Käte Hamburger Kolleg: Cultures of Research
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Demystifying Probabilistic Programming

Probabilistic programming is a fascinating new direction in programming. FaceBook, Google and Microsoft, to mention a few, are investing lots of research efforts in probabilistic programming. Nearly every programming language has a probabilistic version. Scala, JavaScript, Haskell, Prolog, C, Python, you name it, and – yes – even Excel has been extended with features for randomness. These languages aim to make probabilistic modeling and machine learning accessible to any programmer, any user.

Probabilistic programs describe recipes on how to infer conclusions about big data from a mixture of uncertain data and real-world observations. Bayesian networks, a key model in decision making, are simple instances of such programs. Probabilistic programs steer autonomous robots and self-driving cars, are key to describe security mechanisms, naturally encode randomised algorithms, and are rapidly encroaching AI and machine learning.

In this talk, I will unravel the secrets of probabilistic programs, and illustrate some fascinating applications such as the automated detection of seismographic activities and the training of neural networks.