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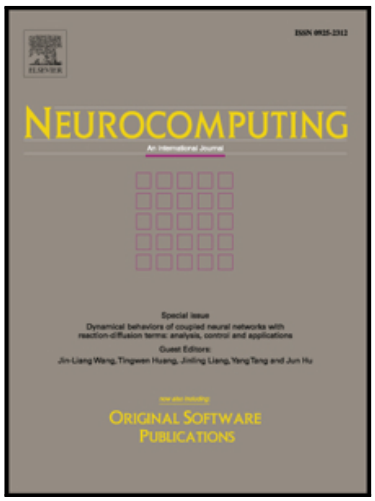

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Learning Bayesian Network Structures Under Incremental Construction Curricula☆

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Abstract

Bayesian networks have been successfully applied to various tasks for probabilistic reasoning and causal modeling. One major challenge in the application of Bayesian networks is to learn the Bayesian network structures from data. In this paper, we take advantage of the idea of *curriculum learning* and learn Bayesian network structures by stages. At each stage a subnet is learned over a selected subset of the random variables. The selected subset grows with stages and eventually includes all the variables. We show that in our approach each target subnet is closer to the target Bayesian network than any of its predecessors. The experimental results show that our algorithm outperformed the state-of-the-art heuristic approach in learning Bayesian network structures under several different evaluation metrics.

Keywords: Bayesian networks, structure learning, curriculum learning.

1. Introduction

Bayesian networks are a class of probabilistic graphical models that have been widely used in various tasks for probabilistic inference and causal modeling [2, 3]. A Bayesian network consists of two components: a *directed acyclic graph*

☆A preliminary version of this work appeared in [1].

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