

# User Behaviour Based Friend Recommendation in Facebook Social Networks

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**Available online at: [www.ijcsonline.org](http://www.ijcsonline.org)**

Accepted: 17/Jun/2018, Published: 30/Jun/2018

**Abstract**— Social networks provides platform to user to share their pictures, videos and make new friends and follow a community and so on. There are different applications of social networks but mostly used applications are Facebook, Instagram, and twitter. A user can recommend a page or community to other user based on their interests but it is difficult to recognize which page or posts posted on page is original or not for this in this paper an attempt has been made to recommend a friend to follow a Facebook page or not. In proposed mechanism the posts are distinguished based on their popularity which is calculated various features like comments reactions shares. this popularity is calculated using python program. The proposed mechanism is analyzed using Gephi with performance metrics like modularity, centrality betweenness, page rank etc.

**Keywords**— *Social Networks, Facebook, User, Posts Popularity, Netvizz and Gephi.*

## I. INTRODUCTION

Social networks keep on receiving critical consideration in the scholarly community and business rehearses. The expanding number of users, alongside the measure of understood and express data accessible, postures challenges in finding, coordinating and suggesting individuals in social networks. The general population suggestions should be acknowledged by the two gatherings and exhibited in a sensible day and age [1].

Existing social coordinating frameworks can be viewed as recommender frameworks that prescribe individuals to each other, in lieu of prescribing items to users [2]. Existing frameworks utilize two prominent methodologies: content-based coordinating, utilizing the users' profiles; and collective based, utilizing users' exercises to encourage the coordinating [3]. Just a couple of social networks utilize a crossover based approach in which the two profiles and exercises are utilized. In any case, with the fast development of users in social coordinating networks and with the expanding measure of data that social coordinating frameworks acquire about their users, recommender procedures are less adroit at coordinating individuals in the social networks. In online social network, numerous substance are for the most part "imported" by users from different frameworks, i.e., the substance sharing framework where substance are facilitated to serve users. Online social network benefit and online substance sharing administration are two of the most mainstream applications in the present Internet [4]. For instance, online social network

administrations like Facebook 1 and Twitter 2 have pulled in a huge number of users everywhere throughout the world, and online substance sharing framework like YouTube 3 and Flickr 4 are likewise giving substance to billions of watchers for each day [5].

Late years have seen a quick merging of online social network and online substance sharing network. Because of the dynamical conduct of users in the online social network and the monstrous number of substance produced by users, it forces extraordinary test for conventional suggestions to give customized substance to users [6].

### A. Friend Recommendation System

Recommender Systems are programming devices and strategies giving recommendations to things important to a user. The proposals gave are gone for supporting their users in different basic leadership forms, for example, what things to purchase, what music to tune in, or what news to read[7]. Recommender frameworks have turned out to be significant means for online users to adapt to the data over-burden and have turned out to be a standout amongst the most ground-breaking and well known instruments in electronic business. Correspondingly, different methods for recommendation age have been proposed and amid the most recent decade, a significant number of them have additionally been effectively conveyed in business conditions. Proof proposes that individuals have a tendency to depend more on recommendations from their companions than on recommendations from comparative however mysterious

people [8]. Along these lines, it bodes well to have the ratings of a recommender framework impacted by the ratings of the user's companions.

In this paper a novel friend recommendation mechanism have been proposed in which facebook pages are recommended to friends. In proposed work dataset of architecture and design page and different friend recommendation techniques in social networks has been examined and surveyed in detail and find that there is more need to find a perfect solution of friend recommendation in online social networks.

## II. RELATED WORK

Kacchi and Deorankar in 2016 [9] proposed strategy called companion recommendation framework in light of users life cycles, they had included one substance highlight of blood gathering, which would improve the utilization of recommendation. In this technique, they coordinate the blood gathering of the looked companion and this coordinating were prompt help application seek fastidiously to extend to the coveted individual. Also a companion recommendation framework to advance disconnected communications with a potential companion who shares both comparative land place of visit and online social connections was proposed by Kim et al. [10] in 2016. To join the two unique information sources, i.e., one from the on the web and the other from disconnected universes, they use a coupled lattice and tensor model that comprises of user-user-put relationship tensor and user-user companions network grid. Likewise, in 2016 Wu et al. [11] proposed a companion recommendation calculation in light of a user closeness chart keeping in mind the end goal to find competitor companions who share interests in social labeling frameworks, for example, Delicious and Last.fm. They utilized the dormant Dirichlet assignment (LDA) and a multi-see users' comparability measure between two users in view of their subjects of premium. In any case, these online-based companion recommendation frameworks have pivotal impediments in mirroring the spatio-worldly attributes of disconnected connections among individuals who wish to have nonintrusive eye to eye associations in their regular day to day existences. In actuality, a coordinating degree work which considers both the quality of social associations and closeness of users' profiles was proposed by Li et al. [12] in 2016. In particular, the novel social-quality mindful similitude work was built by enhancing Katz score for companions of companion's social networks and utilizing Dice comparability work. After that they proposed a Bloom channel based regular properties estimation, which empowers normal companion engaged with Match MORE to appraise coordinating level of companions of-companions with tunable precision for security mindful users in PMSNs. In 2016 Huang et al. [13] talked about companion recommendation issue from the perspective of network relationship. A man has various social parts on-line. In every social part, he/she makes

diverse companions, and these distinctive social parts frame diverse social networks. To think about the impact of various social parts, they proposed a network arrangement technique to discover the connections between's networks. The second viewpoint we consider was combine insightful user similitude conservation to keep up the first information structure.

## III. PROPOSED WORK

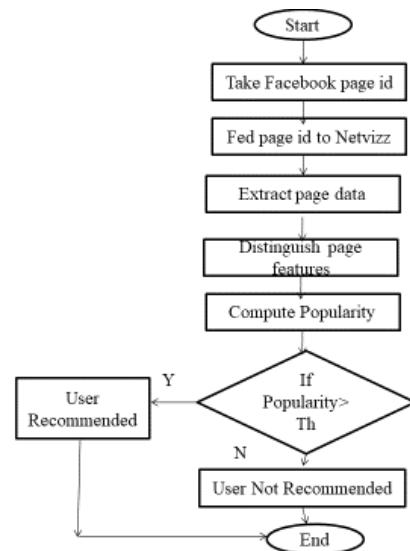


Figure1 flow diagram of proposed work

Figure 1 depicts flow of proposed work. In proposed mechanism a real data set of Facebook page is collected from Netvizz application. To collect real dataset from Facebook it is necessary to first generate Facebook page id from myfbid.com website. After generation of Facebook page id, it will be inserted to Netvizz to generate page data. Netvizz provides complete data that includes all posts posted by admin and posts reacted by users. The dataset includes likes, comments, reactions like love, haha, sad and anger. After downloading of dataset thus dataset is applied to python program. The python program calculates popularity of each post of page and distinguish posts based on some threshold value which is a mean value of popularity of post. The post having popularity less than threshold is not recommended to users and the posts having popularity greater than threshold are recommended to users. On the basis of posts posted by users are further recommended or not recommended to new user based on their previous history of posts.

## IV. RESULTS

The proposed mechanism is implemented through python programming language. It is an open source language and to analyse proposed mechanism Gephi visualization tool is used[14][15].

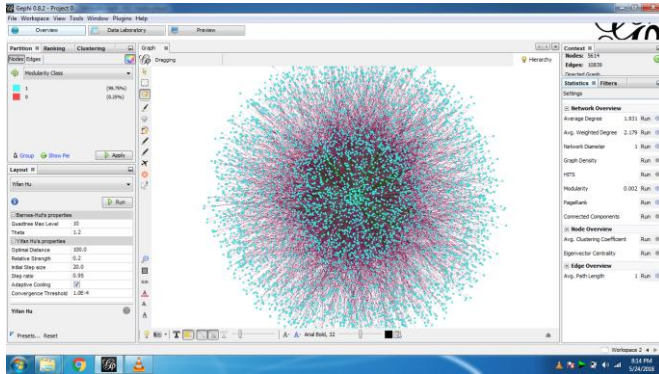


Figure 2 visualization of dataset in gephi

**A. Metrics Used**

- **Modularity:** Modularity is used to measure the strength of separation of a network into modules i.e. groups, clusters or communities. The modularity is high when connection between nodes is dense otherwise it is low.
- **Degree:** The degree of a node is the number of relation (edge) it has, independently.
- **In degree:** The incoming relation or edges on a node is called in degree of node
- **Out degree:** The outgoing edges from a node are called its out degree.

**B. Architecture and design page dataset used**

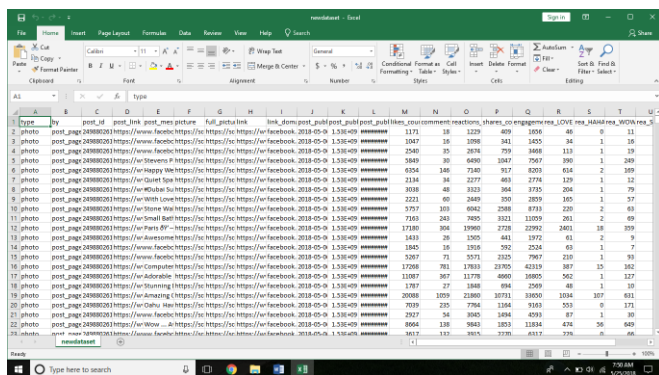


Figure 3 dataset used

Figure 3 illustrates architecture and design page dataset in which posts posted on page, content of post, likes, shares, comments, reactions like haha, sad, love etc. with timing of post has been shown.

**Size Distribution**

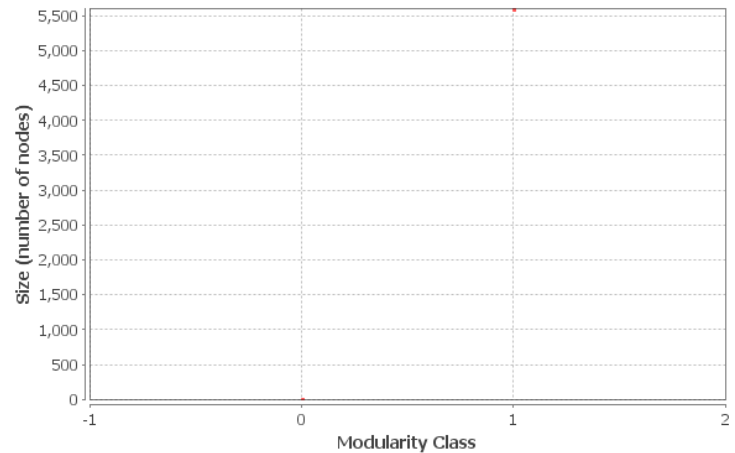


Figure 4 Modularity Classes

Figure 4 shows modularity classes. Modularity is used to find and distinguish the nodes which are closely connected with each other. This size distribution is calculated on the basis of size (number of nodes) and the modularity class.

**Degree Distribution**

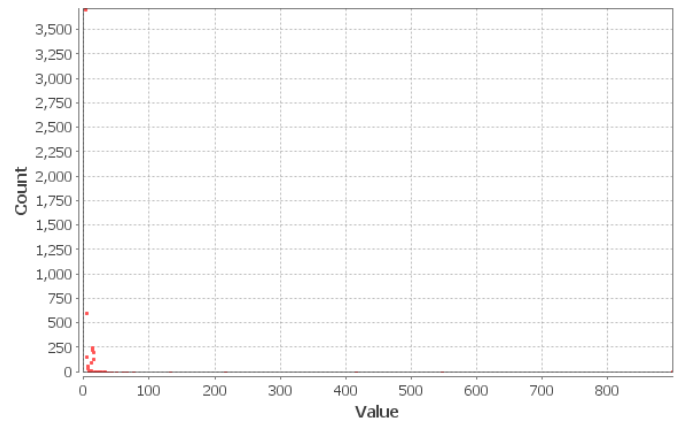


Figure 5 Degree Distribution

Figure 5 shows degree distribution of nodes. Degree distribution is used to measure how much nodes are connected with edges and by counting total number of edges to which node is connected degree of node is calculated.

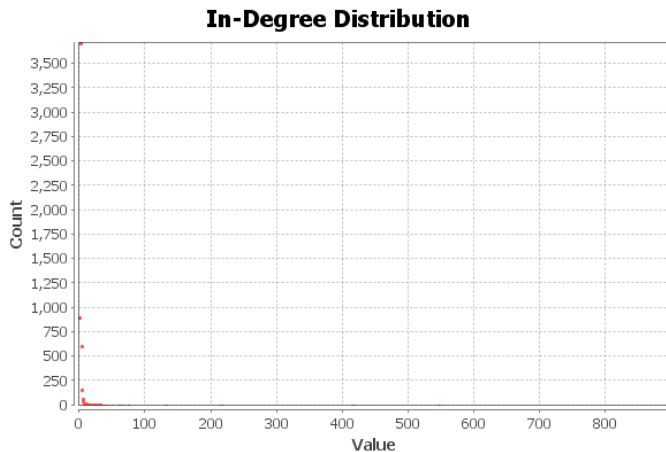


Figure 6 In-Degree Distribution

Figure 6 shows total number of incoming connections to a node. In-degree defines the no. of incoming edges to a node. In this graph in-degree is calculated with the help of count and value.

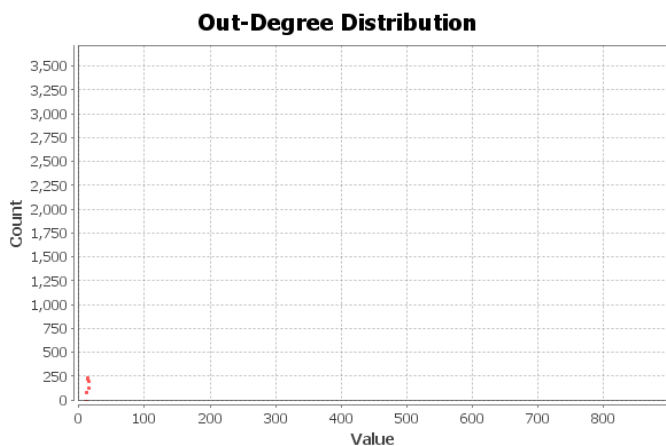


Figure 7 Out Degree Distribution

Figure 7 shows total number of outgoing connections from a node. Out-degree defines the no. of outgoing edges to a node. Out-degree is calculated with the help of count and value.

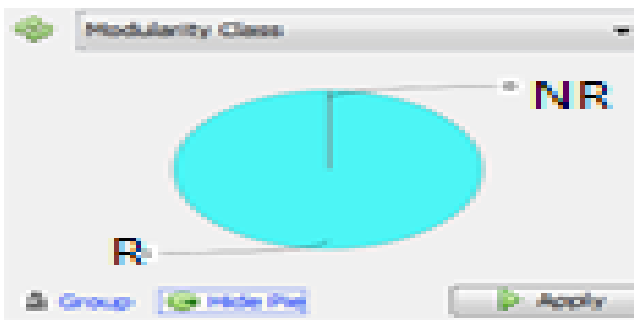


Figure 8 identification of not recommended or recommended posts

Figure 8 shows identification of recommended or not recommended posts. In this fig red color show not recommended and Faroese color shows recommended posts. So it is clear that in proposed work recommended posts are high. If recommended posts are high then it means these have more likes and shares as well as more positive reactions such as haha and love

## V. CONCLUSION

A friend recommendation mechanism based on popularity is presented in this paper. In proposed mechanism popularity of each post of a Facebook page is calculated and based on this popularity the users are recommended or not. The proposed mechanism is implemented in python and results are analyzed with Gephi tool. The results show that proposed mechanism can distinguish users in better manner as compare to existing techniques. In future try to apply this mechanism in some other social network applications also try to propose a new mechanism to recommend users on the basis of their interests and apply some recommendation techniques like collaborative filtering, content based filtering and interest based filtering techniques.

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