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Efficient Representations of Boolean Functions: The View from Knowledge Compilation

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概要

We provide an overview of the area of knowledge compilation, which is concerned with the systematic study of efficient representations of propositional knowledge bases (aka, Boolean functions). We discuss the two key dimensions of knowledge compilation: succinctness of the representation, and the set of operations it supports in polytime. We focus on two key representations: The well-studied Ordered Binary Decision Diagram (OBDD) and the more recent Decomposable Negation Normal Form (DNNF). We highlight the relationship between these two representations, while stressing some of the more recent developments on DNNFs. This includes lower and upper bounds on the size of DNNFs and how they relate to similar bounds on OBDDs; the notion of a vtree and how it generalizes the notion of a variable order; and the newly discovered notion of "interaction function" and the role it plays in the decomposition and efficient representation of Boolean functions.

Tractability & Succinctness

NNF
Tracta
decomposability
eterminism