

Student Internships and Part Time Jobs @ the 360Lab

Topic: Machine Learning for Risk Assessment in Self-driving Cars

The Team

The 360Lab is located at the Interdisciplinary Research Centre for Security, Reliability and Trust (SnT) of the University of Luxembourg.

The team conducts research in the broad area of mobility innovation. Topics of interest include, but are not limited to: Connected and Automated Driving, Artificial Intelligence for Automated Mobility, Security and Resilience of Automotive Systems, Sensing Technologies, Mobility Modeling and Simulation, and Transportation Planning.

For more information visit: <https://360lab.uni.lu/>

Your Role

Work with a team of researchers on machine learning models for evaluating accident risks in the context of autonomous driving. Typical tasks include:

- Gather real-world data using the lab's own experimental vehicle. This vehicle is equipped with a full sensor suite consisting of cameras, accelerometers, precise GPS, and a 3D laser scanner.
- Enrich dataset using contextual data from external sources
- Leverage state-of-the-art deep learning algorithms to extract risk factors from the recorded data. Possibilities include object detection (pedestrians, road signs, lanes, ...), behavior prediction, and others.
- Deploy the risk model on the experimental car and test it in real road scenarios.

If you are passionate about vehicular technologies and hands-on research within a team, please get in touch. Applications are welcome at any time of the year. Timing and specific project will be mutually agreed upon.

Requirements

- Master Student or strong Bachelor Student in Computer Sciences or equivalent engineering degree
- Python & proficiency with UNIX systems
- Experience with Machine Learning
- Experience with Computer Vision and with Tensorflow, PyTorch or Caffe2 is a strong asset
- Experience with C++ and Docker is a plus
- Fluent in English (oral and written)
- EU Driving License

Organization

- Location: SnT Research Center of the University of Luxembourg, Luxembourg City
- Expenses will be covered by a monthly lump sum

Contact: Dr.-Ing. Raphaël Frank, Research Scientist, Head of 360Lab, raphael.frank@uni.lu

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Topic: Machine Learning for Autonomous Driving

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Your Role

Work with a team of researchers on machine learning models for autonomous driving.

The lab has an experimental vehicle equipped with a full sensor suite consisting of cameras, accelerometers, precise GPS, and a 3D laser scanner, which will be used for this project. Typical tasks include:

- Developing and training state-of-the-art Deep Learning models for autonomous driving.
- Validating your approach in photo-realistic driving simulators (CARLA, AirSim).
- Deploying and testing algorithms on the lab's own experimental vehicle and test tracks.

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Requirements

- Master Student or strong Bachelor Student in Computer Sciences or equivalent engineering degree
- Skills: Python, proficiency with UNIX systems
- Experience with Machine Learning
- Experience with Computer Vision and with Tensorflow, PyTorch or Caffe2 is a strong asset
- Experience with C++ and Docker is a plus
- Fluent in English (oral and written)
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Organization

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Topic: Imitation Learning with Segmented Data for Autonomous Steering

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Your Role

Work with a team of researchers on deep learning models that autonomously steer a car end-to-end. Typical tasks include:

- Experiment with State-of-the-Art Deep Learning technologies for Image Segmentation
- Implement a Deep Learning pipeline that performs real-time semantic segmentation on camera images, then use the segmented data to autonomously steer a car using a CNN classifier.
- Deploy the Deep Learning pipeline in the experimental vehicle and test it in real road scenarios.

If you are passionate about vehicular technologies and hands-on research within a team, please get in touch. Applications are welcome at any time of the year. Timing and specific project will be mutually agreed upon.

Requirements

- Master Student or strong Bachelor Student in Computer Sciences or equivalent engineering degree
- Skills: C++, Python, proficiency with UNIX systems
- Experience with Machine Learning
- Experience with Computer Vision and with Tensorflow or Caffe2 is a strong asset
- Experience with Docker is a plus
- Fluent in English (oral and written)
- EU Driving License

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Topic: Kinematic modeling for Autonomous Driving

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Your Role

Work with a team of researchers on machine learning models for autonomous driving. The lab has developed from scratch a feature complete software stack for the autonomous operation of vehicles. This software can operate in real mode deployed in a car, or in simulation mode offline. Typical tasks include:

- Design and develop a Kinematic model for simulating a vehicles movement.
- Implement the simulator in either Python or C++
- Integrate the simulator into our existing software stack
- Use the simulator to evaluate multiple path planning and motion control algorithms

If you are passionate about vehicular technologies and hands-on research within a team, please get in touch. Applications are welcome at any time of the year. Timing and specific project will be mutually agreed upon.

Requirements

- Master Student or strong Bachelor Student in Computer Sciences or equivalent engineering degree
- Skills: C++, Python, proficiency with UNIX systems
- Experience with Machine Learning
- Experience with Computer Vision and with Tensorflow or Caffe2 is a strong asset
- Experience with Docker is a plus
- Fluent in English (oral and written)
- EU Driving License is a plus

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Topic: Sensor fusion for Autonomous Driving

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Your Role

Work with a team of researchers on methodologies for fusing sensory data produced by an autonomous vehicle. The lab has an experimental vehicle equipped with a full sensor suite consisting of cameras, accelerometers, differential GNSS, and a 3D laser scanner, which will be used for this project. Typical tasks include:

- Design and develop sensor fusion techniques based on Kalman Filters:
 - evaluate and reduce measurement errors
 - fuse together measurements from diverse sensors
- Implement a method that generates a Hybrid Occupancy Grid from offline map data and the fused sensory input
- Work with our engineers to Integrate these technologies into our existing software stack

If you are passionate about vehicular technologies and hands-on research within a team, please get in touch. Applications are welcome at any time of the year. Timing and specific project will be mutually agreed upon.

Requirements

- Master Student or strong Bachelor Student in Applied Mathematics or equivalent engineering degree
- Experience with advanced statistics
- Experience with regression analysis
- Experience in C++, Python, and Linux systems are important assets
- Fluent in English (oral and written)
- EU Driving License is a plus

Organization

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