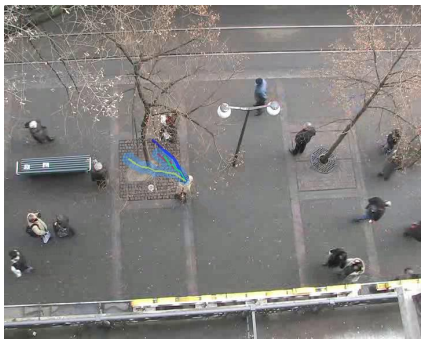
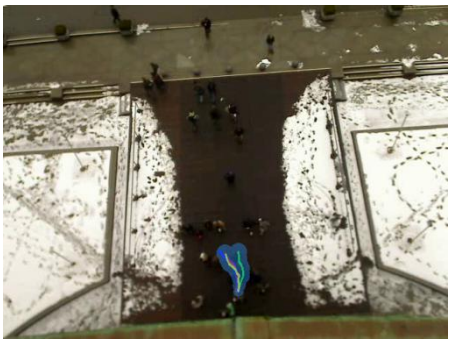
Improving Deep Learning Pedestrian Prediction Models Online

MSc. Project Proposal at the Autonomous Multi-Robots Lab, Cognitive Robotics, TU Delft

Brief description: The prediction of human motion is vital for the safe navigation of autonomous robots among humans. Data-driven methods have demonstrated to achieve state-of-art trajectory prediction performance accounting for the interaction among the agents, the static environment, and multi-hypothesis [1]. Yet, their performance is strongly depend on the training data and may show poor performance on real systems due to the Real-to-Sim or Real-to-Data gap. In contrast, Online Learning algorithms have demonstrated to learn the system dynamics improving the motion planning performance of an autonomous racing vehicle [2]. This project aims to employ the recent advancements in online learning methods [3] to develop a new algorithm to improve the prediction performance of a data-driven method online.





You will test your approach in experiments with a mobile robot (Jackal) and on-board sensing and computing (RealSense D435i, NVIDIA Xavier) at the CoR Lab and the Cyberzoo at TUD.

Desired qualities:

- Motivated and independent
- Good problem solving skills
- Experience/interest in Deep Learning and Reinforcement Learning
- Experience in Python, C++ and Robot Operating System (ROS)

For further questions or to apply, please contact B. Brito <bruno.debrito@tudelft.nl> or Ass. Prof. Dr. J. Alonso-Mora <j.alonsomora@tudelft.nl>. When applying, please provide a short motivation, up to date CV, a transcript of your current degree program and intended start date.

Group information: http://www.alonsomora.com/

References:

[1] Rudenko, Andrey, et al. "Human Motion Trajectory Prediction: A Survey." arXiv preprint arXiv:1905.06113 (2019).

[2] Wagener, Nolan, et al. "An Online Learning Approach to Model Predictive Control." arXiv preprint arXiv:1902.08967 (2019).

[3] Hall, Eric C., and Rebecca M. Willett. "Online convex optimization in dynamic environments." IEEE Journal of Selected Topics in Signal Processing 9.4 (2015): 647-662.