in a polyline format using transformer-based architectures. However, the accuracy of these maps depends heavily on precise labels. In practice, label quality can be compromised due to road construction, outdated data, or human labeling errors.

HD map change detection aims to identify misalignments between map data and recent sensor data when maps are outdated or inaccurate. While neural networks can detect these issues, they require large amounts of training data. Currently, the Trust but Verify (TbV)<sup>2</sup> dataset is the only publicly available benchmark for this task. Because real-world map changes are relatively rare, collecting enough data is challenging. One solution is to artificially introduce map changes — for example, simulating construction sites, lane closures, or changes in lane topology — and use these modified maps to train detection models.

### Your Role

In parallel with an ongoing master's thesis on the impact of map label noise on map perception, we are looking for a HiWi student assistant to:

- Extend the set of artificial map errors currently being developed
- Design and implement a Map Deprecation Framework in Python
- Integrate support for the Argoverse2<sup>3</sup>, Trust but Verify, and NuScenes<sup>4</sup> datasets
- Prepare the framework for open-source release on GitHub

I am happy to answer any questions you might have. Feel free to ask for an appointment or directly ask at my office!

<sup>1</sup>MapTRv2: <https://arxiv.org/pdf/2308.05736>

<sup>2</sup>TbV: <https://johnwlambert.github.io/tbv-dataset/>

<sup>3</sup>Argoverse2: <https://www.argoverse.org/av2.html>

<sup>4</sup>NuScenes: <https://www.nuscenes.org/>

**Institute of Measurement and Control Systems (MRT)**  
Prof. Dr.-Ing. Christoph Stiller

### Advisor:

Jonas Merkert, M.Sc.

### Programming language(s)<sup>1</sup>:

Python advanced

### System, Framework(s):

Linux, Git

### Required skills:

- Experience with map data and coordinates would be a plus
- Experience with NumPy and Matplotlib (shapely is a plus)
- Motivation and independent work style with the interest learning new things

### What we offer:

- Work with state-of-the-art methods and cutting-edge research
- Access to large GPU servers and HPC clusters
- Possibility to do the bachelor/master thesis afterwards

### Language(s):

German, English

For more information please contact:

### Jonas Merkert

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Or directly send in your application including your current grades as well as our questionnaire!

