



Synergistic Fusion: Graph Convolution Networks Integrating Structural and Machine Learning Approaches for Influential Node Identification Using Graph Convolution Networks

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Abstract

Online Social Networks (OSNs) are information networks in which users participate by providing links to other users, publishing content, and joining the network itself. OSNs have emerged as a prominent medium for the dissemination of information and the promotion of both new and viral applications in the present day. The examination of these information networks through social network analysis reveals interaction patterns among the entities. There are numerous methods for identifying influential users in OSNs, ranging from straightforward neighbour count computations to more intricate methods involving machine learning and message-passing. The detection of influential nodes in complex social networks is of the utmost importance owing to the vast quantities of data involved and the dynamic nature of existing topologies. Methods that rely on machine learning and centrality primarily consider node topologies or feature values when assessing the significance of individual nodes. Although network topologies and node attributes should be considered in the process of determining the influential value of nodes, this should happen simultaneously. Because of the massive volume of data and the dynamic nature of current topologies, identifying influential nodes in complex social networks is essential. When assessing the significance of nodes, centrality-based and machine-learning techniques primarily use node topologies or feature values. However, while calculating the influential value of nodes, consideration should be given to both network topologies and node properties. Graph Convolutional Networks (GCN) are a deep learning model that this study has suggested to find the significant nodes in graph-based huge datasets. This article provides a comprehensive review of recent studies that have investigated the identification of influential users in OSNs.

Keywords: Social Networks, Influence, Prominent Nodes, Complex Networks, Communities, Graph Convolution Networks

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