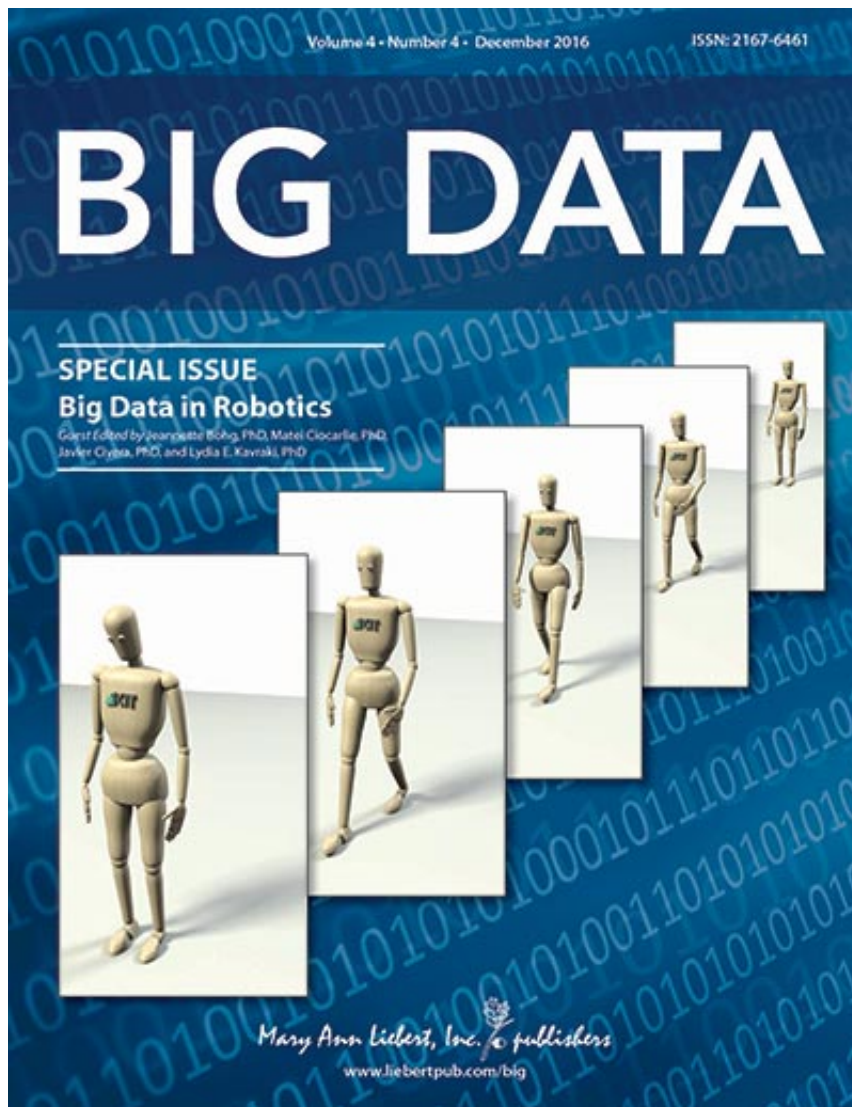


DOOMED is new online learning approach to robotics modeling

February 21 2017



Credit: Mary Ann Liebert, Inc., publishers

Robotics researchers have developed a novel adaptive control approach based on online learning that allows for the correction of dynamics errors in real time using the data stream from the robot. The strategy is described in an article published in *Big Data*.

In the article entitled "DOOMED: Direct Online Optimization of Modeling Errors in Dynamics," the authors and developers of the DOOMED algorithms, Nathan Ratliff, Franziska Meier, Daniel Kappler, and Stefan Schaal, Lula Robotics (Seattle, WA), MPI for Intelligent Systems (Tubingen, Germany), and University of Southern California (Los Angeles), present their approach for minimizing the error between desired and actual accelerations in complex real-world motion systems. Based on data streaming from the robot, the online learning algorithms correct the "inverse dynamics model," updating a correction model until correct acceleration is achieved.

The article is part of a special issue of *Big Data* on "Big Data in Robotics" led by Guest Editors Jeannette Bohg, PhD, Matei Ciocarlie, PhD, Jaview Civera, PhD, and Lydia Kavraki, PhD.

"A major challenge in robotics is designing systems that behave in predictable ways based on some analytical model of the process," says *Big Data* Editor-in-Chief Vasant Dhar, Professor at the Stern School of Business and the Center for Data Science at New York University. "However, in reality, even if such analytical models exist, they are rarely accurate enough in situations that represent all combinations of heat, wear and tear, cable stretch, etc.; situations that a system encounters in reality. In such situations, it is useful to complement models with data collected as a result of real-world operation. Real-world robotic systems need to be robust enough to correct "errors" on the fly. Ratliff et al. combined model-based approaches with machine learning in a novel way to make systems error correcting robust in [real time](#). We are seeing increasing interest in combining analytical model-based approaches with

[machine learning](#) and [big data](#) to create more robust motion systems. This paper makes a very significant contribution in this respect."

More information: Nathan Ratliff et al, DOOMED: Direct Online Optimization of Modeling Errors in Dynamics, *Big Data* (2016). [DOI: 10.1089/big.2016.0041](https://doi.org/10.1089/big.2016.0041)

Provided by Mary Ann Liebert, Inc

Citation: DOOMED is new online learning approach to robotics modeling (2017, February 21) retrieved 23 April 2024 from <https://phys.org/news/2017-02-doomed-online-approach-robotics.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.