THESIS TASK DESCRIPTION

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Visual Task Solving using Reinforcement Learning

Machine Learning methods have revolutionized various fields of intelligent perception and pattern recognition in the last decade. Deep Learning in particular has proven to be the state-of-the-art solution in most machine learning applications. One of the most relevant applications of deep learning is in the field of Reinforcement Learning, where deep neural networks learn to perform tasks from visual inputs.

While the effects of architecture and hyperparameter choices are quite well known in the field of supervised and even unsupervised learning, such knowledge is not quite as available in the field of reinforcement learning due to high computational costs. Therefore the investigation of different architecture choices, hyperparameter settings, and their effect on the learned policy is a necessary task.

The student's task for the thesis is to implement a deep neural network-based solution for performing tasks in a virtual environment via reinforcement learning and training the agents on a number of tasks.

The student's tasks include the following:

- Explore the relevant literature. Present solutions proposed by other researchers.

- Propose an architecture for learning tasks using visual inputs in a virtual environment.

- Implement and train the proposed solutions.

- Evaluate the accuracy and efficiency of the proposed methods. Compare the performance of different models on different environments.

- Examine the computational efficiency of the proposed methods and compare them.

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