

Supervisor's report on student's Bachelor Thesis

May 24, 2022

Student's name: Aleksandr Barinov

Thesis title: Learning Dynamic System Control on a Data Driven Model

Faculty: Faculty of Electrical Engineering

Department: Department of Cybernetics

Supevisor's Department: Department of Cybernetics

Overview of the task The task deals with learning a high performing control law for a highly non-linear dynamical system using Reinforcement learning in simulation and on a data-driven neural network model. This topic is an active area of research and deals with many difficult aspects of sequential deep learning. I assess the difficulty as very challenging due to the amount of new concepts that the student has to familiarize himself with, the advanced algorithms that are required to be used and a significant amount of experimentation, problem solving and debugging to make such a system work on an embedded linux system.

Result All mandatory thesis requirements have been well met, and with decent results. The level of programming in the project is quite high and decently organized, integrating various state of the art deep learning libraries and other systems such as ROS into the project. Aleksandr has been active throughout the last two semesters and has come for consultations every second week. His work has mostly been independent and he was proactively trying new solutions to the countless problems faced along the way. He has also implemented several additional experimental approaches in attempt to solve problems with fast localization and control but we decided to abandon them due in interest of time and were therefore not included in the final thesis. A negative aspect in his work is the inability to systematically and thoroughly decompose and debug a complex system. This lead to delays in progress and end-results which are satisfactory, but could be more impressive. Overall I grade the work positively.

Some minor comments: There are a few minor mistakes such as missing gradient symbols in the policy gradient loss definitions and derivation.

1 Grade

Assignment grade: A (excellent)

2 Supervisor

Supervisor: Teymur Azayev

Date: 24.05.2022

Place: Prague

Signature: