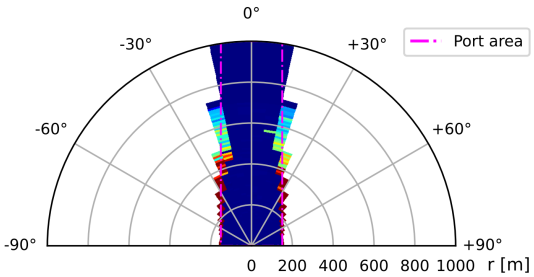
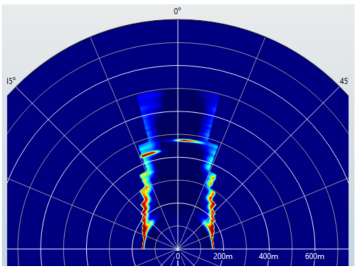
Bachelor/Master Thesis

# Stochastic Observation Modelling for a Deep Reinforcement Learning Environment

Deep Reinforcement Learning (DRL) is a machine learning method that can be utilized to autonomously control a SONAR system, e.g. for harbor monitoring purposes. For training, a virtual training environment is required for the Reinforcement Learning (RL)-agent to interact with. From these agent-environment interactions, an optimal control strategy can be learned to maximize a reward function. This RL-agent is represented by a neural network which can later be exported for the agent to be deployed in another environment. The agent's behavior might differ when the observations of the deployment environment differ from the ones observed during training. To improve interoperability, the training observations should closely match the expected deployment observations.



The goal of this thesis is to adapt the observations of an existing training environment written in Python, used to train a SONAR-system controlling agent for port monitoring. These observations should closely match the expected observations of a real-time SONAR simulation environment where the agent is to be deployed. For this, methods of stochastic data modeling are to be researched to analyze the existing data and generate new SONAR observations accordingly. The DRL-training is to be rerun after adaptation and both the training results and the compatibility of the trained agent in the deployment environment are to be examined.

## Requirements and skills

- Sound knowledge Python
- Experience with data analysis
- Interest in stochastic modelling & Deep Reinforcement Learning

## Contact

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