School of

Computer Science

MSc Defence

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De-Causalization of NIN-AND Tree Models

Chair: Dr. Fangju Wang
Advisor: Dr. Yang Xiang
Advisory Committee: Dr. Luiza Antonie
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ABSTRACT:
Joint probability distributions suffer from combinatorial explosion on the number of variables present. Bayesian networks avoid this issue through encoding conditional independence between variables, making use of a graphical structure alongside tabular representations of probabilistic information for each variable. However, these tabular representations still have exponential growth on the number of incoming connections of the variable in the graph. To address this growth, space-efficient local models have been developed. In this thesis, we make use of the non-impeding noisy-AND tree (NAT) model for expressing local probabilistic information due to its simple causal interactions and expressiveness. We develop a novel approach, which we call de-causalization of the NAT model, which exploits causal independence present in the NAT model to improve inference efficiency. We demonstrate the exactness of this approach and evaluate inference efficiency using lazy propagation.