

Evaluation of Community Detection Methods

Xin Liu, Hui-Min Cheng, and Zhong-Yuan Zhang 

Abstract—Community structures are critical towards understanding not only the network topology but also how the network functions. However, how to evaluate the quality of detected community structures is still challenging and remains unsolved. The most widely used metric, normalized mutual information (NMI), was proven to have finite size effect, and its improved form relative normalized mutual information (rNMI) has reverse finite size effect. Corrected normalized mutual information (cNMI) was thus proposed and has neither finite size effect nor reverse finite size effect. However, in this paper, we show that cNMI violates the so-called proportionality assumption. In addition, NMI-type metrics have the problem of ignoring importance of small communities. Finally, they cannot be used to evaluate a single community of interest. In this paper, we map the computed community labels to the ground-truth ones through integer linear programming, and then use kappa index and F-score to evaluate the detected community structures. Experimental results demonstrate the advantages of our method.

Index Terms—Normalized mutual information, kappa index, F-score, community structures detection

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V článku sa navrhuje nový postup na hodnotenie algoritmov zhľukovania, my ho však použijeme kvôli prehľadu klasických metód v časti 2.1.2

2.1.2 External Indices

Generally speaking, external indices evaluate the clustering result by comparing it with the external supplied true labels. For the sake of clarity, we assume that there are 10 samples with the true labels $[1, 1, 1, 1, 1, 1, 2, 2, 3, 3]$.

Tento prístup predpokladá, že máme k dispozícii správne rozdelenie, čo je prípad napríklad Zacharyho karate klubu alebo aj niektorých iných sietí (niektoré sa spomínajú v článku). V prezentácii sa vysvetlia tieto indexy a vypočítajú sa v R-ku (je možné použiť aj funkcie z balíkov (nie je to ale povinné), ale v takom prípade treba na jednoduchom príklade „ručne“ spočítať, že dávajú presne to, čo požaduje definícia).

Porovná sa úspešnosť preberaných algoritmov na sieťach so známym delením na komunity – karate klub + aspoň jedna iná sieť.