Amortizing Structure Discovery with Generative Flow Networks

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Abstract

An open problem in cognitive science is how the human mind discovers and represents structures for human knowledge. To address this problem via a computational approach, Kemp and Tenenbaum (2008) introduce a posterior distribution which assesses the goodness of fit for a structure to some data; however, Kemp and Tenenbaum's method finding structures with high probability under this posterior relied on hand-crafted search heuristics, was intractable at inference, and lacked convergence guarantees to the true posterior distribution of structures. To address this, we amortize this process with a generative flow network (GFlowNet), a novel framework for developing probabilistic models. When trained, our GFlowNet samples structures proportional to Kemp and Tenenbaum's posterior. We show preliminary results on synthetic datasets that highlights the benefit of our approach in both scaleability and simplicity.

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