

Title: Learning Intelligent Theorem Proving from Large Formal Corpora

Speaker: Josef Urban, CIIRC, Czech Technical University in Prague

Abstract:

The talk will discuss several AI methods used to learn proving of conjectures over large formal mathematical corpora. This includes (i) machine-learning methods that learn from previous proofs how to suggest the most relevant lemmas for proving the next conjectures, (ii) methods that guide low-level proof-search algorithms based on previous proof traces, and (iii) methods that automatically invent suitable theorem-proving strategies on classes of problems. We will show examples of AI systems implementing positive feedback loops between induction and deduction, show the performance of the current methods over the Flyspeck, Isabelle, and Mizar libraries, and also mention emerging AI systems that combine statistical parsing of informal mathematics with such strong theorem proving methods.

Bio:

Josef Urban is a researcher at the Czech Institute of Informatics, Robotics and Cybernetics (CIIRC) heading the ERC-funded project AI4REASON. His main interest is development of combined inductive and deductive AI methods over large formal (fully semantically specified) knowledge bases, such as large corpora of formally stated mathematical definitions, theorems and proofs.

He received his PhD in Computers Science from the Charles University in Prague in 2004, and MSc in Mathematics at the same university in 1998. He worked as an assistant professor in Prague, and as a researcher at the University of Miami and Radboud University Nijmegen.