

Foundation of Learning Finite State Matrix Automata using L* Algorithm

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Abstract

We propose a deterministic version of finite state matrix automaton (DF SMA) which recognizes finite matrix languages (FML). Our main result is a generalization of the classical Myhill-Nerode theorem for DF SMA. Our generalization requires the use of two relations to capture the additional structure of DF SMA. Vertical equivalence \equiv_v captures that words sharing the same vertical location, horizontal equivalence \equiv_h captures that words sharing the same horizontal location. A finite matrix language is defined to be regular if relations \equiv_v and \equiv_h have finite index. We show that the language associated to a DF SMA is regular, and we construct, for each finite matrix language, a DF SMA that accepts this language. More importantly, our result provides a foundation for learning algorithms for DF SMA.