Bayesian Program Induction

Anonymous Author(s)
Affiliation
Address
email

Humans poses a rich, generative knowledge of the processes which give rise to the data they observe in the world, and a great deal of research has shown that this generative knowledge is used to infer the hidden states of the world that give rise to observations. One popular way to think about this knowledge is as theories expressed in a probabilistic language of thought: such theories, as formalized in stochastic programming languages like Church, enable inference in domains where traditional stastical models are not adequately expressive. We do not yet possess, however, a satisfying model of how these theories are acquired. Although several domain specific proposals exist and motivate a broader generalization, what is missing from previous models is an adequate emphasis on higher-order function abstraction, that is, the ability to remove redundancy from a program by abstracting a way a pattern within that program. This idea is central to functional programming techniques. Here, we provide a generative model of theories in a probabilistic language of thought that renders abstraction a fundamental part of the model generating process.