

Clustering via the modified Petford-Welsh algorithm

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Abstract

Detecting meaningful communities has become crucial to advance our knowledge in diverse research areas that deal with datasets which can be naturally represented as networks. By regarding vertex clustering as the opposite problem of vertex colouring, we were able to leverage the Petford-Welsh colouring algorithm to develop a fast, efficient, and highly-scalable decentralised clustering algorithm. Its greatest potential lies in outperforming conventional methods when the community structure is fairly clear-cut.

Keywords: Graph algorithm, community detection, the Petford-Welsh algorithm, simulated annealing, complex networks.

Math. Subj. Class.: 05C85, 05C15, 91C20

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Gručenje s prirejenim Petford-Welshevim algoritmom

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Povzetek

Odkrivanje smiselni skupnosti je postalo ključnega pomena za napredek znanja na različnih raziskovalnih področjih, ki imajo opravka s podatki, ki jih lahko naravno predstavimo kot omrežja. Obravnavanje gručenja vozlišč kot nasprotni problem barvanju vozlišč nam je omogočilo, da se opremo na Petford-Welshev algoritem za barvanje in razvijemo hiter in učinkovit decentraliziran algoritem gručenja, ki se zlahka spopade z rastočo količino podatkov. Njegov največji potencial je v tem, da prekaša klasične pristope, kadar je struktura skupnosti dovolj jasna.

Ključne besede: Algoritem na grafih, odkrivanje skupnosti, Petford-Welshev algoritem, postopno ohlajevanje, kompleksna omrežja.

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