Project Description

Hugot Simon
University of Luxembourg
Email: simon.hugot.001@uni.lu

Mats Brorsson
University of Luxembourg
Email: mats.brorsson@uni.lu

1. Main objectives of the BSP

AWS Deepracer is a race simulator, virtual or physical, that puts car in an environment, which then needs to learn its way around a track using reinforcement learning. This is done with a reward function which will influence the actions of the car. The goal of this project is first to understand and explain what reinforcement learning is and then to experiment with multiple reward functions in the AWS Deepracer environment with the multitude of hyper-parameters. And afterwards, report how these function affect the performances of simulation inside the AWS Deepracer.

2. Required competencies to work on this Bachelor Semester Project

- Knowledge of python
- Basic notions of how neural networks work
- Notions in linear algebra

3. The scientific aspects of this BSP

The scientific aspects of this project are mostly under-standing how reinforcement learning works with the reward function, what are its principles and what are its differences and benefits compared to other machine learning methods. This same study must also be conducted on the value function and policy which are essential parts of reinforcement learning. Another goal is to explain how the AWS Deepracer framework works. This means to explain how the training process is done inside of AWS, what concepts it uses.

4. The technical aspects of this BSP

The main technical objectives are to create AWS Deep-racer models that use the different reward functions and therefore see the difference in the results of those models. Each model has several parameters that can also be modified to affect the performances of the model