Metrics of Social Websites: A Case Study

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***Abstract*—Social Networks are the common platform for the present generations to share ideas. The members of these sites have grown to billions in the last decade and much more at present. In this paper, the metrics Page Rank, Path Length, Clustering Coefficient and Vertex Degree for SNWSs are evaluated by users' database of Facebook. The results indicate that the metrics Page Ranking, Path Length and Vertex Degree first three and last hold highest values and form an edge with the actors. The other metric Clustering Coefficient is reciprocal to the above metrics and the higher the value the greater isolation in the sub-group causing formation of Clique.**

Keywords—Clustering Coefficient, Page Rank , Social Networks, Social Networks Websites (SNWSs) and Vertex Degree.

I. Introduction

Social Websites are supporting the exchange of thoughts and opinions through interaction [1] among the users. They became the windows for all marketing, sales, services and information exchanges among the users.

They are login based. The login mechanism is very simple, and it will not take much time to operate for any user. The system of social network is recognized as a better component to improve the necessary factors in the fields of marketing, sales, and banking sectors.

The main practice in these sites is to exchange thoughts on various services, product features had by the public (users) in the form of direct and indirect way. Statistical values are prepared from the observations of Banking, Insurance, and Educational sectors are showing elements of impact from people reactions or feedback and the platform which causes to do all the activities with a least cost and under uncountable distances among user are not the matter.

With the help of social websites, a user can share the information with the counter user(s). The information can be in the form of simple text, or a short message, or collection of graphs, or charts or set of music tags or collection of related pictures or photos etc. It is indirectly supporting the user to intimate his/her feeling in the form of digital patterns.

This gives a kind of extension to the normal communication/conversations the way people gather in one place and do exchange their feeling with the help of all their body language and other attributes.

This is the reason the public is very much attracted in the usage of social websites to do share the thoughts in a very comfortable manner.

The usage of social websites is increasing exponentially.

The rest of the paper is structured as follows: In section 2, the denotation of related works is made; in section 3, an evaluation of four social metrics is explored, and Section 4 concludes the paper.

II. Related work

The present generation of youth begins the day with the Facebook or other social website. Hundreds of millions of people all over the world make use [2] of social websites, Internet portals, blogs, Wikis, etc. These sites such as MySpace, Facebook and YouTube have the essential features [3] and equipped with the necessary computing facilities to keep gigantic online communities get going.

The user can interact through the social websites in different ways [4] such as login, bookmarking, tags, etc. Now, people from online communities, use them as means to extend their personal networks and for entertainment purposes.

Many businesses and government agencies now involve and make use of social websites to further enhance their business aspects or provide services to people.

In a paper [5], observations and calculations were noted from a Facebook user account in respect of social metrics [6], such as Betweenness, Closeness, and Eigenvector. Differences [5] in hobby based (book reading, music, and TV) and ordinary users were presented. The

conclusions are made that hobby-based interaction has more impact than the non-hobby based list of users.

In this paper, the evaluation of four social metrics - Clustering Coefficient, Page Ranking, Vertex Degree and Path length are made with the help of case study of social website Facebook.

III. Evaluation of Four Social Metrics

A. *Page Ranking:* Page Rank measures the influence [7] of each vertex within the graph. The information from the Facebook account is used to calculate Rankings of Individual actors/nodes. The Max., Min., Avg. and Median values are listed in Table 1.

The data for the user's account graphically shown in Figure 1 represents that the higher the number of mutual interactions, the greater the page rank. A user can have connectivity with all his actors, whereas vice-versa may not be possible.

TABLE I. Statistical Data for the Metric- Page Rank

Name of Statistical factor	Value
Minimum Page Rank	0.174
Maximum Page Rank	7.902
Average Page Rank	1.000
Median Page Rank	0.851

Fig 1. Page Ranking: Users & Freq.

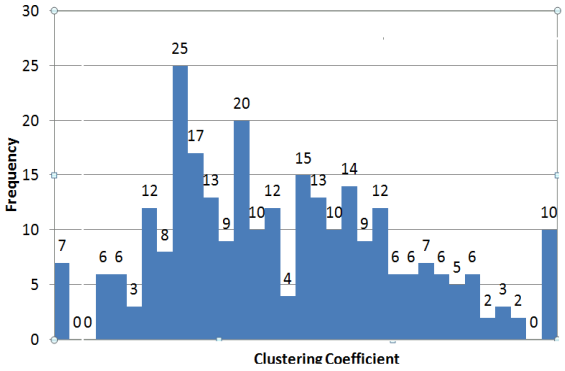


Fig 2. Page Ranking: Users & Freq.

B. *Clustering Coefficient:* The clustering coefficient of a vertex in a graph quantifies how close that vertex and its neighbors are, to be a clique (complete graph). It is an indication how the nodes are embedded with their neighbors.

This can be calculated from the database of user account as tabulated in Table 2. It is also displayed graphically in Fig. 2.

TABLE II. Statistical Data for the Metric- Clustering Coefficient

Name of Statistical factor	Value
Min. Clustering Coeff.	0.000
Max. Clustering Coeff.	1.000
Avg. Clustering Coeff.	0.600
Median Clustering Coeff.	0.586

This shows, which is the node/actor is popular in the subset of users.

C. *Vertex Degree:* It is the metric which measures the number of edges incident to the vertex (node). The calculated values show the strength of relationship between the user and reaming actors.

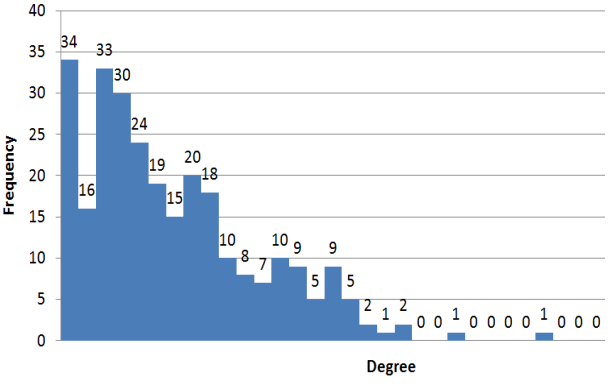
In this network, if any self-loop in an undirected graph is measured twice. The information is shown in Table 3. And a graph is displayed in Figure 3.

TABLE III. Statistical Data for the Metric -Vertex Degree

The values in Table 3 are calculated with the help of NodeXl software by using a database of user account of Facebook.

The graph considered to above values are depicted in the Figure 3 with frequencies are posted as a bars. The degree of initial vertices is higher and the same is shown Figure 3.

Fig 3. Vertex Degree and frequency

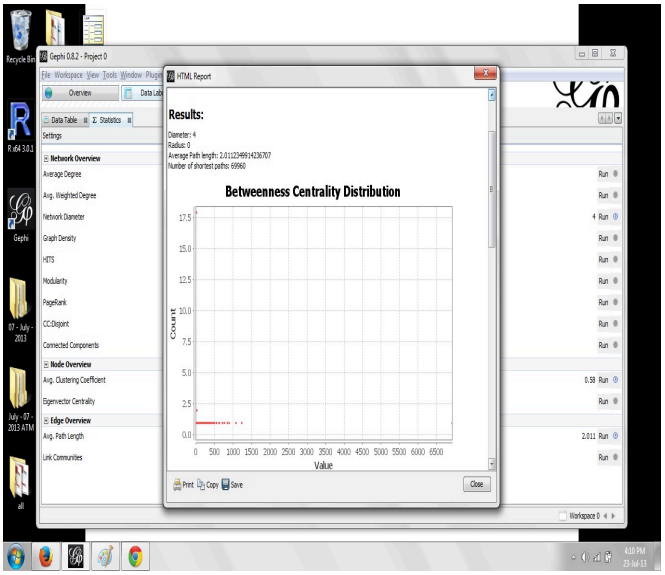


D. *Path Length:* Path length is one metric to find the distance in the available actors. The metric indicates statistically how far or near they existed and with that a valuable decision can be derived based on the requirement.

From the observations made on the existing social network this metric shows the shortest distance between a pair of nodes. The calculated average path length is 2.0154 and number of shortest paths is 63756.

Figure 4, indicates the path length metric.

Fig 4. Evaluation of Path Length metric



E. *Consolidation of four metrics:* Table 4 shows the calculated peak values of four metrics with respect to available actors (nodes). With respect to holders of the account, the metrics Page Ranking, Page Length and Vertex Degree hold the highest values forming an edge.

The other metric Clustering Coefficient is the reciprocal to the above metrics and higher the value, greater the isolation in the sub-group forming (Clique) a Social website.

TABLE IV. STATISTICAL DATA FOR THE FOUR METRICS

Sl.No	Name of the Metric	Value
1	Page Ranking	7.9
2	Vertex Degree	43
3	Clustering Coeff.	1
4	Path length	2.01

IV. CONCLUSIONS

Social networks are the platforms in which the process of interaction is a common agenda. Here the way of exchange of ideas between a pair of members is by means of various channels – like text messaging, voice chatting, photo sharing, etc.

In addition to that the users involved in their respective way of interactions and kind of interesting topics which are selected by him or a group an individual involves in different issues with different ideas among different people can become popular and versatile.

Sending an understandable data, information or a picture in a nut shell and getting some kind of reply for further continuity of chatting/discussions is an alternative, faster, easier and cheaper.

The investigation of relationship among the actors (users) is identified with the help of metrics. In this paper, the surveyed information with the help of social metrics shows the strength of social ties within the users.

Using these metrics the demand/likeness of a product or popularity of services offered by a company can be accessed with the voting process conducting with the help of social websites.

A node can be recognised as most interactive, if the three metrics Page Rank, Vertex degree and Path Length possess maximum values and lower the value of the metric Clustering Coefficient, the better interactive is the node.

Differentiating who is popular or powerful is the essential factor that can be decided by the social metrics.

The involvement of a user either with the family or friends local or global irrespective of country, culture, community affects his personality. This is to say that the person is highly influenced the public around him.

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