מכון ויצמן למדע

THE WEIZMANN INSTITUTE OF SCIENCE

FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Vision and Robotics Seminar

Room 1 ,Ziskind Building
on Thursday, Jun 08, 2017
at 12:15

JOINT VISION AND MACHINE LEARNING SEMINAR

Nadav Cohen
The Hebrew University

Expressive Efficiency and Inductive Bias of Convolutional Networks: Analysis and Design through Hierarchical Tensor Decompositions

Abstract:

The driving force behind convolutional networks - the most successful deep learning architecture to date, is their expressive power. Despite its wide acceptance and vast empirical evidence, formal analyses supporting this belief are scarce. The primary notions for formally reasoning about expressiveness are efficiency and inductive bias. Efficiency refers to the ability of a network architecture to realize functions that require an alternative architecture to be much larger. Inductive bias refers to the prioritization of some functions over others given prior knowledge regarding a task at hand. Through an equivalence to hierarchical tensor decompositions, we study the expressive efficiency and inductive bias of various architectural features in convolutional networks (depth, width, pooling geometry and more). Our results shed light on the demonstrated effectiveness of convolutional networks, and in addition, provide new tools for network design. The talk is based on a series of works published in COLT, ICML, CVPR and ICLR (as well as several new preprints), with collaborators Or Sharir, Ronen Tamari, David Yakira, Yoav Levine and Amnon Shashua.