

Navigation By Reinforcement Learning

3D Vision Project Proposal
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 March 9, 2018

GROUP MEMBERS

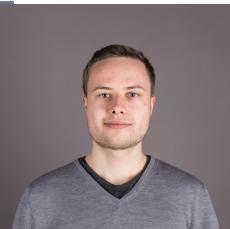
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I. DESCRIPTION OF THE PROJECT

In the Industry 4.0 the need for automation increases tremendously and thus the demand for robots with high navigation abilities in complex three-dimensional surroundings grows vastly. Especially deep learning allows an efficient approach to achieve this. Savinov et al. [1] used an animal inspired non-metric (Gillner Mallot, Foo et al.)[2, 3] semi-parametric topological memory (SPTM) approach. With this approach, they were able to improve their success rate by a factor of three compared to their baselines. Our team will evaluate further tensorforce based baselines which follows the same evaluation procedure as introduced by Savinov et al. [1] and will allow to put their work on an even more solid foundation. [1].

II. WORK PACKAGES AND TIMELINE

Timeline and project planning Our project is organized in four main parts. We will start with an orientation phase to gain some knowledge about previously done work, focused mainly on Nikolay Savinov's paper REFCITE. We will then use our gathered insights to deploy the same environment for training and testing GITHUB of our agent within the vizdoom environment GITHUB and use the same evaluation methods of Reinforcement Learning baselines that were used in Nikolay REFCITE. We go for this setup to be later able to benchmark the performance of our agent against the results of the paper REFCITE. Our vizdoom agent will be trained with the AC3 algorithm REFCITE and if there is time left also with PPO REFCITE. 15.03.18 Finishing orientation 23.04.18 Midterm presentation

28.05.18 Final Presentation, Project finished

III. OUTCOMES AND DEMONSTRATION

The expected outcome of this project is a fully functional agent, implemented with the A3C, as well as the PPO algorithm. Therefore, the agent needs to pass through the same training, validation and test process as referred to in the paper [1]. The performance of said algorithms should be like the baselines in the paper, namely between 20-30%. The result will be illustrated as graphs which show the success rate over steps. Furthermore, we want to show the result of the two agents in form of a demonstration video.

Instructions:

- The document should not exceed two pages including the references.
- Please name the document **3DVision_Proposal_Surname1_Surname2.pdf** and upload it via the moodle.

REFERENCES

[1] John Doe and Jane Doe. A closely related paper. In *an awesome conference*, 2014.