Seminar: Machine Learning for Programming

Target audience: M.Sc. students (= Hauptseminar)
Language: English
Organizer: Prof. Dr. Michael Pradel

This seminar is about recent research on improving software and increasing developer productivity by using machine learning, including deep learning. We will discuss research papers that present novel techniques for improving software reliability, security, and performance. Topics of interest include any kind of program analysis based on machine models of code or program executions. The seminar combines topics from program analysis and machine learning:

**Program analysis, e.g.,:**
- Bug detection tools
- Automatic completion of partial code
- Predicting program properties, e.g., types
- Identifying malicious software
- Performance optimizations

**Machine learning, e.g.,**
- Recurrent neural networks
- Graph-based neural networks
- Vector embeddings
- Conditional random fields

After the initial kick-off meeting, every student is assigned a research paper. Each student presents her/his paper during one of the weekly meetings. Moreover, each student prepares a term paper that summarizes the original research paper. Grading will be based on the talk, the term paper, and active participation during the presentations.

More information: software-lab.org/teaching.html