

Social Networking Analysis: A case study in Tools

Tushar Kaushik, Sarthak Singhal, Jayant Mandan, Kamlesh Sharma

Abstract: Social network sites like Twitter, fb, and Google Hangouts appear like the highest visited sites at the net. They contain a large volume of dependent, semi-dependent and unstructured information about the users and additionally the relationships amongst them. The analysis of such great amount of knowledge could be a difficult issue. huge information forms an easy/straightforward means through that it becomes easy to scale, diversify, and interactively analyze this vast quantity of knowledge that has many billions of rows and columns among the tables. To perform cost-efficient method of such sizable quantity of information, special graph based tools for mining are required so one can definitely shape the social web. A lot of such tools for analysis are accessible with their own alternatives and advantages. Selecting associate degree applicable tool for a selected task is tough to make your mind up. This paper focuses on numerous graphics tools which could be used to extract/analyze a great amount of knowledge.

Keywords: Component; Formatting; Style; Styling; Insert (Key Words)

I. INTRODUCTION

A Social network community is outlined as a community of interactions or relations, where the nodes are called parents or actor, and additionally the rims or archs are the relations or interactions among these actors or parent nodes [1]. Social web and additionally the strategies to analyze them existed far from decades [2]. There may be many form of social web like electronic mail network, phone community, alliance community. However currently on-line social networks like fb, Twitter, LinkedIn, MySpace etc. are advanced that received reputation inner extraordinarily short amount of time and accrued full-size quantity of users. Facebook is said to possess over five hundred million users in 2010 [3].

The sector of social web and their evaluation has evolved from graph idea, data and social science and it is hired in lots of alternative fields like scientific subject, business utility, communicate, economic system and many others. Reading a social network is familiar to the evaluation of a graph because social net shape the topology of a graph. Graph evaluation tools are there for many years. But they aren't designed for studying a social network graph that has complex properties. A web social community graph can be extraordinarily giant. It will contain numerous nodes and edges. Social networks rectangular measure dynamic i.e. there's continuous evolution and boom. A node in social network once in a while has many attributes.

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There square measure tiny and sizable communities within the social graph. Previous graph analysis gear don't seem to be designed to manage such large and complicated social community graph. Social media has undoubtedly changed the way we use marketing to promote our businesses and various offers. We now have the opportunity to disseminate targeted messages through a plethora of tools and channels, in a practically cost-free manner. But social media marketing takes its toll on you in terms of time. We have to put time and effort in creating an appropriate social media strategy. Then, we need to create content to share, and finally, we should define timelines for sharing that content.

Regardless of what we do or say related to our products or services, our audience has its own thoughts about it. And, social media seems to be the most practical way for the audience to express its opinion. If we don't keep a finger on the pulse of our audience, we will never be able to reap all the benefits of social media. Moreover, our efforts may easily backfire. Social media analytics tools help us get acquainted with the true feedback on our actions and the content we display online. This gives us the opportunity to outshine the competition and keep our customers coming back. This paper discusses some graph analysis tools that are used for analyzing large social networks.

Most of the people of students are victimized by using social media and social networking gear in some capability. And, in fact, the tempo of change in terms of which social media equipment are being utilized by students appears to adjust yearly now. The motive of this paper isn't to introduce you to each unmarried device, however as an alternative to outline a few social media gear that can be used by college students in the study room and for assignments.

The thread that connects these digital tools is their social nature; these are tools that require you to have interaction with human beings and assets outdoor of yourself, to engage, to take part, to curate, and to communicate. All social networking tools can be effective approaches for students to learn, have interaction, and community if we're able to assist display them how by means of extra absolutely integrating them into our lessons.

These tools are helpful in following ways:

- **Tracking the Needs of our Target Audience**

In order to reach the full potential of our business, we need to understand the attitudes and preferences of our target audience. If we can find out what our audience wants, we will know what to provide and how to provide it. Social media gives us a myriad of opportunities to do this if we use the appropriate tools.

There's a lot of random chatter on social media, and that's a fact. But there's also some really valuable data we can use to our advantage. Our current and potential customers give their comments and opinions about various products,

services and companies, as well as the latest news and trends.

• Insights About Competition

Millions of social media users are spreading information about themselves and the world around them like never before. They are now able to share all the good and bad experiences in real time. What's more important, their claims are supported by photos, videos, and geo-locations. It's a little scary, isn't it? But the good side of this is they share their thoughts about competitor products and services, too. Having these insights, you can learn a lot about the strengths and weaknesses of competitor companies. You can also learn from the mistakes of your competitors and use this information to make better decisions in the future[1].

II. SOCIAL NETWORK ANALYSIS

Social network analysis (SNA) is the methodical analysis of social web. SNA observes the behavior of peoples on various topics and their social relationships in terms of net theory, consisting of nodes (representing individual actors inside the network) and ties (which represent relationships between the people, like relationship, kinship, structure position, sexual relationships, etc.) [4][5][6].

Expectations from the results acquired by social networking analysis:

1. Coming across the shape of social networks.
2. Finding numerous characteristic values for the web. Eg. centrality, between-ness, density, etc.
3. Locating groups inside the social community.
4. Conceptualizing the overall or part of the social web.

Several works are done on varied social networks to analyses and find out varied sorts of relationships and knowledge [7,8,9,10].

Kinds of Network Analysis

There are 2 basic forms of SNA, i.e.

- Ego network analysis
- Complete network analysis.

Table 1. Difference Between Complete and Ego Networks

Socio-centric (Whole/ Complete Network)	Ego-Centric (Ego/Personal Network)
Focus on the complete cluster	Focus on individual ego networks
Global structure	Structure
Patterns of interaction used to explain:	Composition
Concentration of power	Shape
Flow of data or resources	Cases are individual ego networks
Status structures	Generalized to other ego networks

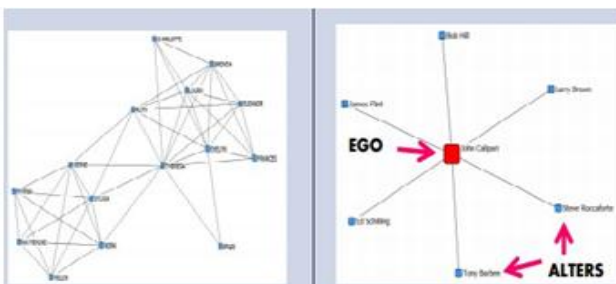


Figure 1. Example of Complete and Ego Network

Uses of social network analysis:[12]

- Recognizing unknown facts changing into commercially viable, e.g. RFID, ordination sequencing, tissue engineering.
- In computer-supported cooperative learning.
- Numbering of trends, of writers, of corporations commercializing trend.
- Reviewing page necessity Page Rank (Related to algorithmic in-degree computation), authorities/hubs.
- Finding Communities: discovering near-cliques.

III. SOCIAL NETWORK ANALYSIS TOOLS

Social network analysis equipment are accustomed to set up, analyze, visualize or simulate nodes (agencies, or know-how) and edges (courting or interaction) from numerous types of enter report together with mathematical fashions of social networks. There are many equipment tools in the market for analysis of social networks. The international N/w for Social N/w Analysis[2][3] (INSNA) continues an oversized list of software system programs and libraries. Following are the brief detail regarding every of the subsequent tools-

a. NodeXL - it's far a free, open-supply template for Microsoft® Excel® 2007, 2010 and 2013 that makes it easy to discover community graphs. With NodeXL, you can enter a network area list in a worksheet, click on a button and see your graph, all within the acquainted environment of the Excel window. some of its capabilities are:

- Adaptable Import and Export
- Straightlink to Social web
- Deep view and Scalable
- Adaptable Layout
- Flexible Altered Aspect
- Dynamic Fltering
- Strong Vertex pairing
- Graph Metric Estimation
- Work Autonetics



Figure 2. Example of NodeXL

b. Networkx – It is a Python programming language software bundle for the advent, modification and the examine of shape and features of the complex n/w. With the help of this s/w we can upload and save networks in widespread records codecs,



and might generate different forms of random and traditional n/w, examine network shape, construct community fashions, build networks, and lots extra. Networkx has many functions like language facts structures for graphs, dI Graphs, and multi Graphs. Nodes can be "whatever" (e.g. text, pics), Edges can maintain arbitrary records (e.g. weights, time-collection), trendy graph algorithms, community shape and analysis measures and so forth. Some of its features are:

- Data structures for graphs, digraphs, and multi-graphs.
- Many normal graph algorithms.
- Network structure and analysis measures.
- Generators for classic graphs, random graphs, and artificial networks.
- Nodes can be "anything" (e.g., text, images, XML records).
- Edges will hold arbitrary information (e.g., weights, time-series).
- Open source 3-clause BSD license.
- Well tested with over 90% code coverage.
- Additional advantages from Python embrace quick prototyping, easy to teach, and multi-platform.

The Good

- 1) Easy to use
- 2) Pure Python
- 3) Multiple Export Formats
- 4) Light Weight Framework

The Bad

- 1) Graphs only accept simple data types
- 2) Limited build-in plotting via matplotlib



Figure 3- Example of Network

- c. MeerKat – It's miles suitable for several kinds of n/w analysis, in addition to social networks. It provides filtering mechanisms, interactive piece of writing, assist for dynamic networks, varied metrics and automatically detects groups.

A number of its features are:

• Network visual image with multiple layouts.
• Interactive network piece of writing.
• Support for dynamic networks (multiple timeframes).
• Network filtering.
• Computes completely different measures of spatial relation (network metrics and statistics).
• Automatically detects communities (community mining).
• Shows community dynamics in time (community event analysis and visualization).

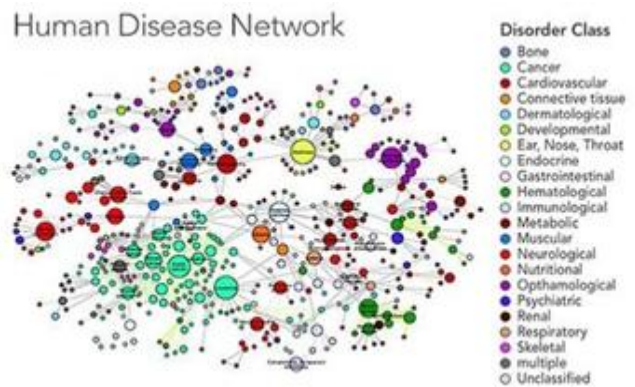


Figure 4-Example of Meerkat

- d. Gephi- It is a visualization and research platform for different networks, dynamic and hierarchical graphs. This tool is for those people who want to study and learn graphs. Like Photoshop but for data, the user interacts with the representation; manipulate the structures, shapes and colors to reveal hidden properties. Some of its features are:

- Development started in 2008
- Interactive interface.
- Uses Java.
- Recent scriptability enhancements.
- Provides Photoshop for graphs with customizable visual image.

visual image.

- Supports most file formats for networks.
- Improvable by plugins.
- Community detection still experimental.

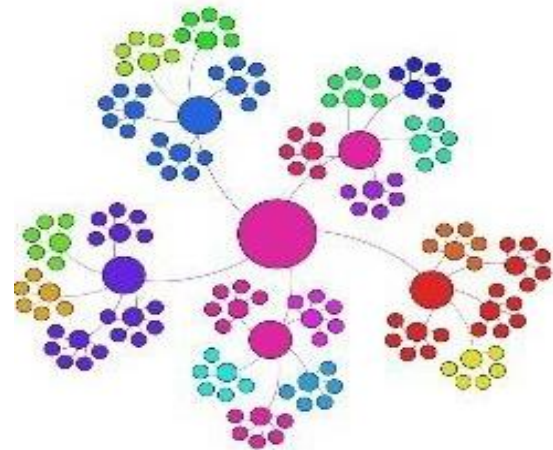


Figure 5-Example of Gephi

- e. Pajek – It is a widely used code for drawing networks, Pajek conjointly has analytical capabilities, and can be used to calculate most spatial relation measures, determine structural holes, block model, and so on. Some of its features are:

- Development started in 1996
- Data mining familiarized
- Many graph operators on the market
- Quick
- Exports 3 dimensional visual image
- Macro



- Supports matrices, adjacency lists and arcs lists familiarized input files

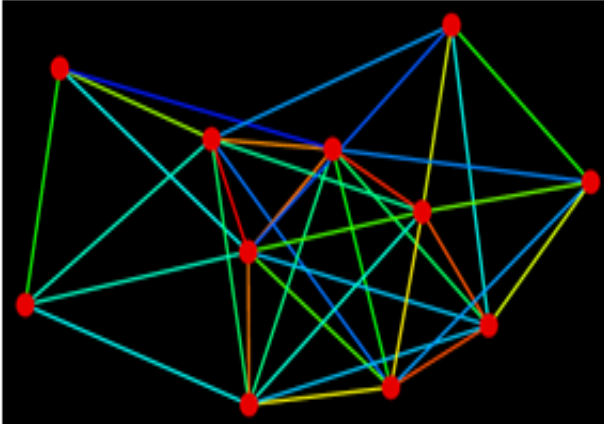


Figure 6-Example of Pajek

f. IGraph –It's miles a unfastened software program package tool for growing and manipulating graphs. It consists of implementations for traditional graph theory troubles like minimal spanning trees and network drift, and also implements algorithms like community shape search. The efficient implementation of IGraph lets in it to address graphs with millions of nodes Python and Ruby. Some of its features are:

- Used in R (a statistical environment) and Python.
- The low level routines are written in C.
- GUI interface available for R.
- Community detection ready.
- Not custom attributes friendly

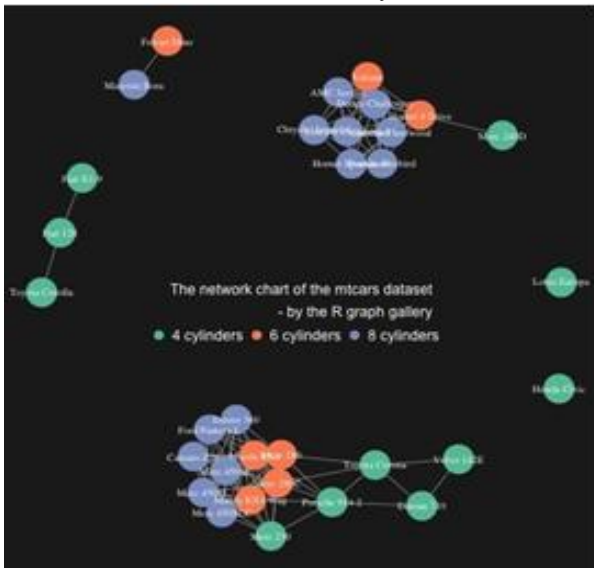


Figure 7-Example of IGraph

g. SocNetV (Social Networks Visualizer) – it's miles a cross-platform, adaptable device for evaluation and vision of Social web. It helps userto build a network web (graphs) on a digital material, or upload n/w of numerous formats (GraphML, GraphViz, Adjacency, Pajek, UCINET, etc). also, SocNetV allows you to change the social net, review their social and numerical features and follow visualization layouts. Some of its features are:

- Matrix routines: contiguity plot, Laplacian matrix, Degree matrix, Cocitation, etc.
- Ordinarygraph and network unity metrics, like solidity, diameter, line and gap, association, oddness, cluster coefficient, interchange, etc.
- advanced measures for social n/w review like similarity and status indices.
- speedy algos for n/w diagnosis, like triad census, clique census, etc.
- Tectonic equivalence evaluation, the usage of hierarchic cluster, nodescentrality and tie profile variance, Pearson coefficients.
- Design models depending totally and frequently on prominence indices or on power-directed placement for giant vision of the social web.
- Multi-relational network loading and printing. Load a social network inclusive of multiple members of the family or produce a social community for your own and add multiple family members to it.
- built-in net crawler to robotically produce "social networks" from links determined in an extremely given preliminary uniform useful resource locator.

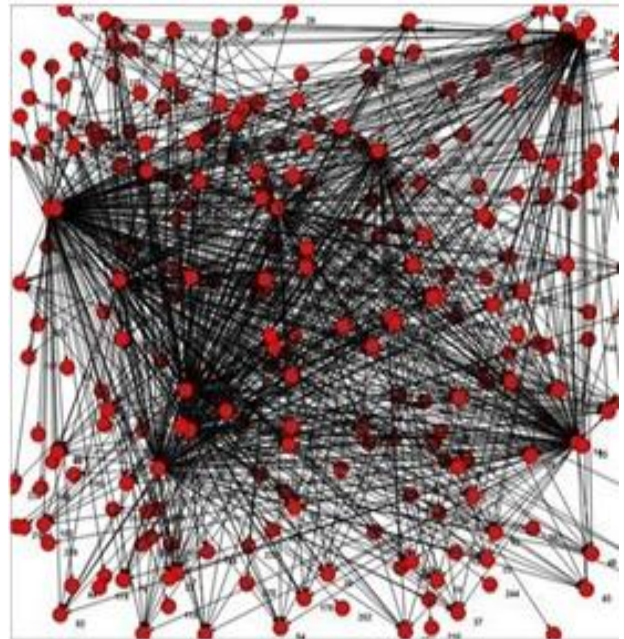


Figure 8-Example of Soc Net V

IV. COMPARISON OF SOCIAL NETWORK ANALYSIS TOOLS

The stand-alone Social n/w analysis tools are Pajek and Gephi , Networkx and IGraph are libraries. Pajek/gephi runs assist through windows systems and Networkx use python library and IGraph use python/r/c library for social network analysis. Networkx, IGraph or Pajek can take care of large amount of information set extra than one million nodes and Gephi can take care of up to 150000 nodes. Table.1 - Is comparing different Social community analyzing software of foundation of software program type.

Table 1. Comparison of Different Social Network Analysis Tools

	IGraph	Networkx	Pajek	NodeXL	MeerKat	Gephi	SocNetV
Software type	Library	Library	Stand alone	Stand alone		Stand alone	
Multi-relational Graph			+	+			+
Spatial relation	+	+	+			+	
Bridge computation			+	+			
Min. Load Time			+				
Min. Execution Time	+						
Network filtering					+		
Multiple Layouts					+		
Automatic detection					+		
Dynamic filtering				+			
Community detection				+			+
Graph metric calculation				+			
3D Visual image			+	+			
Attribute handling		+	+	+		+	
Clustering	+		+		+		+

V. CHALLENGES

In the latest review of using Social n/w analysis (SNA) gear for evaluation purposes, it became cited that one of the criticism of the field of SNA is that the majority of the work is instructional and does not bring about simple or realistic application. In view, possibly the principle challenge with the usage of SNA tool is the extra of riches. There is more than one types of software around for evaluation and visualization of networks, too many to be reviewed right here. For “rookies” the most instantaneous sensible challenge is more basic: how to load the raw statistics and bring a beneficial visualization and possibly generate a few simple metrics describing the data.

VI. CONCLUSION

IGraph is quickest tools that give most of graph alternatives and cope with massive and complicated n/w. Libraries

(Networkx or IGraph) are additional beneficial for superior and huge datasets, analysis motive and for the cluster. Pajek and Gephi is suitable software package for standalone programs. Pajek is maximum suited for multi-relational community graph. All of them software bundle will compute spatial relation, cluster coefficient, network diameter, page rank, density. Gephi does not provide the facilities for dyad or bridge computation. IGraph and Pajek are quicker software bundle tools in comparison to others. but Pajek doesn't provide all graph options. IGraph offers quickest end result to the general public graph alternatives. Load time is minimal for Pajek software program package deal. Execution time for spatial relation, web page rank, graph degree and ciques is minimal in IGraph software program package deal. Accordingly supported execution time IGraph is pleasant software program package.

MeerKat is great for network filtering, visualization with more than one layouts and automatic detection of groups in given statistics. NodeXL is appropriate for dynamic filtering i.e. it right away cover vertices and edges the use of a set of sliders and for graph metric calculations. SocNetV gives the fastest algorithm for community detection including triad census, clique census, and so on. and this tool is also used for multi-relational community loading and enhancing.

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