

The New Wave in Robot Grasping

Ken Goldberg – UC Berkeley

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Computer Science & Engineering building room # 1202

Despite 50 years of research, robots remain remarkably clumsy, limiting their applications in home decluttering, warehouse order fulfillment, and robot-assisted surgery. The First Wave of grasping research, still dominant, uses analytic methods based on screw theory and assumes exact knowledge of pose, shape, and contact mechanics. The Second Wave is empirical: purely data driven approaches which learn grasp strategies from many examples using techniques such as imitation and reinforcement learning with hyperparametric function approximation (Deep Learning). The New Wave is based on hybrid methods that combine analytic models to bootstrap Deep Learning models, where data and code is exchanged via the Cloud using emerging advances in cloud computing and big data. I'll present emerging results from our lab and suggestions for future research, including Dex-Net 2.0 and 3.0, our latest extensions to Dex-Net, that use analytic grasp models to synthesize training data for deep learning rather than physical data collection.



Ken Goldberg is an artist, inventor, and UC Berkeley Professor focusing on robotics. He was appointed the William S. Floyd Jr Distinguished Chair in Engineering and serves as Chair of the Industrial Engineering and Operations Research Department. He has secondary appointments in EECS, Art Practice, the School of Information, and Radiation Oncology at the UCSF Medical School. Ken is Director of the CITRIS "People and Robots" Initiative and the UC Berkeley AUTOLAB where he and his students pursue research in machine learning for robotics and automation in warehouses, homes, and operating rooms. Ken developed the first provably complete algorithms for part feeding and part fixturing and the first robot on the Internet. He has over 250 peer-reviewed publications and 8 U.S. Patents. He co-founded and served as Editor-in-Chief of the IEEE Transactions on Automation Science and Engineering. Ken's artwork has appeared in 70 exhibits including the Whitney Biennial and films he has co-written have been selected for Sundance and nominated for an Emmy Award. Ken was awarded the NSF PECASE (Presidential Faculty Fellowship) from President Bill Clinton in 1995, elected IEEE Fellow in 2005 and selected by the IEEE Robotics and Automation Society for the George Saridis Leadership Award in 2016.

Hosted by Michael Yip (yip@ucsd.edu)

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