

Spotting and Characterizing Opinion Leaders in Cyber Communities

Joo Young Lee¹, Jungsun Yoon², Sun-Hwa Hahn³

¹pinejoo@kisti.re.kr, ²jsyoon@kisti.re.kr, ³shhahn@kisti.re.kr

S&T Trends Information Analysis Department

Korea Institute of S&T Information

52 Eoun-Dong Yuseong-Gu Daejeon 305-33 Republic of Korea

(TEL) +82-42-828-5057, (FAX) +82-42-828-5198

1. Introduction

Cyber community is a newly developed social place based on the technology infrastructure, Internet. The Internet supports various modes of communication such as BBS, messenger, e-mail and chatting room, etc. These applications enable members to take active interactions. In addition, the mode of communication is used for the sake of gathering members into a particular place. The aim of setting such places is to make communities where members share the common context by activating the interaction among them. Therefore, activating the interaction becomes important, because the activity leads the growth of communities themselves.

However, it is not always easy to activate in fact because of the lack of triggers of topics. In other words, we need to control the activation of a community if we could throw fascinating topics into the community. It is necessary to focus on 'opinion leaders' who are sensitive to the trend and having a great influence on members' decision making. Opinion leaders can provide fascinating topics that trigger the activation of the community.

This paper aims at spotting and characterizing opinion leaders, as a trigger of activation, with the application of the Influence Diffusion Model (IDM) by Matsumura, Ohsawa and Ishizuka (2002) in an example cyber community, 'Tourist Cafe' at the Global Network of Korean Scientists & Engineers (KOSEN, kosen21.org). KOSEN was established in 1999 in order to share knowledge and information resources of Korean scientists and engineers all over the world.

2. Application of Influence Diffusion Model

According to Matsumura, Ohsawa and Ishizuka (2002), Influence Diffusion Model (IDM) is a method for discovering influential comments, members, and terms in discussions of cyber communities. One of the features of online discussions is that communications between members are done by exchanging comments. The first assumption of IDM is that the relations of comments, called comment-chain, show the flow of influence. If comment Cy replies to comment Cx, it is considered that Cy is affected by Cx. In other words, if member Y replies to a comment of

member X, Y is considered to be affected by X. The influence diffuses from C_x to C_y or from X to Y. In this way, the influence diffuses throughout the comment-chains. Another feature of online discussions is that comments are written by natural language composed terms. The second assumption of IDM is that people's idea is expressed and disseminated by the terms. Based on these assumptions, Matsumura, Ohsawa and Ishizuka (2002) define the process of diffusing influence as follows;

Definition 1. The influence is defined by the degree of terms propagating throughout the comment-chains. If C_y replies to C_x, the influence of C_x onto C_y, i_{xy} , is defined as

$$i_{xy} = |w_x \setminus w_y|/|w_y| \dots (1)$$

where w_x and w_y are the set of terms in C_x and C_y respectively, and $|w|$ denotes the count of w . In addition, if C_z replies to C_y, the influence of C_x through C_y, i_{xz} is defined as

$$i_{xz} = |w_x \setminus w_y \setminus w_z|/|w_z| \times i_{xy} \dots (2)$$

where w_z are the terms in C_z. The more a comment affects other comments, the more the influence increases. Then, the influence of a subject, a comment, person or a term comes to be measurable.

Definition 2. The influence of a subject, a comment, person, or a term to the community is measured by the sum of influence diffused from the subject to all other members of the

community.

Applying Definition 2 to C_x, the influence is measured by the sum of influence diffused from C_x, i.e., $i_{xy} + i_{xz}$ if the community has three members x, y and z .

3. Spotting Opinion Leaders

In IDM, the influence of a person X is defined as the sum of influence of X's comments. I apply IDM to Tourist Café's BBS named 'Bubble Talk' discussing about the tourism all over the world. The results, top 4 members during 6 months (January-June, 2004) in the order of values of diffusing influence (I_x) are listed in Table 1.

Table 1. The Top 4 in Its Influence

| Ranking | Member ID | I_x |
|---------|-----------|-------|
| 1 | A | 0.396 |
| 2 | B | 0.358 |
| 3 | C | 0.347 |
| 4 | D | 0.111 |

Table 1 shows that the top rank member, A, was a person that posted the most influential message, because it is the beginning of the comment-chains in the BBS. The third-rank member, C is the creator and operator of Tourist Café, KOSEN. He frequently offered the hot information or advices about tourism. The second-rank member, B has been KOSEN enthusiast for more than 2 years and also has been offering much information or comments from other users and raising constructive discussions. The difference between C and D is too significant to be dealt with at the same level of influence. Therefore, I believe that

Top 3 are suitable for opinion leaders in Tourist Café, KOSEN.

4. Characterizing Opinion Leaders

The characteristics of opinion leaders are different from each other. I regard their influential terms as their characteristics. The influential terms for each opinion leaders in Table 1 are listed in Table 2.

Table 2. Characteristics of Opinion Leaders

| Member ID | Characteristics (Influential Terms) |
|-----------|---|
| A | France, festival, world, e-mail, tour, invite... |
| B | performance, marriage, women, dance, test, world, art... |
| C | anniversary, world, music, festival, good news, train, weekend... |

Table 2 shows that

- A has the characteristics, which are France, festival, world, e-mail, tour, invite, etc.
- B has the characteristics, which are performance, marriage, women, dance, test, world, etc.
- C has the characteristics, which are anniversary, world, music, festival, good news, train, weekend, etc.
- A and C have similar characteristics, which are festival and world.
- all the opinion leaders have common characteristics, which is world, etc.

The common characteristics are from the term 'world', as the main topic or objective of discussions of the Tourist Café is to share information of the world tourism. Especially, it is found that B often provokes other topics than world tourism.

5. Conclusions

The results of the paper guide us to understand the opinion leaders and their characteristics by quoting the case of Tourist Café, KOSEN. As the future strategy for activating a community, KOSEN should plan to let opinion leaders whose characteristics are related to the community's current topic and frequently provide BBS with some topics for activating the community. As opinion leaders are volunteers devoting to their own time and money, we should compensate their activities for giving honor with the appropriate title at the KOSEN or benefits of participating in various kinds of events for free and rights to access to the part of administrator's boundary etc. It is possible to introduce opinion leaders' story at the newsletters or distinguish them from other members by the special icon behind their names. Opinion leaders tend to be proud of their position by attracting attention of other members or administrators. If we promote further their activities, the community can obtain qualified content from members. In the case of Tourist Café, it deserves to collect tour information from members all over the world. In conclusion, opinion leaders activate the community not only by consistently initiating or responding discussions but producing or encouraging other

members to produce useful content. Community managers should consider the effect of their activities and make the best of them strategically with the provision of various benefits.

References

- [1] Naoshiro Matsumura, Yukio Ohsawa and Mitsuru Ishizuka: Influence Diffusion Model in Text-based Communication, *WWW02*, 2002.
- [2] Naoshiro Matsumura, Yukio Ohsawa and Mitsuru Ishizuka: Mining and Characterizing Opinion Leaders from Threaded Online Discussions, *WWW03*, 2003.
- [3] Joo Young Lee and Sun-Hwa Hahn: Mode of Communication in Cyber Communities, *2003 KSH*, 2003.
- [4] Joo Young Lee and Sun-Hwa Hahn: A Study on the Knowledge Community for Creating and Sharing Knowledge, *BIEN 2003*, 2003.