Vision Based Robot Manipulation Testbed for Reinforcement Learning

In order to assist in general tasks, autonomous robots should be able to interact with dynamic objects in unstructured environments. Robot manipulation of objects is the key component in all autonomous robot applications requiring interaction with environment. In vision based robot manipulation, robot has to measure the environment state using camera and take actions according the measured state and goal. The main challenges in here are interpreting the noisy high dimensional data from camera and deciding actions according to stochastic and non stationary environment state.

This project will develop a testbed for evaluating and developing various reinforcement learning algorithms for vision based robot manipulation tasks. Reinforcement learning algorithms usually have very low data efficiency and require lot of training data. Traditional testbeds available for robot manipulation tasks are not designed for parallel/distributed training making them slow for collecting training data. Developing a testbed which can run multiple simulations in parallel and is flexible enough for testing different reinforcement learning algorithms on different tasks like grasping, moving etc. will aid in developing RL algorithms faster and can be used as a standard framework for benchmarking different RL algorithms.

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