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E-GOVERNMENT FROM A WEB 2.0 PROSPECTIVE

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Introduction

*"**Web 2.0**......refers to a supposed second-generation of Internet-based Services .... that emphasize online collaboration and sharing among users."* [Wikipedia]

The proliferation of Web 2.0 has brought about drastic changes in the Internet culture worldwide. Today, users no longer only regard the WWW a globally distributed information-base, where they 'surf' for useful information; but also a timely information exchange platform for interactive communication. The operation of Web 2.0 is based on the philosophy of "evolution of knowledge". Taking Wikipedia [1] an on-line encyclopedia as an example, any users can freely and openly contribute their ideas in the evolution process. Thus today information over WWW is practically owned by the users rather than by the information owners themselves as previously in Web 1.0.

Under the Web 2.0 culture, Internet users increasingly form groups and communities on-line based on their common interests and interact among themselves. . Typical channels for this purpose include MSM for on-line interaction [2]; Friendster for establishing friendships [3]; Weblog for knowledge and ideas sharing [4]. These e-communities, large or small, are comprised of users with diversified education and cultural backgrounds. An ensemble of e-communities in turn comprises an e-society. Similar to real world societies, any environments populated with people with different beliefs, interests and values of judgment would inevitably lead to disagreements, arguments or even confrontations. Different e-communities may adopt different ways to express their disagreements and some of them may choose to do it violently, e.g. mail-bombs, virus, etc. To prevent violence and vandalism in a real world society, the government pays a crucial role. It often endeavors to understand the problems and needs of its citizens in order to design suitable services and facilities to fulfill them. The same applies to an e-society, the e-Government should discover the same of its e-communities and e-citizens; analyze them and provide appropriate e-services and e-facilities to establish a healthy and harmonious living co-existing environment.

How to understand the behavior of e-citizens? This lays down the objective of this article. The rest of this document introduces two key technologies, namely social network analysis and opinion mining for the said purpose.

Social Network Analysis

*"**Social Network**.........Social networking also refers to a category of Internet applications to help connect friends, business partners, or other individuals together using a variety of tools. These applications, known as on-line social networks are becoming increasingly popular."* [Wikipedia]

Fundamentally, social network analysis is not a new concept. It has been widely applied in social science domain, where researchers design models to represent relationships among people and identifying properties about a network (i.e. community) or individual in the network [5], e.g.

Connectivity models how people are connected to one another in a network;

Centrality models how people influence others most in the network; and

Authoritativity models how people are referenced in the network.

And Etc.

On the WWW, networks of people and objects form an e-society. Within a network, people and objects interact dynamically. In general, the following types of interactions take place regularly:

People-People Interactions, e.g. users include each other as contacts in MSN messenger;

Object-Object Interactions, e.g. blog posts cites other blog posts in Weblogs; and

People-Object Interactions, e.g. users create bookmarks for uploaded photos in Flickr [6]

Object-People Interactions, e.g. on-line payment.

As people and object communicate, vast amount of data about the people, objects and their interactions can provide invaluable information in many applications. For example, information for suggesting a new book to potential customers in e-CRM (customer relationship management); for sales predication in e-business; for identifying people/communities with prejudice behaviors in e-security; for recommending authoritative domain experts/departments for better collaboration between e-citizens in e-government; etc.

Traditional social network analysis approaches, however, are mostly conducted subjectively based on interviews and/or questionnaires over a small population size. They are not directly applicable to investigating the WWW, which involves thousands,

or even millions, people, objects and their interactions. Similarly, classical statistical methods are also ineffective. Consider a "word cloud" maintained by flickr. The most important word (i.e. the biggest word in the cloud) is determined by how many users specify that word at that instant. In this way, simple word frequency count would reflect the 'authoritativeity' of an object. But flickr has not take into account significance of the users contributing the keywords. Clearly an expert user should carry more wait than a novice. Thus, in on-line social network analysis, one must consider the semantic relationships between people and people; object and object; as well as people and object,

Consider another example, blog posting. If a blog post could arouse heated discussion and attracted many users, it would be considered 'authoratative'. But a popular blog post may not always be positive hence authoritative. Some popular blog posts may invite negative comments from other bloggers on the posts rendering them 'controversial'. Differentiation between positive/'authoritative' and negative/'controversial' blog posts is far beyond the capability of simple statistical methods. It requires good understanding of the content of the blog site.

Opinion Mining

"Opinion Mining is a recent discipline at the crossroad of information retrieval and computational linguistics which is concerned not the topic of the document is about, but the opinion it expresses." [7]

Opinion mining [8] facilitates on-line content analysis. It is commonly used for automatic analysis of on-line evaluation. Evaluation is a popular social process for people to assess objects (or other people). Students evaluate their professors (or vice versa); consumers evaluate products/services; reviewers review conference/journal papers; etc. Famous on-line product review sites include www.amazon.com for books and http://www.imbd.com for movies. Effectively, evaluation is a kind of people-object (or people-people) interactions.

Previously under Web 1.0, products/services information is posted by the manufacturers/service-providers and they fully own such information. For marketing purposes, the WWW is widely used as a propaganda platform for their products. For this reason, the credibility of the information is highly skeptical. In practice, opinions from expert users often influence consumers' decisions.

It has, however, been difficult to consult a large group of experts off-line. The advent of Web 2.0, e.g. Weblogs, has certainly overcome this predicament. Automatic analysis of Weblog is the target of opinion mining.

Conclusion

"A Government is obliged to look after her citizens. Web is a growing society The e-Citizen should be looked after by the e-Government. Otherwise, watch out for e-crime: e vandalisms, e-riots, ... etc. leading to an insecure workplace" [9]

The advancement in Web 2.0 has rapidly changed the landscape of e-government. Today, e-government is becoming more and more e-citizen centric. To serve its customers well, the behavior and culture of the e-citizens must not be undermined. For that purpose, two state-of-the-art technologies, namely social network analysis and opinion mining are introduced in this article. Effective adoption of these technologies can assist an e-government to provide the desirable e-services and e-facilities to her e-citizens. These in turn will prevent e-crime, e-vandalisms, e-riots, etc. leading to a healthy e-society where you and me harmonious live and work together.

References

[1]   See http://www.wikipedia.org

[2]   See http://www.msn.com

[3]   See http://www.friendster.com

[4]   A typical Weblog example: http://www.weblog.com

[5]   Stanley Wasserman, Katherine Faust and Mark Granovetter. *Social Network Analysis: Methods and Applications*. Cambrige University Press, 1994.

[6]   See http://www.flickr.com

[7]   See http://medialab.di.unipi.it/web/Language+Intelligence/OpinionMining06-06.pdf

[8]   Minqing Hu and Bing Liu. "Mining Opinion Features in Customer Reviews." *Proceedings of 19th National Conference on ArtificialIntelligence* (AAAI-2004), San Jose, USA, July 2004.

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