

CAN YOU ALREADY PLAN YOUR OWN CAREER DURING YOUR STUDIES?

# YES.

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MOBILITY IS EXACTLY YOUR TOPIC AND WORKING INDEPENDENTLY IS YOUR STRENGTH? DO YOU WANT TO USE AND EXPAND YOUR PROGRAMMING SKILLS AND YOUR MACHINE LEARNING ABILITIES IN A PRACTICAL WAY? THEN START YOUR CAREER WITH US AT THE FRAUNHOFER IVI WITH A

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## THESIS (MASTER): **REINFORCEMENT LEARNING BASED TRAFFIC OPTIMIZATION**

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At the **Fraunhofer Application Center »Connected Mobility and Infrastructure«**, we research and develop concepts to design the mobility of the future in a safer, more efficient and resource-saving way. We are dedicated to current research questions on automated and cooperative driving and combine a wide range of competencies in the fields of sensor technology, communication and artificial intelligence. In the process, we use synergies with local industry and work closely with the city of Ingolstadt and its partners.

For our current research projects, we are looking for excellent students who would like to write their final thesis in the field of machine learning/reinforcement learning.

Within the scope of the thesis(es), cutting-edge methods for the optimization of traffic flows (e.g. in the context of autonomous mobility) based on reinforcement learning approaches are to be developed and evaluated. If interested, please apply with cover letter, CV, Bachelor's transcript, Master's transcript, a one-page letter on research interests and previous work/knowledge in the field of machine learning and especially reinforcement learning. We are looking forward to your applications!

### **Your profile**

- study one of the following or related fields: Data Science, Electrical and Information Engineering, Physics, Computer Science, Mathematics or Mechanical Engineering
- strong background in machine learning, deep learning and reinforcement learning
- very good grades
- very good programming skills in Python
- experience with TensorFlow, PyTorch and SUMO
- own studies in the field of reinforcement learning
- experience with algorithms such as Q-Learning, A2C, PPO, Rainbow
- very good understanding of neural networks as well as LSTM- and transformer-architectures
- motivation and ability to work in a team
- initiative and creativity

### **What you can expect**

- versatile and practical projects
- professional supervision
- motivated teams in an open-minded working atmosphere
- a modern research infrastructure and
- flexible working hours

Fraunhofer is the largest organisation for application-oriented research in Europe. Our thematic fields are oriented towards people's needs: Health, safety, communication, mobility, energy and the environment. We are creative, we shape technology, we design products, we improve processes, we open up new paths.

The Fraunhofer Institute for Transportation and Infrastructure Systems IVI in Dresden employs more than 100 scientists in four departments. The institute cooperates closely with the TU Dresden, the TU Bergakademie Freiberg and the Ingolstadt University of Applied Sciences.

The Fraunhofer Application Center »Connected Mobility and Infrastructure« in Ingolstadt as a new structural unit of the Fraunhofer IVI was founded in 2019 and uses the existing synergies from the competences of the THI and the Fraunhofer IVI, especially in its start-up phase. The plan is to develop further fields of technology in the coming years in the areas of autonomous systems, digitalisation in transport and vehicle and road safety.

**If you are interested, please contact us, quoting the reference number IVI-Hiwi-00669.**

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