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Forward Model Learning for Motion Control Tasks

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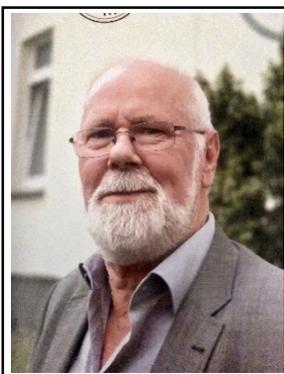
Abstract

In this talk, we study the capabilities and limitations of forward model learning agents and their applications to motion-control tasks. Forward model learning agents learn to approximate the environment dynamics to apply planning algorithms for action-selection. While previous work has shown that forward model learning agents can efficiently learn to play simple video games, we extend their applicability to domains with continuous state and action spaces. Our experiments show that such agents are quickly able to learn an approximate model of their environment, which suffices to solve several simple motion-control tasks. Comparisons with deep reinforcement learning further highlight the sample efficiency of forward model learning agents.

Biographical Data



Alexander Dockhorn is Postdoctoral Research Associate at the Queen Mary University of London. He received his PhD at the Otto von Guericke University in Magdeburg. In his recent research, he studies the capabilities of prediction-based search agents with a special interest in partial-information games. He is member of the Institute of Electrical and Electronics Engineers (IEEE), he serves as chair of the IEEE CIS Competitions Committee and recently joined the Games Technical Committee. Since 2017 he is organizing the Hearthstone AI competition to foster comparability of AI agents. His webpage: <https://gaigresearch.github.io/members/Alexander-Dockhorn>



Rudolf Kruse is Emeritus Professor for Computer Science at the Otto-von-Guericke University of Magdeburg Germany). He obtained his PhD and his Habilitation in Mathematics from the Technical University of Braunschweig in 1980 and 1984 respectively. Following a stay at the Fraunhofer Gesellschaft, he joined the Technical University of Braunschweig as a professor of computer science in 1986. From 1996-2017 he was the leader of the Computational Intelligence Group in Magdeburg. He has co-authored 15 monographs and 25 books as well as more than 400 peer-refereed scientific publications in various areas with 18000 citations. He is Fellow of the Institute of Electrical and Electronics Engineers (IEEE), Fellow of the International Fuzzy Systems Association (IFSA), and Fellow of the European

Association for Artificial Intelligence (EURAI/ECCAI). His group is successful in various industrial applications in cooperation with companies such as Volkswagen, SAP, Daimler, and British Telecom, see his webpage www.is.ovgu.de/Team/Rudolf+Kruse.html His current research interests include data science and intelligent systems.