

Supervisor's report on student's Bachelor Thesis

May 24, 2022

Student's name: Jiří Hronovský

Thesis title: Learning a Structured Locomotion Algorithm for Hexapod Robots

Faculty: Faculty of Electrical Engineering

Department: Department of Cybernetics

Supevisor's Department: Department of Cybernetics

Overview of the task The task was to create a hand designed legged control algorithm and turn several suitable heuristic modules of the algorithm into learnable functions in attempt to achieve superior performance through random search optimization. The task was reasonably difficult, requiring a lot of programming in simulation, as well as the use of robotics methods such as forward/inverse kinematics and machine learning methods such as neural networks and evolutionary strategies.

Result This task was reasonably implemented, with a nice GUI, and achieves good results. The results are also compared to an unstructured approach and tested on several different terrains, followed by a discussion and comparison of the approaches. In this regard, I consider all individual mandatory requirements of the thesis to be well met. Jiří worked independently and attended consultations regularly every week. The thesis is generally organized well enough but the results are slightly more difficult to navigate due to the amount of comparisons.

Some minor comments: Many acronyms, in some places there is a minor mixup with older versions (LSA, LSP) Some algorithm pseudocodes could be improved from nested forloops to a more readable format. I would have welcomed an analysis of the reward landscape of the structured learning method which was discussed during consultations but didn't make it to the final version. Would be nice to see the performance of the rest of the black box optimizers at least on a single experiment.

1 Grade

Assignment grade: A (excellent)

2 Supervisor

Supervisor: Teymur Azayev

Date: 24.05.2022

Place: Prague

Signature: