

Potential Role Of Social Networks In Healthcare Information Exchange

Sandhya Rani Kodali #
Sony Krishna Reddy#
Jaya Lakshmi Gundabathina *
#M.Tech Students

*Asst Professor: Department of Information Technology
V.R.Siddhartha Engineering College
Kanuru-7, Andhra Pradesh, India

Abstract

In this paper, we set out the usage and importance of social networking sites (SNS) in healthcare information delivery. We discussed the rapid rise of SNS in the recent years has been complemented by a flood of individuals and businesses in healthcare industry seeking to use new tools to communicate with patients, healthcare professionals and medical institutions and how SNS now provide a limitless, real-time resource for information, the practice of medicine, physicians and hospitals. We have also discussed importance of data mining in processing, analyzing large amount of data and defining pattern behaviours of large cluster of users on SNS.

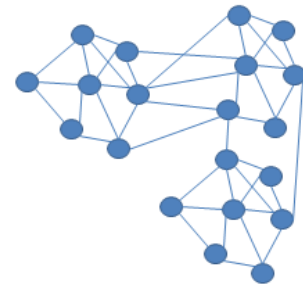


Fig 1.1: Network Model

1. Introduction

1.1 Network

A network is a series of actors /points / nodes / vertices interconnected by communication paths / edges / arcs / lines / links. Networks can interconnect with other networks and contain sub networks. Networks allow different kinds of flows such as messages, money, and diseases

1.2 Social Network

Social network allow users to share ideas, activities, events, interests with in their individual networks online. A social structure made of nodes that are generally individuals or organizations. A social network represents relationships and flows between people, groups, organizations, animals, computers or other information/knowledge processing entities [1]. The social network facilitates social relations among people who, for example, share interests, activities, backgrounds, or real-life connections. A social network service consists of a representation of each user (often a profile), his/her social links, and a variety of additional services. Most social network services are web-based

and provide means for users to interact over the Internet, such as e-mail and instant messaging. The study of social network clear way of analyzing the structure of whole social entities [2].The study of these structures uses social network analysis to identify different patterns, locate entities, and examine network dynamics. Social networks are self-organizing, emergent, and complex, such that a globally coherent pattern appears from the local interaction of the elements that make up the system [3].

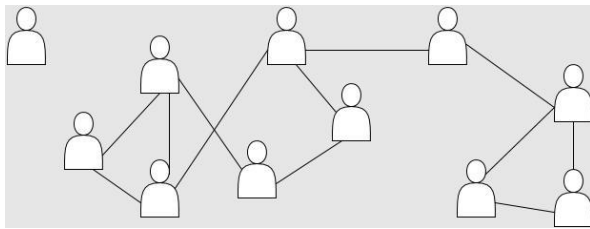


Fig 1.2: Social Network

1.3 Social Networking Analysis

Social network analysis (SNA) is a process of quantitative and qualitative analysis of a social network. SNA measures and maps the flow of relationships and relationship changes between knowledge-possessing entities. Simple and complex entities include websites, computers, animals, humans, groups, organizations and nations [4].The data of social networks is unusual.The social network data is described by a specialized language and quiet different from conventional data, and leads to apply statistics. Therefore network data are defined by actors and relations. The network analysis focuses on relations on actors. Network analysis is formulation and solution of problems that have network structure and captures in a graph. Graph theory provides methods and concepts for graphs and SNA methods used to analyze and visualize social networks.

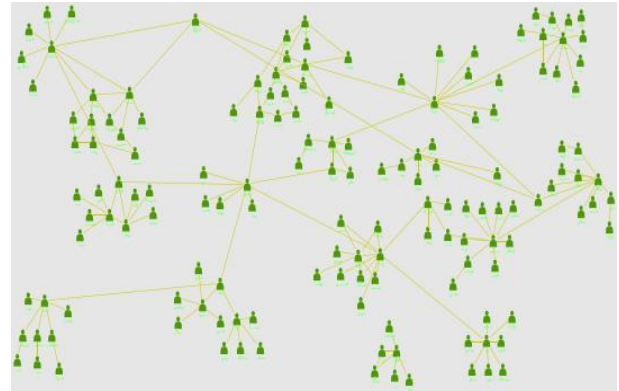


Fig 1.3: Social Networking Analysis

SNA has found many domains beyond social science like study of web pages, food chains in ecosystems, business applications, and army agencies to identify terrorist networks from traces of communication. Social networking sites. Social network analysis provides both a visual and a mathematical analysis of human relationships. Social network analysis has emerged as a key technique in modern sociology. It has also gained a significant following in anthropology, biology, communication studies, economics, geography, information, organizational studies, social psychology, and sociolinguistics[4]

Social Networking has become worldwide phenomenon. Two-thirds of the world population still not having access to the internet, this leaves huge room for future internet growth. By the statistics given by eMarketer.com it is estimated that over 1.2 billion people used social networking services during December 2012.As per comScore report Social networking accounts for 1 of every 6 minutes spent online.

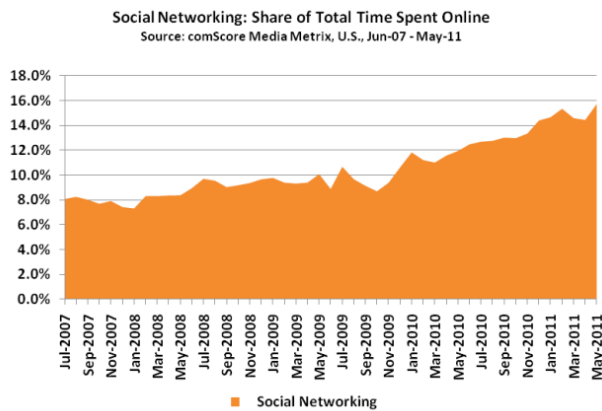


Fig 1.4: SNA 2007-2011

As the social networking industry continues to grow, the social landscapes composition will likely include a small number of 'super networks' and an increasingly diverse and competitive number of niche social networks.

2. Network Mining

Data mining is the extraction or mining of knowledge from large amounts of data. The information and knowledge gained can be used for applications ranging from market analysis, fraud detection, and customer retention, to production control and science exploration [5].

Link mining is a confluence of research in social networks, link analysis, hypertext and web mining, graph mining, relational learning, and inductive logic programming. Link mining tasks include link-based object classification, object type prediction, link type prediction, link existence prediction, link cardinality estimation, object reconciliation (which predicts whether two object are, in fact, the same), and group detection (which cluster objects) [5]

Social network data mining is simply known as network mining. Network mining examines relationships between objects to extract useful structural patterns in networks from internet, World Wide Web to social networks. Using network Mining Techniques we are moving from data to knowledge. The ethical values for social mining must consist of privacy (protection of human data to be mined), fairness (use of human mined knowledge) and trust, awareness and transparency.

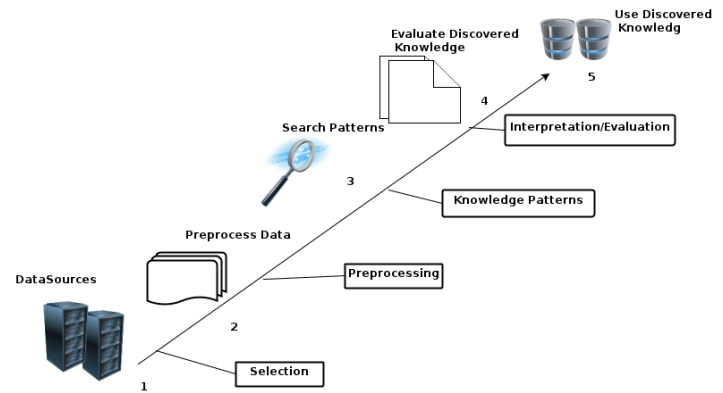


Fig 1.5: Discovering Knowledge

Data mining brings a set of tools and techniques that can be applied to this processed data to discover hidden patterns that provide healthcare professionals an additional source of knowledge for making decisions. Data mining is a collection of algorithmic ways to extract informative patterns from raw data. Extraction of different types of metadata relevant to social development centric applications - entity, sentiment, intention. Resources used in extraction of metadata are task independent domain knowledge, task specific domain information and network features. Data mining is purely data-driven and this feature is important in health care it helps doctors/physicians (domain experts) figure that (causation) out and derive 'Descriptive/predictive model' vs. 'Causal model'. The discovered patterns can be technological, multiplicity in demographics and determination in usage type. Data mining for SNA involves community extraction, link prediction, cascading behavior, identifying actors and experts in social networks and characterization of social networks.

3. Social Networking & Medical data

Human medical data are at once the most rewarding and difficult of all biological data to mine and analyze. The major points of uniqueness of medical data may be organized as Heterogeneity of medical data, Ethical, legal, and social issues, Statistical philosophy and special status of medicine. It is important in medical data mining, as well as in other kinds of data mining, to follow an established procedure of knowledge discovery, from problem specification to application of the results. Knowledge discovery is a non-trivial process of identifying valid, novel, potentially useful and ultimately understandable patterns from large collections of data [6]

Exchange of healthcare data on social networks lead to many e-health communities. While social networking has become a great information equalizer that has radically transformed the way people communicate around the world and elevating electronic communication to a level that is near face to face, health professionals should ensure that information is correct and accessible. The World Health Organization, however cautions users of social media (WHO,2009), especially those in the health profession to be wary of the quality of information taken through social networking sites such as Facebook. Merging medical data and social networking data in the same system gives clinicians and management in a healthcare organization the ability “to understand the impact of patient concerns on their business much better.” A healthcare organization that uses private networking for healthcare will be better positioned to know where the risks and opportunities for innovation are, and where they should focus their scarce resources, and avoid potential disruptions to business.

The social media landscape is evolving at lightning speed and virtual communities in healthcare are gaining momentum. In India the usage of digital media has been consistently in tandem with the general population. Physicians are using Internet, social networking websites and emails to communicate with peers, patients and thought leaders. Around 90% of physicians in India who use the internet have given a rating of 4 / 5 for quality of information available online and 3.5 / 5 for internet making their practice easier [7].

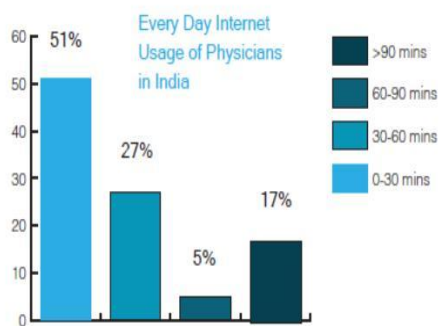


Fig 7: Every day internet usage by physicians in India

The awareness of social networking sites for healthcare information has gradually increased and as hospitals are no different from other service providers

who rely on word of mouth publicity, social media has become a boon for them. Recent survey catching the e-Healthcare Bug analyses the growing influence of digital media on the Indian healthcare segment by sharing trends in the usage and perception of the internet by consumers.

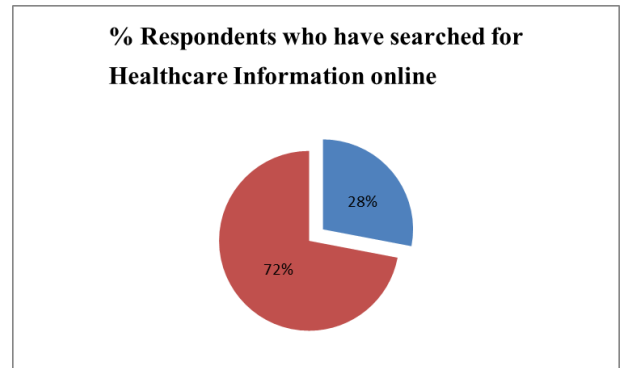


Fig 1.6: % Online Respondents

❖ Social Networking Sites Standards and Policies:

Physicians who use social media and social networking should be advised to protect themselves from unintended consequences of such practices and to maintain the public trust by:

- Protecting the privacy and confidentiality of their patients
- Avoiding requests for online medical advice
- Acting with professionalism
- Being forthcoming about their employment, credentials and conflicts of interest
- Being aware that information they post online may be available to anyone, and could be miscomprehended.

❖ A healthy Physician-Patient Relationship:

The physician-patient relationship is fundamental to the provision of acceptable medical care, and physicians are expected to recognize the obligations, responsibilities and patient rights associated with establishing and maintaining an appropriate physician-patient relationship. The relationship between a physician and patient begins when an individual seeks assistance from a physician for a health-related matter, and the physician agrees to undertake diagnosis and treatment of the patient. [8]

❖ Ethical Standards:

• Simple and Sincere

Physicians have an obligation to disclose clearly any information (e.g., economic, qualified or personal) that may perhaps influence patients' understanding or use of the information, products or services offered on any website offering health care services or information.

• Privacy

Physicians have an obligation to prevent unauthorized access to, or use of, patient and personal data and to assure that "de-identified" data cannot be linked back to the user or patient.

• Integrity

Information contained on websites should be truthful and not misleading or deceptive. It should be accurate and concise, up-to-date, and easy for patients to understand. It should clearly indicate whether it is based upon scientific studies, expert consensus, professional experience or personal opinion.

4. Amplifying Healthcare using Social Networking

In this paper we are proposing a model to expand and improve patient-to-patient relationship by means of social networking sites as internet usage awareness has widely increased in urban, rural areas of India. With this awareness and usage, India has become second highest country visiting healthcare data bank providing networkingsite.Webmd.com,patientslikeme.com,medIndai.net are some sites depicting the interactive/emotional side of the website providing information on medicines, health and also includes doctors,hospitals,chemists,pharmaceuticals and medical institutions. Examples of some current social network applications in the health care arena

Basic model of a Social Networking for Healthcare:

- Creating data bank:

Health care application	Participants	Impacted organizations	Representative social networking applications
Maintaining health and wellness	Consumers Health coaches	Physicians Health plans Wellness facilities Hospitals Alternative providers/ health coaches Employers	WebMD offers a social networking platform for both consumer- and physician/expert-moderated health conversations
Disease management	Consumers Physicians Allied health professionals	Physicians Retail clinics Health plans Device manufacturers Drug companies	Novartis recruited patients from PatientsLike Me
Personal Health Records (PHRs)	Consumers Health professionals	Drug & device manufacturers CROs Academic medicine Health plans	PatientsLike Me and MedHelp allow participants to upload detailed information patients.

Create data bank gathering information associated with the patients 'disease, previous treatment history, physicians instructions.

➤ Creating a social networking :

Create an online social networking tool (like Facebook) that allows patients to regularly update basic details (symptom/treatment/side effects). This will also uses the data to create graphs/charts allowing patients to manage their health record online. This encourages the patients to log in frequently.

➤ Create a product or report:

A strong sales team required to spread out to the metros and discuss the benefits of signing on to such a network. Marketing must be aimed towards patients as well as doctors. Based on the information exchanged on the network, an analytical team must gather the data and use analytical tools in order to create a product/report that can be purchased by industry players as valuable primary research data.

➤ Providing Privacy:

The most important factor of maintaining a network is privacy and security services monitoring the quality of information being shared.

➤ Offline maintenance:

Organising offline concords where patients can share their experiences and meet their online associates.

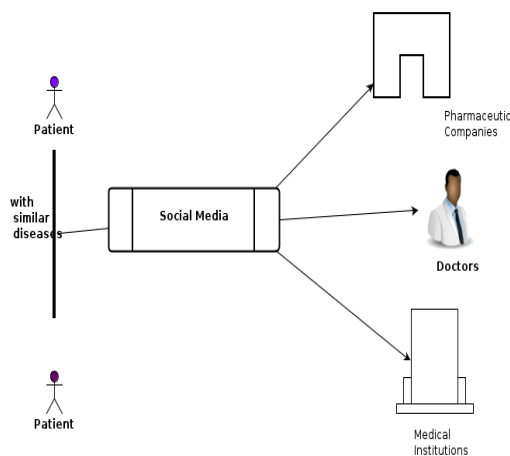


Fig 8: Online Healthcare System

5. Conclusion:

Internet has emerged as moderate to enable information sharing through social media. Social networking sites offering a new platform and became a channel for individuals seeking healthcare information, patients wanting others

who are battling with similar health disorders and healthcare professionals connecting to share information, network and learn from each other. Thoughtful and deliberate use of social media will be an increasingly important element of a health industry organization's business strategy. Developing social network has become a necessity and if health organizations do not take steps in this direction, they run the risk of becoming stagnant and obsolete. By this we can say "People are connected, healthily".

6. References

- [1]J.A. Barnes, "Class and Committees in a Norwegian Island Parish", Human Relations, vol. 7, 1954, pp. 39-58.
- [2] Wasserman, Stanley; Faust, Katherine (1994). "Social Network Analysis in the Social and Behavioral Sciences". Social Network Analysis: Methods and Applications. Cambridge University Press. pp. 1-27. ISBN Special:BookSources/978521382694|978521382694.
- [3]Newman, Mark, Albert-László Barabási and Duncan J. Watts (2006). The Structure and Dynamics of Networks (Princeton Studies in Complexity). Oxford: Princeton University Press
- [4] D'Andrea, Alessia et al. (2009). "An Overview of Methods for Virtual Social Network Analysis". In Abraham, Ajith et al.. Computational Social Network Analysis: Trends, Tools and Research Advances. Springer. p. 8. ISBN 978-1-84882-228-3
- [5] Jiawei Han and Micheline Kamber, Data Mining Concepts and Techniques, second edition, published by Elsevier.
- [6]Fayyad UM, Piatesky-Shapiro G, Smyth P, Uthurusamy R. Advances in knowledge discovery and data mining. Boston: AAAI Press/MIT Press, 1996.
- [7]White paper called 'Media Usage by Physicians in India' – research conducted by Brandcare Medical advertising with 150 HCP's
- [8]Model Guidelines for the Appropriate Use of the Internet in Medical Practice. Federation of State Medical Boards. 2002.