

State reduction of weighted automata using certain equivalences

Aleksandar Stamenković

Faculty of Sciences and Mathematics, University of Niš, Višegradska 33,
18000 Niš, Serbia

In this talk, for a given weighted automaton \mathcal{A} over an alphabet X , we introduce L -weakly left and L -weakly right invariant equivalences corresponding to \mathcal{A} , where L is an arbitrary language over X . We give a simple procedure to build the resulting weighted automaton from the starting one using L -weakly left (resp. L -weakly right) invariant equivalence. Since resulting weighted automata have smaller or equal number of states than the starting ones, the above-mentioned equivalences can be used for state reduction. Moreover, we prove that starting and resulting weighted automata are L -equivalent in case L is suffix-closed (prefix closed) and using that result we obtain some additional consequences. We also provide a procedure for computing L -weakly left (resp. L -weakly right) invariant equivalences corresponding to a weighted automaton \mathcal{A} . Since, in general, given procedure has some drawbacks regarding its efficiency, we investigate some particular cases where these shortcomings are overcome.