A Comparative Analysis of Community Detection Algorithms on Social Networks

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Abstract Social networks display community structures of interest, which have to be uncovered to understand the latent relationships present in them. These networks are composed of loosely connected small clusters, whose structure is more convenient for analysis. Graph clustering algorithms have been developed to identify communities in real or artificial networks using structural characteristics of the network. Determining the efficiency of such techniques with respect to accuracy and computational time is an open question in the absence of ground truth labels for the underlying communities as is seen in most real-world situations. In this study, performance of eight state-of-the-art graph clustering algorithms are demonstrated on small egocentric graphs, obtained from Facebook. The results are used for objective evaluation and a critical discussion is presented.

Keywords Graph theory · Community structure · Complex networks

1 Introduction

Networks are used to graphically represent relationship or structure in many complex systems which could be natural, technological or social. Understanding the process of formation of networks or studying why certain systems exhibit a particular structure can provide insights to various phenomenon like diffusion, contagion. Therefore the scientific study of networks is a multidisciplinary field spanning physics, computer science as well as social sciences. A network or graph consists of nodes or vertices and edges. An edge connects typically 2 nodes but if three or more nodes are connected

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