VU Autonomous Racing Cars (2020S)
Lab 8: Reinforcement Learning

Team 3
Stefan Adelmann
Hannes Brantner
Daniel Lukitsch
Thomas Pintaric

Overview

- Training was done on the **f1_aut** track.

- We used the **Tensorforce*** framework

  *) https://github.com/tensorforce/tensorforce

  - Proximal Policy Optimization (PPO),
    using mostly default hyperparameters
  - Network: Two-layer CNN
  - 1:9 laser scan subsampling (120 rays)
  - Small batch size (10 episodes)
  - Randomized exploration (additional action noise)
  - Trained for 3K episodes (about 10K would be ideal).
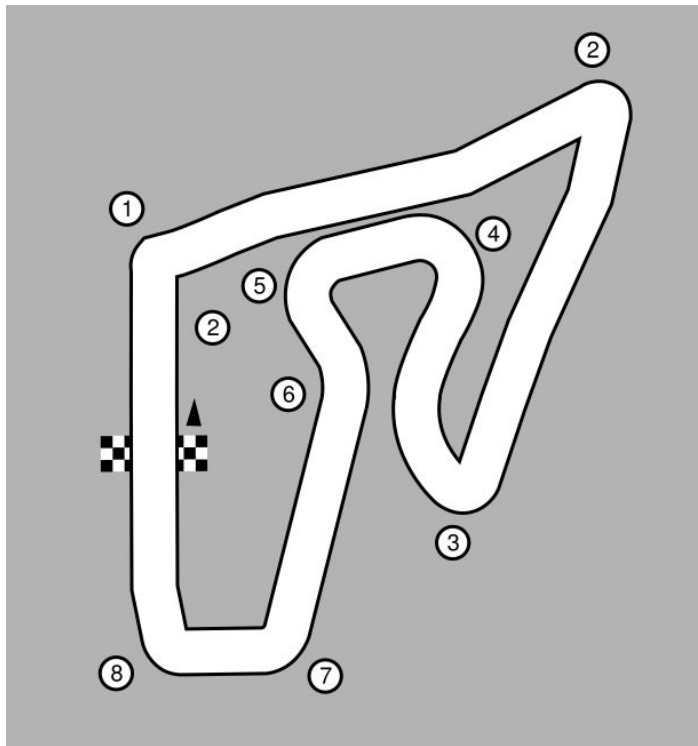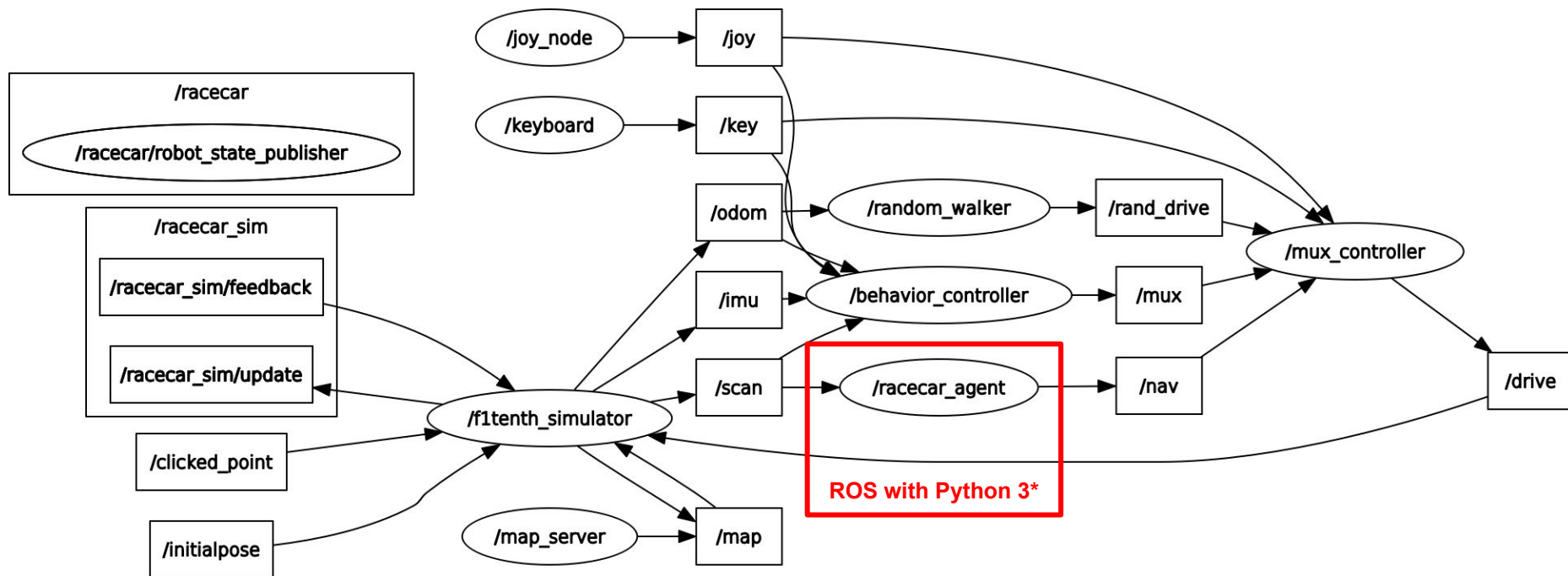
Reward shaping

Reward is based on two **pre-computed costmaps**:
Driven distance, distance from closest obstacle.

State space exploration (after 2800 episodes):

Runtime deployment (ROS)