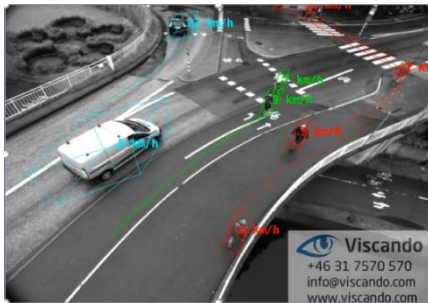
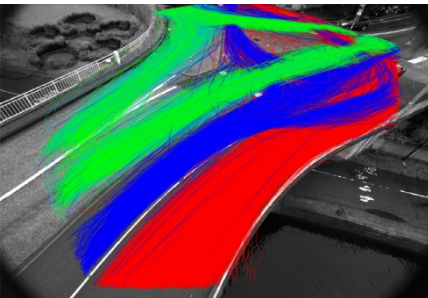




Viscando, a high-tech start-up company from Gothenburg, accelerates transition to safer, more sustainable, and enjoyable mobility. We help cities to design safer traffic infrastructure, to implement efficient and predictive traffic control and accident mitigation. We assist autonomous vehicle (AV) developers with ensuring safety of AVs in real traffic, teaching AVs to understand and predict reactions and intentions of human road users, as well as providing them with sufficient real time information about the surrounding traffic situation.



The way we do it is through collecting real time, accurate and objective information about movements, behaviors, interactions, and conflicts of road users using our in-house developed 3D&AI based stationary stereovision sensors. We use this information to yield actionable insights on traffic risks, real-time traffic information, as well as traffic scenarios and behavior models.



We collaborate with many cities and municipalities in Sweden, universities, research institutes like RISE and VTI, and leading companies in automotive sector, for example Zenseact, Veoneer and Ericsson.

Our ongoing technology development – from signal processing in sensors to building behavior models for AVs – is research intensive, so we can offer challenging and exciting master's degree projects to ambitious and high-performing students interested in traffic safety and autonomous driving.

Short project descriptions are provided below. Details of the projects will be further decided with chosen students and their academic supervisors.

### **Deep learning-based object segmentation and classification for stereovision sensors**

Summary: Developing state of the art DNN-based object detection and classification algorithms for stereo images, to enhance 3D reconstruction-based stereovision algorithms. Two alternative implementations are of interest: either high efficiency real-time algorithms for embedded hardware or high accuracy ones for powerful computational servers.

This project requires competence in machine learning, programming (including GPU programming), mathematics and data analysis, and is suitable for 1-2 students.

### **Efficient and accurate real-time tracking in infrastructure sensors**

Summary: Improving real-time object tracking algorithms for single or multiple interconnected stationary infrastructure sensors. Based on known limitations of current tracking and identified customer needs, suitable improvements shall be chosen, implemented, and evaluated.

This project requires competence in signal processing, mathematics, programming (C++ and/or Python), data analysis, and is suitable for 1-2 students.

### **Simultaneous calibration and tracking in stationary sensor grids**

Summary: Development of a method to identify accurate positions and orientations of individual stationary sensors in a sensor grid by optimizing object tracking for traffic objects moving across the field of view of the sensor grid.

This project requires competence in mathematics, signal processing and optimization, data analysis, and is suitable for 1-2 students. Preferable programming language is Python.

### **Data driven AI human behavior modelling for autonomous driving**

Summary: Development of an AI-based behavior model for a chosen type of road user (pedestrian, cyclist or car driver) interacting with other road users in a specific traffic situation (e.g. pedestrian crossing). The model, that we envision to be based on inverse reinforcement learning (IRL) technique, shall be integrated in a traffic simulator to enable simulation of autonomous vehicles interacting with human road users.

This project requires competence in AI, mathematics, programming (Python) and is suitable for 1-2 students.

### **AI-based intention prediction for early traffic conflict detection**

Summary: Development of data- and AI-based intention prediction model. This model will be trained on previous experience of road users' movements and conflicts for a specific location (which comes from historical data from Viscando sensors) for real-time prediction of potential conflicts for new road users entering the location.

This project requires competence in AI, mathematics, programming (Python) and is suitable for 1-2 students.

### **Scenario extraction from naturalistic driving data**

Summary: Identification of different types of road user interactions (also called scenarios) from naturalistic driving data for a specific location, for example a complex urban intersection. These scenarios will be further parametrized and parameter statistics for different scenario types quantified.

This project requires competence in data analysis, programming (Python), statistics and is suitable for 1-2 students.

---

Want to apply or to know more? Please send an email to Yury Tarakanov, [yury@viscando.com](mailto:yury@viscando.com). To apply, attach your CV, grades and a short personal letter describing why you are interested about the project,

and how your education and experience fits to it. Please also provide a short list of relevant projects (e.g. course projects).