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Enriched ant colony optimization and its application in feature selection Original Research Article
Neurocomputing, Volume 142, 22 October 2014, Pages 354-371
Rana Forsati, Alireza Moayedikia, Richard Jensen, Mehrnoush Shamsfard,
Mohammad Reza Meybodi
  Abstract

Abstract This paper presents a new variant of ant colony optimization (ACO),
called enRiched Ant Colony Optimization (RACO). This variation tries to consider
the previously traversed edges in the earlier executions to adjust the pheromone
values appropriately and prevent premature convergence. Feature selection (FS)
is the task of selecting relevant features or disregarding irrelevant features from
data. In order to show the efficacy of the proposed algorithm, RACO is then
applied to the feature selection problem. In the RACO-based feature selection
(RACOFS) algorithm, it might be assumed that the proposed algorithm considers
later features with a higher priority. Hence in another variation, the algorithm is
integrated with a capability local search procedure to demonstrate that this is not
the case. The modified RACO algorithm is able to find globally optimal solutions
but suffers from entrapment in local optima. Hence, in the third variation, the
algorithm is integrated with a local search procedure to tackle this problem by
searching the vicinity of the globally optimal solution. To demonstrate the
effectiveness of the proposed algorithms, experiments were conducted using two
measures, kappa statistics and classification accuracy, on several standard
datasets. The comparisons were made with a wide variety of other swarm-based
algorithms and other feature selection methods. The results indicate that the
proposed algorithms have superiorities over competitors.

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