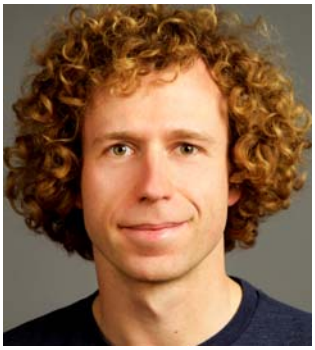
HUMANITY CENTERED ROBOTICS INITIATIVE

BROWN

Rico Jonschkowski
Technische Universität Berlin

“The things that robots don't need to learn ...”



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It is fascinating to observe the current wave of excitement in our community about deep learning. We seem to be tempted to believe that in order to reproduce intelligence in robots, all we need is more data and computation (and maybe a small tweak here and there); that everything there is to learn can be learned from scratch with a "master algorithm" that uses only very weak assumptions. I don't think that this approach is reasonable. There are many things that robots don't need to learn (physics, their own embodiment, the existence of objects, etc.). But how can we specify these "things" that robots don't need to learn and combine them with machine learning to fill in the rest? In this talk, I will summarize insights from our recent ICRA workshop on this topic and present three of our own approaches to this question: 1) representation learning with robotic priors, 2) patterns for learning with side information, and 3) recent results on incorporating structure from robotic methods into neural networks.

Rico Jonschkowski is a research associate and Ph.D. candidate in the Robotics and Biology Laboratory at the Technische Universität Berlin in Germany. He received an AAAI-15 Robotics Fellowship and, together with his colleagues, won the Amazon Picking Challenge at ICRA15. Before joining this lab, Rico worked as research assistant and teaching assistant at the Freie Universität Berlin, where he received his Bachelor’s and Master’s in Computer Science with minors in Philosophy and Psychology in 2011 and 2012, respectively. During his studies, he was also a member of the university's RoboCup team FUmanoids. Rico's current research focuses on incorporating prior knowledge into robot learning.