

Title: Behaviour modeling and prediction in varying traffic scenarios

Level: Bachelor/Master

Keywords:

Behaviour modeling and prediction, autonomous driving, Lyft dataset

Supervisor: Naveed Muhammad, **Co-supervisor:** Yar Muhammad

Skills required:

Strong programming skills, experience with deep learning and large datasets

Description: As drivers, humans instinctively take into account factors such as location speed, acceleration etc. of other vehicles in order to predict the future behaviour and devise a suitable, safe and efficient manoeuvre while in traffic. This is not trivial for an autonomous vehicle. In this project you will work with Lyft motion prediction dataset and investigate filtering and machine-learning based techniques for modeling and prediction of agent behaviour in traffic.

Some relevant literature:

[1] Lefevre S., Vasquez D., Laugier C., "A survey on motion prediction and risk assessment for intelligent vehicles", ROBOMECH Journal, 2014.

[2] Naveed Muhammad, Björn Åstrand, "Predicting Agent Behaviour and State for Applications in a Roundabout-Scenario Autonomous Driving", Sensors, 19(19), 2019.

[3] Naveed Muhammad, Björn Åstrand, "Intention Estimation Using Set of Reference Trajectories as Behaviour Model", Sensors, 18(12), 2018.

[4] The dataset: <https://www.kaggle.com/c/lyft-motion-prediction-autonomous-vehicles/data>

[5] Sajjad Mozaffari, Omar Y. Al-Jarrah, Mehrdad Dianati, Paul Jennings, Alexandros Mouzakitis, "Deep Learning-based Vehicle Behaviour Prediction For Autonomous Driving Applications: A Review", Arxiv 1912.11676, Available at <https://arxiv.org/abs/1912.11676>