

## **Filling the gap between Simulation and Reality**

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Computer-based simulations are a very useful tool in the development and evaluation of technical systems. Investigations in a virtual reality have many advantages over material experiments: They are usually cheaper, easier to manipulate and easier reproducible. But the results of simulations for more complex situations are subject to many uncertainties because of simplifying assumptions. The behavior of sensors and actuators in reality is subject to the laws of physics and difficult to imitate completely by software. Hence there is still a big gap between the simulation and the reality. This makes it difficult to transfer methods and code from simulation to real systems. Going one step further, artificial intelligence can be understood as simulation of cognitive processes. This leads to the question if artificial intelligence is possible without a real body for interaction with the real world. The talk reports on investigations and experiences with real and simulated cognitive robots. Soccer playing robots from RoboCup are used as an illustrative example. Problems include perception, motion, and behavior control.