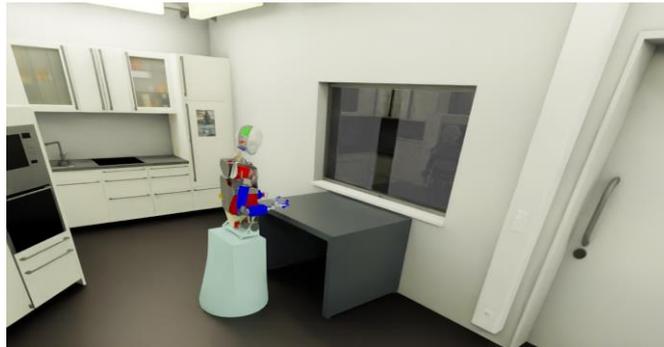


## Internal simulation of Robot Experiences in Blender

Remembering what happened in the past is one key element of intelligence. We as humans make massive use of multi-modal temporal experiences when being faced with new scenarios or when deciding how to behave in a certain situation. Most robots however do not have such an episodic memory and therefore cannot make use of their experience. For this reason, we are developing a new memory component, which collects and stores episodes from the robots perception and inner cognitive processes.



*The humanoid robot ARMAR-III in a simulated environment for high-quality data augmentation. The input of the augmentation is an experienced episode. The output is a episode with modulated physical properties or different environments.*

We as humans are able to learn from only a few samples. We only need to see or perform a skill once in order to refine our inner model. Machine Learning techniques on the other hand usually need a great amount of data for generalization. Augmentation offers a way to generate new episodes from already experienced ones. This process can be seen as robot “dreaming”. It lets the robot rediscover important episodes of a day and use the simulated outcome of the episode for learning. We recently connected our multi-modal episodic memory to Blender, in order to generate high quality simulations.

In this project, you will improve our existing ArmarX memory structure with mechanisms simulating the outcome of an episode with modulated physical properties or in different environments.

Knowledge in C++ is required for this work. Knowledge in Machine-Learning tools (such as Tensorflow) will be helpful but is not required.

- ArmarX (C++): [armarx.humanoids.kit.edu](http://armarx.humanoids.kit.edu)

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