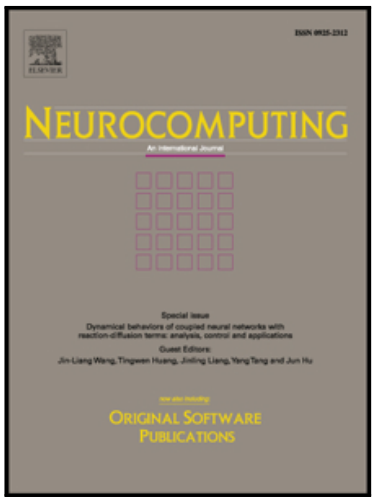

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A Multi-Objective Biclustering Algorithm Base On Fuzzy Mathematics

Xiaoshu Zhu[a,b,c], Jie Qiu[b,c,*], Miao Xie[c], Jianxin Wang[a]

[a] *School of Information Science and Engineering, Central South University, Changsha, 410083, China.*
[b] *School of Computer Science and Engineering, Yulin Normal University, Yulin, 537000, China.*
[c] *Guangxi Universities Key Lab of Complex System Optimization and Big Data Processing, Yulin Normal University, Yulin, 537000, China.*

Abstract

Biclustering algorithm is to cluster in the horizontal and vertical directions simultaneously in matrix. This algorithm identifies a set of sub-matrix by adopting a greedy iterative strategy, which employs the mean squared residue to measure the element consistency of a sub-matrix. Biclustering algorithm is widely applied in large and complex data. However, different versions of biclustering algorithm always have the problem that with the increasing of data size, more irrelevant rows or columns are involved in clustering which results in the poor performance of clustering. Therefore, this paper proposes a new algorithm, which combines fuzzy member matrix and comprehensive evaluation in fuzzy mathematics with multi-objective optimization algorithm to improve the performance of biclustering algorithm. In order to validate the effectiveness of the new algorithm, the performance the new algorithm and other three mainstream algorithms are compared on three gene/protein expression datasets. The results show the new algorithm has better element consistency, and sub-matrix capacity than other algorithms.

Keywords: Biclustering, Fuzzy mathematics, multi-objective optimization, Mean Square residue

*Corresponding author
Email address: jgxyqj@126.com (Jie Qiu)