Abstract of Presentation

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Augmenting Computational Neuroscience from Robotics: Trying to Grasp Grasping

Abstract: Looking into the brain is notoriously hard. Therefore, many hypotheses about brain function are first tested in simulation for their feasability and for making predictions within the scope of the entailed idealizations. With the availability of increasingly sophisticated robots, the simulation approach can be complemented in an important way: computational ideas about how the brain connects perception and action can now be implemented on robot systems. This makes such ideas testable in real world situations and offers new avenues for modeling brain function: instead of having to model all components of the interaction between the brain, the body and the world, the body model becomes replaced by a real item, the robot body, turning the modeling of the interactions with the world "into the real thing". Testing hypotheses in such settings exposes them to new challenges that may be easily overlooked in the more idealized, pure simulation approaches and that arise from unexpected or hard-to-model properties of real-world interactions that easily escape the idealizations even of sophisticated simulations. As a major example, we consider the case of grasping, where the attempt to synthesize grasps and manipulation abilities for anthropomorphic robot hands sheds light on the computational problems to be solved by the brain and helps to narrow down the possibilities for their solutions.