Chapter 3
A Novel Friend Recommendation System Using Link Prediction in Social Networks

Anbalagan Bhuvaneswari
https://orcid.org/0000-0001-6651-2031
Vellore Institute of Technology, Chennai, India

K. K. Jijina
Vellore Institute of Technology, Chennai, India

ABSTRACT

Link prediction is a method used to predict the existence of a non-existing links between two entities within a network. However, the growing size of social networks has made conducting link prediction studies more challenging. This chapter proposes a friend recommendation system that employs feature engineering techniques on a given dataset. The feature engineering process involves extracting relevant features such as shortest path, Katz centrality, Jaccard distances, PageRank, and preferential attachments, etc. Random Forest and XGBoost algorithms are then utilized to recommend non-existent connections by suggesting new edges in the graph. By implementing these approaches, the authors aim to improve the accuracy and effectiveness of friend recommendations in the social network graph. By considering both types of edges in the recommendation process, they enhance the performance of the friend recommendation system. This approach allows leveraging the valuable insights within the network graph, resulting in more accurate and reliable recommendations.

DOI: 10.4018/978-1-6684-8953-6.ch003

INTRODUCTION

Social networks have become an integral part of our daily lives, providing platforms for individuals to connect and share information. With the vast amount of data generated in these networks, the need for efficient friend recommendation systems has emerged. Friend recommendations help users discover new connections and enhance their social network experience. One effective approach in designing such systems is through link prediction, which predicts potential connections between users based on their network characteristics. Numerous research studies have been conducted in the field of friend recommendation systems using link prediction. For instance, Zhang et al. proposed a hybrid link prediction algorithm that combines both content-based and structure-based features to improve recommendation accuracy (Zhang et al., 2015). Similarly, Liu et al. utilized a deep learning model to capture complex network patterns for better friend recommendations (Liu et al., 2018). These studies highlight the significance of link prediction techniques in enhancing the accuracy and effectiveness of friend recommendation systems. This paper proposes a novel approach to friend recommendation by incorporating positive and negative edges in a network graph. Leveraging link prediction matrices, the system predicts future connections, enabling personalized and accurate friend recommendations. The rapid growth of social networks has provided individuals with a vast amount of information and a wide range of connections. These networks have become an integral part of people's lives, enabling them to interact, share information, and build relationships. However, as social networks continue to expand, users often face challenges in finding and connecting with like-minded individuals.

Friend recommendation systems play a crucial role in addressing this challenge by suggesting potential friends based on users' interests, preferences, and social connections. Traditional friend recommendation approaches mainly rely on explicit user attributes or structural information in the social graph. However, these methods often suffer from limitations such as sparsity of user attributes or lack of explicit information about the relationships. In this research article, we present a novel friend recommendation system that leverages link prediction techniques in social networks. Link prediction focuses on inferring missing or future links based on the existing network structure and user attributes. By applying link prediction algorithms, we aim to enhance the accuracy and effectiveness of friend recommendations, ultimately improving the user experience within social networks. Several innovative techniques are to be identified to enhance friend recommendations.

Social Networks

Social networks have revolutionized the way people connect and interact in the digital era. With the immense popularity of platforms such as Facebook, Twitter, and Instagram, understanding the dynamics of social networks has become a crucial area of research. Various studies have explored the structural properties, information diffusion, and user behavior within social networks (Newman, 2010; Watts, 2004). These investigations have shed light on the complex nature of social interactions and provided insights into the formation and evolution of online communities. Social networks can be classified into various types based on the characteristics of the connections between individuals.