Today with the growth of spreading information, the question of “how to measure a user’s influence on others in social networks?” becomes increasingly challenging and interesting. Because, influential users are more likely to be infected and to infect a large number of users. Indeed, influence is the ability to popularize a particular content in the social networks. Various measures of influence have been proposed over the years to rank the nodes of a network according to their topological and structural importance.

On the other hand, many real-world social networks actually have a two-mode nature that can be modeled as bipartite graphs. In a bipartite network, there exist two types of nodes and links only connect nodes of different types. The common influence measures were just defined for one-mode networks with an acceptable performance but they do not work well for bipartite networks. To this end, projection methods have been introduced to convert bipartite networks to one-mode. Although the projected one-mode network is always less informative than its bipartite representation, some of the measures for one-mode networks have been extended to bipartite mode. Therefore, to retain the original information in bipartite networks, the need for proposing an efficient measure in such networks seems essential.

In this research, we address the problem of identifying influential users in bipartite social networks. To this end, it is so important to understand the characteristics of bipartite social networking sites and develop a mechanism to compute the similarity distance and influence possibilities in the affiliation structure. Our proposed method is based on a type of F-divergence, called Hellinger distance of users.

This metric is used to quantify the statistical distance between neighborhood degree distributions for every pair of nodes in users’ partition in a bipartite network. Since similarity measures are in some sense the inverse of distance metrics, we can construct a new similarity matrix between users. Hence, we detect the influential users using common interests in large social networks efficiently and effectively. Our method convert users’ similarity matrix to users’ score vector, then we use an aggregation method to combine scores of each user. Finally, we rank nodes according to their computed scores from the previous step.

We experimentally evaluate the performance of the proposed method on real datasets of Davis’ Southern Women Club and Cond-mat Collaboration networks. The simulation results demonstrate that our method can rank nodes better than the state-of-the-art centrality metrics such as degree, betweenness, closeness, and PageRank centralities. For a closer look, we obtain the similarity of the orderings when ranked by each of the quantities via Kendall and Spearman rank correlation coefficient. Indeed, we make relevance between the proposed metrics and the popular centrality measures in bipartite social networks.