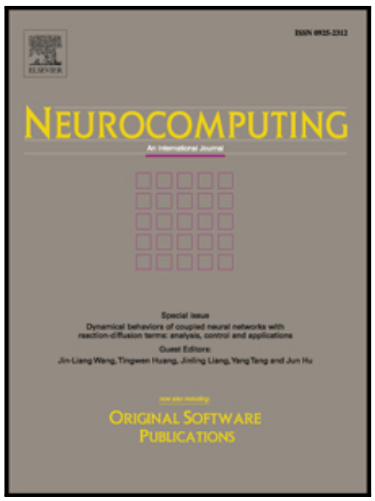

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Weighted aggregation of partial rankings using Ant Colony Optimization

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Abstract

The aggregation of preferences (expressed in the form of rankings) from multiple experts is a well-studied topic in a number of fields. The Kemeny ranking problem aims at computing an aggregated ranking having minimal distance to the global consensus. However, it assumes that these rankings will be complete, i.e., all elements are explicitly ranked by the expert. This assumption may not simply hold when, for instance, an expert ranks only the top-K items of interest, thus creating a partial ranking. In this paper we formalize the *weighted Kemeny ranking problem for partial rankings*, an extension of the Kemeny ranking problem that is able to aggregate partial rankings from multiple experts when only a limited number of relevant elements are explicitly ranked (top-K), and this number may vary from one expert to another (top-K_i). Moreover, we introduce two strategies to quantify the weight of each partial ranking. We cast this problem within the realm of combinatorial optimization and lean on the successful Ant Colony Optimization (ACO) metaheuristic algorithm to arrive at high-quality solutions. The proposed approach is evaluated through a real-world scenario and 190 synthetic datasets from `www.PrefLib.org`. The experimental evidence indicates that the proposed ACO-based solution is capable of significantly

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