

A Framework for Semantic Advertisement over Social Media

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Abstract

Social networking has become a reality with presence of many sites such as Facebook, Twitter etc. They facilitate people to have virtual communities across the world and allow them to have communication through various means. Advertising in such web sites can provide maximum benefits to the companies. This paper presents a framework that supports semantic advertisement over such web sites based on the user preferences or favourites and interests by performing mining user's interactions in the social networking sites. Our framework can categorize social networking users based on the topic exchanges in the network and discover after mining the conversations as to which kind of advertisement can be placed in user's pages automatically. Thus relevant advertisements which are meaningful to users as per their interests can be placed so as to attract the users. When compared to traditional advertising methods, this method improves or promotes businesses more and the cost of advertisement can be lowered as well.

Keywords: *Social Media, Environmental Analysis*

1. Introduction

Due to advent of Internet and its associated technologies such as web services and SOA, social networking became a reality and we can see more and more such sites coming up to serve people. The social networks provide a platform for people to meet and exchange views from any corner of the world without time and geographical restrictions. Different types of social networks is possible such as instance messaging, forums, emails and web logs besides sites like Facebook, Twitter etc. Internet users can have virtual communities over social networking sites to foster friendship and even professional conversations thus making it a great experience when used positively. The social networking sites also can waste time if used negatively or unnecessarily. However, they have important influence on people in the real life [1]. As social networks became popular and users are increasing day by day, they will have large amount of traffic going through conversations across the users. Such huge data becomes

goldmine for researchers for data mining operations. By analyzing such data collective behavior of people can be understood. They can be used for the purposes of advertising[3] and marketing[2] as well.

In this paper we are going to mine the conversations across the users and find their preferred topics of interaction, and take decisions on the placement of advertisements. We call it semantic advertisements that will have more benefits when compared with traditional advertising. This is because the placement of advertisements on user pages is done after discovering the user's favourites or interests only. This kind of advertisements are more effective as they are knowledge based. In traditional advertising there is no provision of finding interests of people. We just place advertisements and users may or may not respond to them. Moreover, the traditional advertising is very costly when compared with advertisements posted over social networking media. This is very positive advantage and also the human interactions based advertisement makes it semantic advertisement that is after mining the data thus giving required business intelligence that helps in taking well informed decisions on the fly. In social networking sites, there is more flexibility in terms of size of advertisements as well. The result of this kind of advertisements can minimize users' dissatisfaction and bring about more success when compared with traditional advertising system.

2. Related Work

Social networking phenomena recently has its presence felt across the globe. It makes social meetings, interactions across the people communicate, employees easy. The interactions over social media resulted in huge amount of data that became a goldmine for researchers to have various mining operations to bring about knowledge and business intelligence [1]. Researchers in this area encompass email, IM, mining [1], [5], [9], advertisement

management [3], virtual marketing [2] and community discovery [7], [8]. Very large number of users communicating over social networking media can provide great opportunity for virtual marketing. Virtual marketing is a process of passing business related messages of advertisements to other people over Internet for the purpose of promoting product sales, services etc. Virtual marketing believes that the existing users are very satisfied and they take time to view the advertisements. In virtual marketing trust is the key ingredient required. The facilities like IM and chatrooms provide great opportunities to have virtual marketing on them. Thus social networking sites and other facilities became very attractive places for advertisements [10]. Very useful advertisements are contextual advertising. This kind of advertising is based on the knowledge. Based on specific knowledge, these advertisements are placed in web pages. In this method keywords are obtained from the web pages and then based on that corresponding advertisements are placed. However, this kind of advertisement is also not suitable as users may not show interest in this kind of advertisements. In the recent years, social media encouraged different kinds of advertising methods. Many companies targeted advertising based on the concepts and keywords for making advertisements more relevant. The properties of news groups Weblogs, Forums, and Chatrooms are used for making advertisements. Forums are used for public mailing that helps in reaching many people and making advertisements in such places will be beneficial. Chatrooms are helping for instance messaging which can help in making advertisements. Emailing also can be used for advertisement activities.

The main target of researchers over social media is to analyze the content and place advertisements that make it more relevant. The researchers also focused on group of people who have similar locations, friends, events, and geographical features and properties [11]. As all advertising systems need some area for advertisements, they use new approaches to split the target space and take decisions accordingly. Email marketing is also an example for advertising system [3]. Creating subgroups among the users also can help in making advertisements sensibly. Broadcasting advertisements based on the subject audience. Limiting advertisements is possible by asking the users of their interest and based on the interest advertisements can be placed. This can reduce the disappointment of users over such advertisements. Group of people can be of static or dynamic. By analyzing the data present over social networking sites, it is possible to have dynamic grouping of users. The target in social network analysis is to discover knowledge pertaining to network structure, description and perform satisfaction models and virtualizations [11]. There are many ways of collecting the required data including interviews,

observations and questionnaire through web related means. The basic approach to analyzing social networking data is graph model where a set of nodes are considered and entities are considered, edges are nothing but links between entities and thus network can be modeled and traced easily. Such graphs can be created using different ways [11]. Out of them, some monitor the network state over a period of time based on location or both of them [11]. Network may be different based on the different viewpoints which are useful for all types of models such as degree, betweenness, closeness. These properties can be useful for finding accurate relationships between the entities. Finding actor's relationship is another goal of analyzing social networking. In this paper social networking is analysed for semantic advertisements. The semantic advertisements are nothing but knowledge based advertisements. First of all the interactions among the users of various categories are mined and their interests, topics of discussions are known and then advertisements are placed in their pages. In this paper, we propose a framework that takes care of mining interactions among the users in social networking media and place advertisements in their pages dynamically. Such advertisements will be as per the priorities or interest of the users. Therefore when compared with traditional advertising the semantic advertising has great deal of advantages.

3. Environment Analysis

For successful advertisement, choosing suitable place is very important. In case of social networks also, it is important to choose better site with more number of users involved in the conversations. Very popular web sites that are into social networking business have to be used. However, before choosing, their popularity has to be analysed. For this reason this section provides a series of graphs to know that.

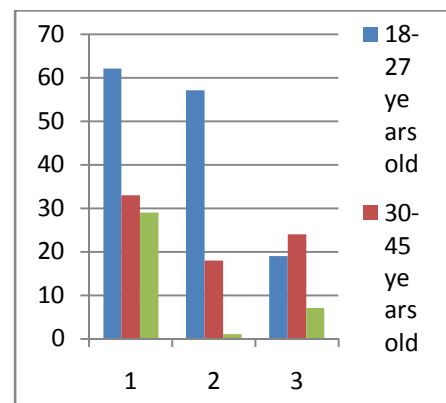


Fig. 1 – Usage of Emails vs IM

As can be seen in fig. 1, the people and age groups among social networking users is presented. People between age 18 and 27 are more involved in social networking. People with age group between 30 and 45 are relatively less while people between 40 and 60 age are even lesser in their presence in social networking media.

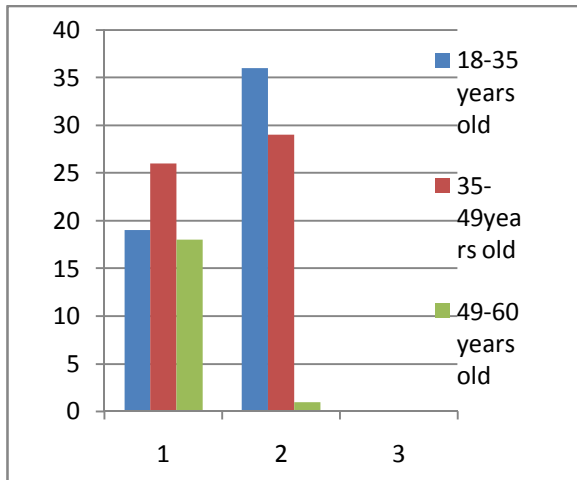


Fig. 2 – IM users spending time

As can be seen in fig. 1, the people and age groups among social networking users is presented in terms of spending time. People between age 18 and 27 are more involved in social networking. People with age group between 30 and 45 are relatively less while people between 40 and 60 age are even lesser in their presence in social networking media with respect to spending time.

4. Proposed Framework

The proposed framework for semantic advertisements is as shown in fig. 3. The overall work flow diagram is shown. It contains various entities and interactions among them for the purpose of making semantic advertisements.

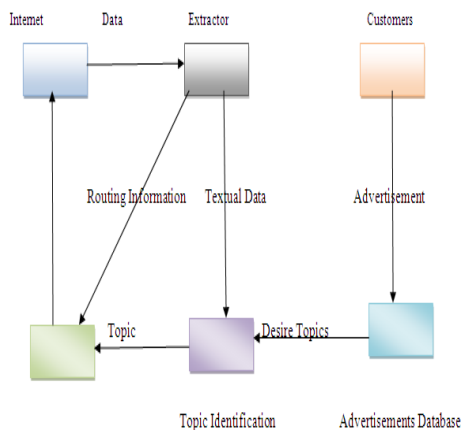


Fig. 3 – Proposed Framework and Its Work Flow

As can be seen in fig. 3, it is evident that Internet is used as the platform in which social media is running. When users have interactions over social media, the extractor component is responsible to take data and then extract textual data. The extracted textual data is given to topic identification module. The topic identification module is responsible to identify the preferred topic by comparing the desired topics taken from advertisement database which contains customers' advertisements. The extractor component also takes care of sending routing information. The final topic identified and the routing information are used to place final advertisements into the social networking media. Required data mining operations are used to extract data and also find the suitable topic identification. The advertisements are placed automatically in social networking sites.

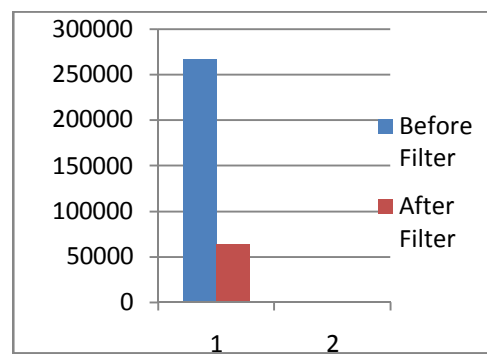


Fig. 4 – Found keywords before and after filtering

As can be seen in fig. 4, The graph shows details about statistics on before filtering and after filtering. Before filtering the keywords are more while they are very less after filtering. This helps in making advertisements published as per the topic selection. This will reduce customer dissatisfaction as well and best way of advertising with many advantages over traditional advertisement approaches.

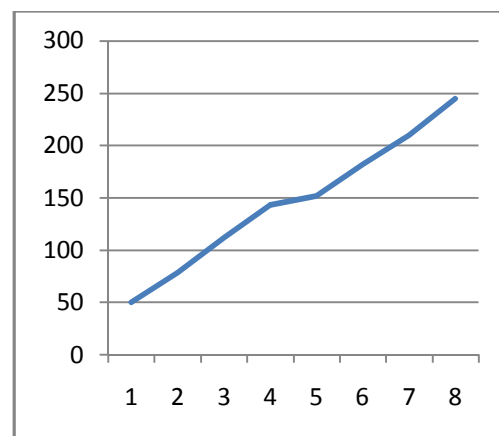


Fig. 4 – Cache set state

As can be seen in fig. 4, it is shown that only 269 keywords are kept in cache. When dynamic set is added to this number total keywords exist will be 389. Thus according to 870 contexts, we have only 0.44 keywords per each document.

5. Conclusion

This paper presents a new of advertising known as semantic advertisement which is based on mining the interactions of people in the social networking sites. This brings out the hidden potential of social networking environments. The facilities like Email, IM, and other facilities using which people across the globe can communicate revolutionised the communication scenarios. The led to the new way of advertising as well. Virtual marketing has become an established practice. In this paper we proposed and implemented a framework that allows mining of user interactions and find out their interested topics and publish advertisements that suits their interests. This helps in making them more meaningful and useful to users also. Their dissatisfaction is minimized and the advertising companies and sponsors make more business. Moreover the advertisements based on mining human interactions can improve the relevancy of advertisement and also make it cheaper when compared with traditional advertising. Thus our framework helps in promoting businesses with ease by making semantic advertisements that are more effective and the result of business intelligence. Such advertisements can always lead to profits to organizations in question when compared with traditional advertisements.

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