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The Role of Mathematics in Social Sites and Networking

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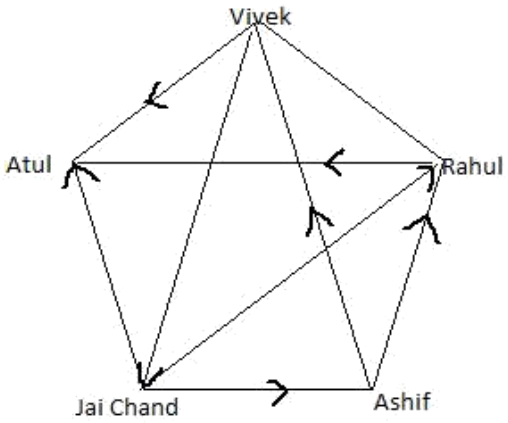
Abstract: Mathematics plays an important role in every field of life. Mathematics has many branches and used day to day life in many ways. In present scenario mathematics used for multiple networking and also used for social apps as well as sites like WHATS APP, FACEBOOK, TWITTER, OLA, ZOMATO etc. Social network analysis has an important role in analyzing social relations and patterns of interaction among people in a social network. Such networks can be casual, like those on social media sites, or formal, like academic social networks. Each of these networks is characterised by underlying data which defines various features of the network. Keeping in view the size and diversity of these networks it may not be possible to dissect entire network with conventional means. Social network visualization can be used to graphically represent these networks in a concise and easy to understand manner. Social network visualization tools rely heavily on quantitative features to numerically define various attributes of the net-work. These features also referred to as social network metrics used everyday mathematics as their foundations. In this paper we provide an overview of various social network and sites that are commonly used to analyses social networks.

Keywords: Mathematics, Social network analysis, Metrics, Network, Academic networks, Facebook.

Mathematics plays an important role in every field of life. Mathematics has many branches and used day to day life in many ways. In present scenario mathematics used for multiple networking and also used for social apps as well as sites like WHATS APP, FACEBOOK, TWITTER, OLA, ZOMATO etc. Social net-work analysis has an important role in analyzing social relations and patterns of interaction among people in a social network. These networks can be casual or formal like academic social networks. Each of these networks is characterized by underlying data which defines various features of the network. Mathematics is one of the most important subject in our daily life. Every person in the universe uses mathematics in different ways whether the person have a knowledge of it or not. In present scenario mathematics is playing most important role in social sites and social apps like WhtsApp, twitter, Facebook, Ola, Uber, Zomato etc. All these apps and sites are linked with the mathematical graph theory and networking. Social media is any medium of communication that allow interaction whereas a net-work consists of nodes representing entitles/joint and these nodes are connected by edges representing connection between the entitles. For example, friends connected by Facebook, WhatsApp and twitter etc.. They can be found around us in a variety of shapes and forms like WhtsApp, Ola, Uber, Instagram , Facebook, Twitter, Zomato, etc.. Social networks have mathematical representations like graphs, matrices, mappings and relations. A definition of social network found as ”a structured representation of the social actors (nodes) and their inter-connections (ties)”. These networks can be represented as a graph G

= (V; E): Here V is for vertices and E for edges The set V denotes entities (people, places, organizations, industries etc.) joined in pairs by edges in E denoting acquaintances or relationships(friends, siblings, co-authors, passengers, etc.). For examples: The network below shows the interactions between 5 Facebook Friends. An arrow having head in the direction of a person means that person received a post on his timeline/wall. An arrow having tail for the side of a person means that person wrote the post. Arrows on both ends means the two people posted on each other's timeline/ walls and therefore received a post from each other.



To analyze this network we define an adjacency matrices

A_{ij} = 1 if there is a connection between nodes i and j

A_{ij} = 0 if there is no connection.

In order to do so, we must define what values of 1 and 0, horizontal, and vertical means.

A value of 1 in any row shows that the row person posts to the column persons timeline/wall.

A value of 0 shows they do not post on the column person's timeline/wall.

A value of 1 in any column shows they receive a post from the row person.

A value of 0 in any column shows they do not receive a post from that row person.

	Jai Chand	Ashif	Rahul	Vivek	Atul
Jai Chand	1	1	1	0	1
Ashif	0	1	1	1	0
Rahul	0	0	1	0	1
Vivek	1	0	0	1	1
Atul	0	0	0	0	1

These networks and the underlying groups have emerged on the Web at a rapid pace and have become one of the widely used online activity. These networks are an aggregation of groups or virtual communities with each of these communities different from the other in composition, purpose and intent. Members of these virtual communities profit from being linked to other people sharing common interests despite their geographically dispersed affiliations. Social networks are often constructed for business entities sort of a company or firm, for educational entities sort of a school or University.

Social networks have got a lot of attention from the research community long before the advent of the Web. Between 1950 and 1980, when Vannevar Bush's proposed hypertext medium 'Memex' was gaining acceptance, Social Sciences also contributed a lot in measuring and analyzing social networks . There are numerous examples of social networks formed by social interactions like co-authoring, advising, supervising, and serving on committees between academics etc..

One can't even think of keeping aside these networks because they engage enormous number of users thus providing a large customer base to businesses on the one hand and the most common medium of interaction among geographically separated users on the other. The focus of Social Network Analysis is relation-ships, their patterns, implications, etc.. The study of social networks for behaviour analysis of actors involves two aspects: (a) the use of formal theory organized on the basis of mathematical conventions and (b) the factual analysis of network data as quantified by various social network analysis metrics. So it can be understood that social network metrics play an important role in SNA.

SOCIAL NETWORK ANALYSIS: LEVELS AND METRICS

Like in other fields metrics help define certain attributes in quantitative terms. There are five different levels of social network analysis, each of them characterized by the structure of the underlying network. It may be at dual level, triple level, performer level, subset level, or network level. Metrics like centrality, prestige and roles such as isolates, liaisons, bridges, etc. are used to analyses the social net-work at actor level, whereas distance and reachability, structural and other notions of equivalence, and tendencies toward reciprocity are important at dyadic level.

Conclusion:

Mathematics known as The Queen/Mother of all the sciences as well as other streams and the graphic theory is the important aspects of mathematics also Social network is no exception. Fundamentals of mathematics play an important role in the formulation of Social Network Analysis. A social network app and sites have any shape, size, matter and form but the basic considerations remain almost same. In this paper we explained various social network analysis and apps metrics and their dependence and how they work on mathematical concepts

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