

Comparing Evolutionary Strategies on a Biobjective Cultural Algorithm

Lagos C.

Crawford B.

Cabrera E.

Soto R.

Rubio J.-M.

Paredes F.

Evolutionary algorithms have been widely used to solve large and complex optimisation problems. Cultural algorithms (CAs) are evolutionary algorithms that have been used to solve both single and, to a less extent, multiobjective optimisation problems. In order to solve these optimisation problems, CAs make use of different strategies such as normative knowledge, historical knowledge, circumstantial knowledge, and among others. In this paper we present a comparison among CAs that make use of different evolutionary strategies; the first one implements a historical knowledge, the second one considers a circumstantial knowledge, and the third one implements a normative knowledge. These CAs are applied on a biobjective uncapacitated facility location problem (BOUFLP), the biobjective version of the well-known uncapacitated facility location problem. To the best of our knowledge, only few articles have applied evolutionary multiobjective algorithms on the BOUFLP and none of those has focused on the impact of the evolutionary strategy on the algorithm performance. Our biobjective cultural algorithm, called BOCA, obtains important improvements when compared to other well-known evolutionary biobjective optimisation algorithms such as PAES and NSGA-II. The conflicting objective functions considered in this study are cost minimisation and coverage maximisation. Solutions obtained by each algorithm are compared using a hypervolume S metric. © 2014 Carolina Lagos et al.