Propagation of New Innovations - An Approach to Classify Human Behavior and Movement from Available Social Network Data

Mahmud, Faisal; Hasan, Samiul[1]
Civil & Environmental Engineering Department
Old Dominion University, Norfolk, Virginia, USA
Massachusetts Institute of Technology[1], Cambridge, Massachusetts, USA

E-Mail: fmahm001@odu.edu, shasan@MIT.EDU

Abstract. It is interesting to observe new innovations, products, or ideas propagating into the society. One important factor of this propagation is the role of individual's social network; while another factor is individual's activities. In this paper, an approach will be made to analyze the propagation of different ideas in a popular social network. Individuals' responses to different activities in the network will be analyzed. The properties of network will also be investigated for successful propagation of innovations.

1. INTRODUCTION

In this world of science and technology, online social networking gained vast popularity for chatting, photo/ video/ file sharing as well as communicating with friends, family members, colleagues and others. Recently, websites like Facebook, Flickr, Youtube and Myspace turned into the media of communication and connect users to each other with the purpose of finding and exchanging content. As people are passing their more times in these sites, these websites become a marketing platform for companies' products, in some cases political campaigns. From movie trailers to amateur fun video, everything can reach to millions of online users through these entire social networks.

In this paper, the authors proposed a propagation concept on new innovations through which human behavior can be classified upon using popular social network sites. For data analysis and conceptualization of data spread in the social networks, only Facebook, a popular social network site is considered. Thus we have divided our paper into three main parts- Part A: Research questions and probable solutions, Part B: Proposal of a propagation theory and Part C: Analysis and link establishment between social network to real world. This paper begins with a background to the related work in the very concept of propagation theory. Then Part A to Part C is discussed following the conclusions and future works.

1.1 Literature Review

There have been various works related to social networking and characterizing. One of the distinguishing features of online social networks is information dissemination along social links. Content in the form of ideas, products, and messages spreads across social connections like a virus: one person discovers new content and shares it with a few of their friends, who share it with a few of their friends, and so on. Alan et al. called this spreading of a piece of content along links in a social network a "social cascade" [1]. Seminal work on persuasive communication, the branching process, and the diffusion of innovations spawned extensive literature in sociology, economy, social psychology, political science, marketing, and epidemiology [1, 2, 3, 4, and 5].

In order to get the path of propagation, we had to obtain the traces of content dissemination from Facebook [6]. Before the data analysis in Part: C, Part: A, and Part: B are discussed with some research questions, probable answers and establishment of a propagation theory.

2. Detailing of Analysis

Part: A
Research questions and probable answers

All type of research works and projects are based on some questions and the goal of a project work or research is to find out the answers of these questions either with an explanatory remark or not. In this research work, we had to face some research goals with the following questions:

1. What is the significance of utilization of a social network data and what should it meant for?
2. Why we should consider social networking as an important media of communication?
3. If social networking is an important media of communication, then how we can consider it for our real life human behavior classification?

By getting the explanatory answers to these questions, we can make a decision- a social network is such a new innovation that can help to classify human behavior.

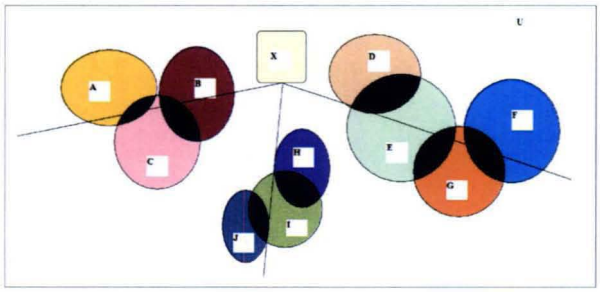

Figure 1: Visualization of common interest.

In Facebook, friends, family members, colleagues and sometimes unknown persons relate to each other through the friend list. No matter whether any two person knew each other or they have common interest, just to increase one's own friend list, he/she may add other people in his/her friend list. This is a case where people add randomly a person into his/her network. In other case, suppose A, and C are friends (figure 1) whereas B and C are friends. A may not know B and vice versa. But, if all these A, B and C are the members of a common group, say X, then they can know each other. The only other way to relate A, and B is possible when C can allow both A and B to see his/her friend list. The situation is similar in case of D, E, F, G, H, I and J. If and only if they can relate to each other under a common group X where they all are the members of this group X. so, if we can trace a group's propagation into a network, we can find out a social network link where each and every entity corresponds leaf of a big tree, the tree thus be named as master group. Under this master group there lies hundreds to millions of people of common interest. Thus the significance of utilization of a social network data is that it reveals a real-life scenario of human behavior, the behavior that is meant for whether a person feels a common interest for something or not, whether he/she feels in the same way that other people feel. In total, this network data is a master platform of human propagation.

Figure 2: Wagon wheel of Facebook group.

There are 10 different group types in Facebook. Any individual can create a new group under these 10 different types. As a result, if it is possible to create a master group so that these 10 different groups can be a member of that master group, we can easily find out a link of propagation theory. The work is not so difficult indeed, the Facebook itself is the master group, so if we can sort out individual group existence and the members' propagation, we can find out a huge link or network. This work is placed for future research.

We should consider social networking as an important media of communication as it reflects our original life picture. A person's behavior can reflect through a social network. In Facebook, you can send a message to a friend or someone, can chat, can upload pictures, invite to join a party, support a person or not as well as join in a group to exchange your views and ideas. You can even know about a person by the information part of his/her profile in the Facebook, can know every other details if you are not enlisted to limited profile list or the person prevents you to know about him/her by privacy settings. Is it possible to gather/ know/ collect the information about a person by other means? Is it possible to share such a huge thing through other way of communication? The answer is "No", may be you can know by other means, but it will cost you time and money. From this perspective, a social

network like Facebook now requires too many security options- otherwise the network which once you trusted just for communication and thoughts sharing, may turn a suicidal weapon to you.

Part: B
Proposal of a propagation theory

All types of social network sites are created with new innovative ideas. The sites vary from each other by contents, types, purpose as well as features. Some sites are created just to share the photographs, some to chat only, some for video and some other for everything in a mix-up condition. We have chosen Facebook for its featuring contents.

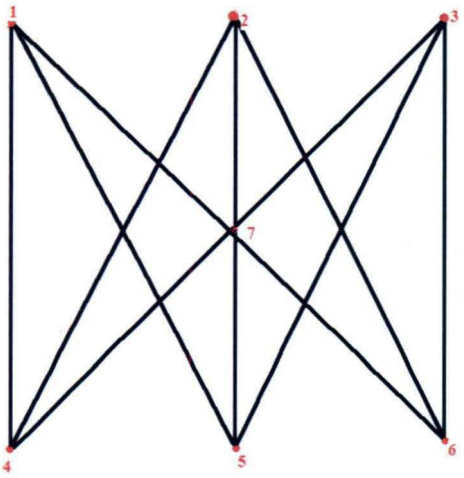

Figure 3: Node connectivity.

In figure 3, node connectivity diagram is shown with 7 different nodes. It is actually a complete bipartite graph [7]. Each node represents an entity of a person. The lines thus represent the connecting group through which an entity can travel to its designated location upon his/her wish. The path of travel of a person thus distributed through different ways and different locations, in some cases with common interest to the same location. If we consider the node connectivity figure in a space and rearrange the nodes with new connecting lines, it will make a new propagation approach within a common field, but with new innovation. So, there are the following options of connectivity:

1. A person can be linked with one or more groups with common interest and
2. A person can be linked without common interest but within the same path of travel.

Part: C
Analysis and link establishment between social networks and real world

When a group is established by using a social network (hereinafter Facebook), it's existence and popularity changes with the passage of time.

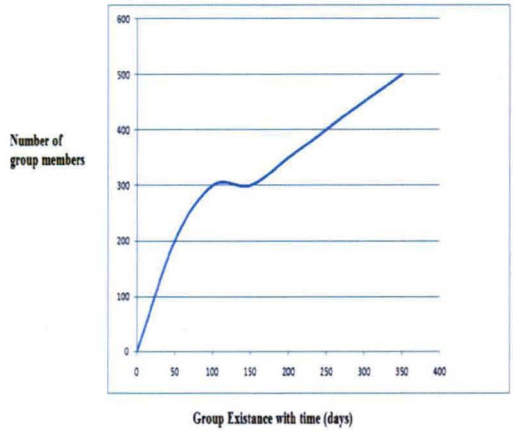

Figure 4: Growth pattern of a group (popular).

A group can gain its popularity within a very short time and also can loss the popularity. It depends on how many people are joining in that very group with common interest. In order to get the group popularity within a social network, we posted a video link about a train accident for trial basis and counted its popularity as the days passed. In the same manner we observed the fan's number for different group activities, comments and photographs. Based on this type of observation and research, we created and simulated some growth pattern graphs. In figure 4, a schematic graph of group growth and popularity is visualized where group popularity increases with time. The simulated figure with different other options of group popularity is shown in figure 5 and 6. In figure 5, the growth popularity changes from popular to unpopular. In figure 6, the growth popularity shows a stable condition. The reasons behind popularity, unpopularity or stability depend on many more things. These reasons' findings are kept for future works.

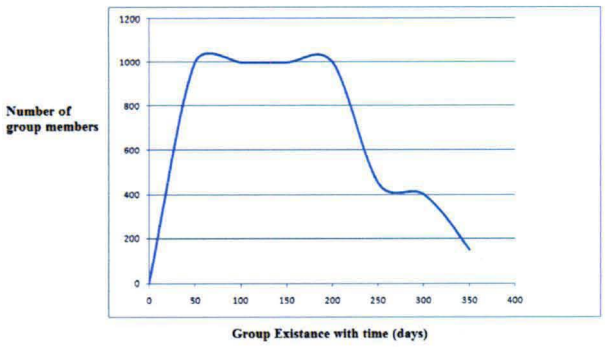

Figure 5: Growth pattern of another group (popular to unpopular).

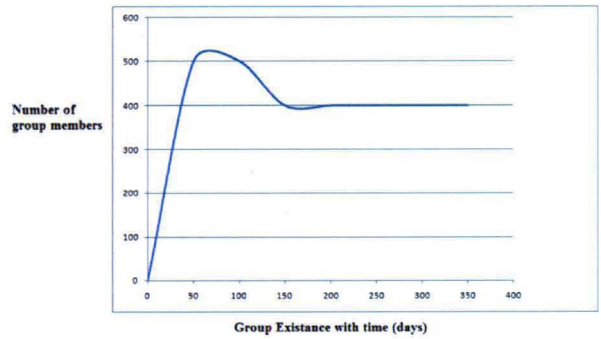

Figure 6: Growth pattern of another group (popular to stable).

The essence of using social network is to be connected with the other people either for reasons or no reasons. In actual life this same thing is happened with a live perspective. Now, social networking sites become so innovative that we can do almost everything through these sites. Our likings, disliking, beliefs, supports, aims and so other things are reflected through these sites. We don't need to go anywhere to wish, support, prevent or say anything by car or by person; we can easily do that with more lively through the sites. Thus social networks are taking the place of real life communication.

3. Conclusion and Remarks

The aim of this paper is to analyze a popular social network and classify the human behavior for getting an overall idea about propagation theory. The propagation theory to match with the real life will only make a sensible research work about human behavior classification; we believe to have done this work. The authors wish to be involved this type of work in future to establish a rigid base theory of human behavior by utilizing existing social networks.

4. REFERENCES

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