Journal of King Saud University – Computer and Information Sciences xxx (xxxx) xxx

Contents lists available at ScienceDirect

Journal of King Saud University – Computer and Information Sciences

journal homepage: www.sciencedirect.com

Efficient sequential covering strategy for classification rules mining using a discrete equilibrium optimization algorithm

Mohamed Mahdi MALIK *, Hichem HAOUASSI

ICOSI Lab, Fac. ST, Univ Khenchela, BP 1252 El Houria, 40004 Khenchela, Algeria

ARTICLE INFO

Article history:
Received 3 May 2021
Revised 4 August 2021
Accepted 29 August 2021
Available online xxxx

Keywords:
Rule-based classification
Classification rules
Population-based optimization
Discrete equilibrium optimization algorithm
Classifier's interpretability

ABSTRACT

Rule-based classification is one of the important tasks in data mining due to its wide applications, particularly in the domains that need to interpret the classification decision such as medical diagnosis. The rule-based classification is a combination of the classification and association rule mining fields which aims at building interpretable classifiers by means of classification rules. This paper presents a novel and efficient sequential covering strategy for Classification Rule Mining to improve the interpretability of classifiers using a Discrete Equilibrium Optimization Algorithm called DEOA-CRM. Our approach benefits from the advantages of associative classification and population-based intelligence. It is inspired by the recent meta-heuristic equilibrium optimization algorithm. New discrete operators defined enable our approach to avoid local solutions and find global ones, improving the exploration and exploitation power in the search space. The proposed DEOA-CRM is tested on a total of 12 test data sets of various sizes and benchmarked with four recent and well-known rule-based classification mining algorithms. The obtained results confirm the efficiency of our algorithm in three chosen measures. Our approach fully deserves its use for classification rules generation to help decision-makers generate accurate and interpretable models.