מכון ויצמן למדע

THE WEIZMANN INSTITUTE OF SCIENCE

FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Vision and Robotics Seminar

Room 141 ,Ziskind Building
on Tuesday, Nov 04, 2014
at 10:00

NOTE UNUSUAL TIME AND PLACE

Rob Fergus
NYU and Facebook

Learning to Discover Efficient Mathematical Identities

Abstract:

In this talk, I will describe how machine learning techniques can be applied to the discovery of efficient mathematical identities. We introduce an attribute grammar framework for representing symbolic expressions. Given a set of grammar rules we build trees that combine different rules, looking for branches which yield compositions that are analytically equivalent to a target expression, but of lower computational complexity. However, as the size of the trees grows exponentially with the complexity of the target expression, brute force search is impractical for all but the simplest of expressions. Consequently, we explore two learning approaches that are able to learn from simpler expressions to guide the tree search. The first of these is a simple n-gram model, the other being a recursive neural-network. We show how these approaches enable us to derive complex identities, beyond reach of brute-force search, or human derivation. Joint work with Wojciech Zaremba and Karol Kurach.