Chapter 27
Modeling of Enjyo via Process of Consensus Formation on SNS

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Abstract "The pen is mightier than the sword" said in previous times, the role of dispatching information was given to the people with the special trainee, the people called "Mass-Communication". However, it has become possible for everyone to dispatch the information on social society with the advent of the Web. Accordingly, Enjyo is often observed on Social Networking Services. Enjyo is a phenomenon that leads the tragedy to individual/company who sends the promotion information via a process of consensus formation as the result of many SNS users. In this research, we analyze the value of reputation on social media in some cases with the purpose of modeling Enjyo. In this study, we tried to numerically analyze and model some cases of Enjyo as well as to classify them by using the data on SNS. For achieving our purpose, we proposed a method of measuring a state of Enjyo and applied the case study method for analysis. With this method, the process of the analysis is likely to be influenced by one's subjective interpretation or assessment. Therefore, we also tried to facilitate its efficiency and accuracy with random sampling. As a result, several patterns of Enjyo were identified. Moreover, one of the cases of appropriate Enjyo extinction was observed.

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27.1 Introduction

Jeff Zucker, the president of CNN Worldwide said in 2014, "Everyone has a blog. We're all journalists now [1]". This symbolizes the status quo that every single person can dispatch information to the world by SNS. Conventionally the mass media have played a role to transmit information. But with the advent of the Internet, information can easily be disseminated widely to the people by any individuals via SNS. Professional journalists are well-trained, and understand the huge impact that might be inflicted upon the society through dispatching information. The number of people and organizations in the field of journalism tends to be limited because they need to have logistics channels (e.g. newspaper, magazine, radio, TV, etc.). Therefore the range of information dissemination is relatively small, although the interpretation of information can differ depending on each media. The information is usually cross-referred among the media by the eyes of the general public, thus it is unlikely that the subjective partiality of the transmitters (the mass media, in this case) gives a strong influence on the transmitted information itself (of course it often happens that the media sort out the information; which information is more important than the other, and which should be reported or not). However, as SNS has enabled the general public to widely disseminate the information today, each one of us can play the similar role of mass media. The purposes of the information dispatch by the general public are, in most cases, to bring up some topics for communication between friends, and to simply inform friends and acquaintances of some news. But in some cases, the information is disseminated with the intention of manipulating the story under the subjective partiality of the individual. It is also possible for anybody to add his/her own opinions or beliefs to the information and to transmit it to the public. When information is transmitted in such a way, the original information and facts will inevitably change and be more or less distorted. Conventionally, it took a few months for the public opinion to be formed for certain news through the interaction between the mass media and the general public. But today, the public opinion via SNS only needs a few days or hours to be molded.[1] It sometimes results in a party's business bankruptcy, losing jobs, or arrest on a crime. This kind of social phenomenon is called "Enjyo".

On the other hand, there are possible cases in which the promotion via SNS would succeed, and there are some researches which predict the "Hit" by observing the reactions of the people on SNS [2]. To induce the Hit, it is known that not only the quality of the content and the conventional promotion, but also the direct communications (the effects on potential consumers from the player) and the indirect communications (e.g. word-of-mouth, buzz) are important. Moreover, the effectiveness of word-of-mouth is well known and it is researched widely as the method of the marketing [3–7]. This is why people dispatch their activities on SNS.

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[1]This speed is astounding for the author who has been working as a journalist, editor, and writer for more than 30 years in magazine industry.

Nevertheless, there is only a fine line between Enjyo and Hit and the dispatch on SNS can sometimes lead to the tragedies.

The purpose of this study is in the quantification and modeling of some cases of Enjyo on SNS. The result will hopefully contribute to developing the tools to predict Enjyo as well as identify the appropriateness of Enjyo for each case. In this research, we numerically analyzed and modeled five cases of Enjyo with an attempt of classifying them by using the data on SNS.

27.2   Principle of Modeling

Some individuals or groups disseminate a piece of information which can cause a sensational event. Most of the time they simply have an intention to gain favorable and positive attention from others. However, it is not always the case. Unfortunate consequences, such as business bankruptcy, job loss, and arrest on a crime, are often produced through some inflammatory arguments or malicious disclosure by unspecified individuals. We call this phenomenon "Enjyo." Also in this article, we use the term "Informing" to describe the process of forming public opinion after transforming its value, being affected by the great amount of unspecified mixed opinions via SNS.

In this study, we adopted the case study approach by using the data collected from SNS, and the details will be described as follows. An operator has categorized each opinion posted on Twitter, Internet discussion boards, or blogs into "positive," "neutral," and "negative" opinions toward the person who triggered the sensational event X. If an operator k categorizes an opinion of an individual i about an event X into "positive,"

$$\epsilon_k(\mathcal{T}_i(X)) = 1 \ , \tag{27.1}$$

If "neutral,"

$$\epsilon_k(\mathcal{T}_i(X)) = 0 \ , \tag{27.2}$$

If "negative,"

$$\epsilon_k(\mathcal{T}_i(X)) = -1 \ , \tag{27.3}$$

where ϵ_k a coding function. By permuting the sequence of options t with the timestamps, we define the public opinion, $Y(t)$, at the time of t as,

$$Y(t) = \sum_{j=1}^{t} \epsilon_k(s_j) \ , \tag{27.4}$$

where $s_t(X)$ denotes the $\mathscr{T}_i(X)$ sorted by timestamps. Moreover, we define the Enjyo as,

$$\lim_{t\to\infty} Y(t) < 0 \; . \tag{27.5}$$

Furthermore, if we consider applicative use, it is difficult to find a solution of ϵ_k for every $s_t(X)$, because the analysis on the typical case requires a tremendous number of operators who solve ϵ_k in real time, if we aim to create the forecast system of Enjyo. Thus, we test to compare the results with those in random sampling for i. This random sampling would simulate if the $Y(t)$ by reduced data has the same tendency with $Y(t)$ of all of data or not. Furthermore, the random sampling will be applied for k because of the influence on ϵ_k given by the subjective ideas of operators.

27.3 Analysis of Enjyo

27.3.1 Data Description

To analyze Enjyo, five cases were selected from Twitter and summary sites of the online forum (such as 2-channel), and $Y(t)$ was evaluated by using the formula described in Sect. 26.2. On collecting the samples, we tried to choose each case that could demonstrate the distinctive behavior of the curve $Y(t)$. Also in our intuition, those cases were on a very fine line; whether they would be put in a state of glory or in Enjyo.

27.3.2 Case Study

27.3.2.1 Case 1: Crowd Funding Platform Business

Case 1 is the instance of the service of supporting needy students with scholarship fund collected through crowd-funding. The data were collected from Togetter (the collecting service from the twitter for specific keywords or interests of those who create the thread) from 8:09 to 11:38 on Dec. 26th, 2012. Although the number of tweet was 10053, we used 9676 of them by ignoring clearly meaningless tweets. This service was started by a famous public figure, and became a topic of conversation for a period of time through SNS. In the beginning, the idea was supported by many people, but slowly it was heading for Enjyo. It was due to the disclosure of the fact that the first student chosen as a scholarship recipient was not actually a needy student. This was hunted down by the student's real name as well as her portrait photos revealed on SNS. (According to some reported information, the
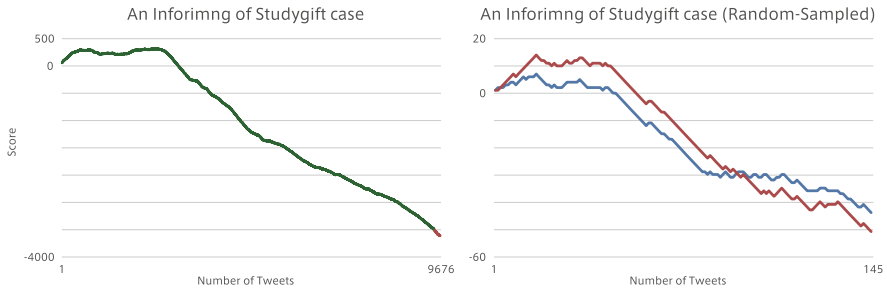
Fig. 27.1 Behavior of $Y(t)$ in case 1 (*left graph*: without sampling, *right graph* (*red*): 145 individual's tweets were random sampled, *right graph* (*blue*): 145 operators were random sampled)

student possessed a smartphone and PC, and went abroad several times.) Figure 27.1 shows the curves of $Y(t)$. Although the value of $Y(t)$ increases at the beginning, it begins to decrease around $t = 2000$, eventually ending up in a state of Enjyo.

27.3.2.2   Case 2: Iceman in Freezer

As Case 2, we selected an event in which juvenile mischievous behavior on SNS resulted in getting a series of negative responses from anonymous people. In this case, Enjyo broke out due to a photo of a teenager inside a convenience store's freezer which was uploaded by his friend onto a site of SNS. Presumably those boys uploaded the photo just for showing off among their friends, but they received such severe bashing because the photo was open to the public. Unfortunately, some SNS users, who were absolute strangers identified the boys by tracking down their accounts. Eventually criminal papers were filed with prosecutors against those teenagers on suspicion of forcible obstruction of business. The data were collected from the two threads on 2-channel which were focused on the Iceman news and were active on 26th and 27th July, 2013. Although the number of posts was 2000, we used 1926 of them by ignoring clearly meaningless tweets. Figure 27.2 shows the behavior of $Y(t)$ in this case. The sharp and continuing decline clearly indicates the occurrence of Enjyo.

27.3.2.3   Case 3: Exposure of Bureaucrat

Case 3 is an instance that a fast-track bureaucrat repeatedly made harsh remarks on his pseudonymous blog. This civil servant was tracked down by the users of SNS outraged over his derogatory and discriminating remarks on the blog, and was eventually faced the consequence of being subjected to disciplinary action. The data were collected from in 2-channel which was focused on the bureaucrat news and was active from 17:55 to 19:17 on 24th Sep, 2013. Although the number of posts
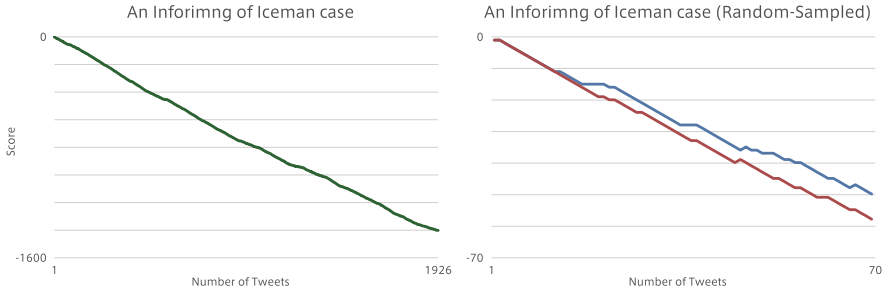
Fig. 27.2 Behavior of $Y(t)$ in case 2 (*left graph*: without sampling, *right graph* (*red*): 70 individual's posts were random sampled, *right graph* (*blue*): 70 operators were random sampled)
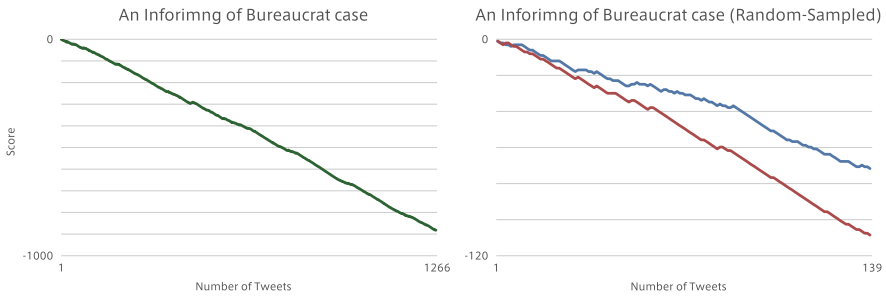

Fig. 27.3 Behavior of $Y(t)$ in case 3 (*left graph*: without sampling, *right graph* (*red*): 139 individual's posts were random sampled, *right graph* (*blue*): 139 operators were random sampled)

was 1163, we used 1266 of them by ignoring clearly meaningless types. Figure 27.3 shows the ongoing state of Enjyo, which is similar to Case 2.

27.3.2.4   Case 4: Rebroadcast of Popular Feature Film

The case of a rerun of a blockbuster feature film is selected as Case 4. The data were collected from on Togetter, which was focused on the rebroadcast and was active from 13th to 20th Jan, 2014. Although the number of tweet was 3847, we use 3701 of them by ignoring clearly meaningless tweets. The behavior of $Y(t)$ is shown in Fig. 27.4. This demonstrates a different pattern of $Y(t)$ with a curve, not declining toward the end, which means Enjyo didn't occur in this case.

27.3.2.5   Case 5: Anger to Headhunting

Case 5 presents the event that a well-known CEO of IT company showed his furious anger through his blog toward an employee who was headhunted and left the company. This was in the news, and Enjyo broke out on SNS. However, the curve
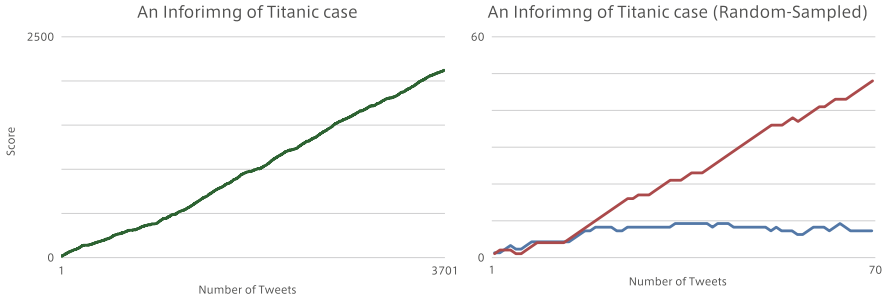
Fig. 27.4 Behavior of $Y(t)$ in case 4 (*left graph*: without sampling, *right graph* (*red*): 70 individual's tweets were random sampled, *right graph* (*blue*): 70 operators were random sampled)
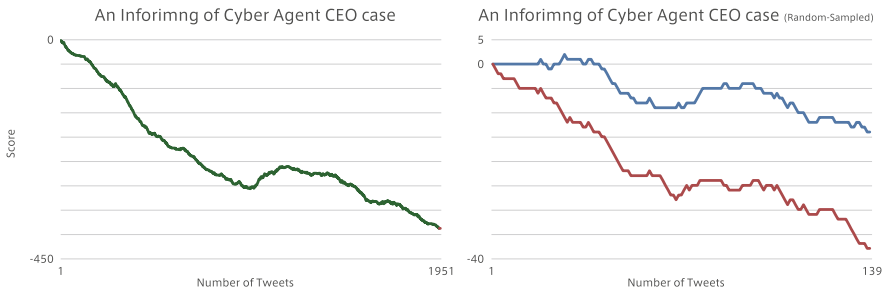

Fig. 27.5 Behavior of $Y(t)$ in case 5 (*left graph*: without sampling, *right graph* (*red*): 139 individual's posts were random sampled, *right graph* (*blue*): 139 operators were random sampled)

of $Y(t)$ in Fig. 27.5 indicates a slight rise in the middle (around $t = 1000$). The data were collected from on Twitter with the name of the company as the searching word from 2nd to 11th Oct, 2014. Although the number of tweet was 2007, we used 1951 of them by ignoring clearly meaningless tweets.

In this case, the curve of $Y(t)$ seems to go straight downhill, but it slightly rises in the middle around $t = 1000$. Since membership fees are required to read the blog posts in question, non-members are accessible only to the headlines. Enjyo broke out instantly because those headlines were flashy. However, there were quite a few readers who criticized the CEO but at the same time commented "I can't read the entire texts." This implies that Enjyo in this case was ignited by those who didn't know much about the news but wanted to enjoy the state of Enjyo. On the other hand, the subscribed members who had access to the entire texts commented that there was no need to attack the CEO. Those favorable comments were posted at the point around $t = 1000$. From this analysis, an assumption can be made that the transmitters of the information on Case 5 intentionally caused Enjyo. Furthermore, there is a possibility that they might have had a foresight on how Enjyo would fade out by making use of the information gaps in advance.
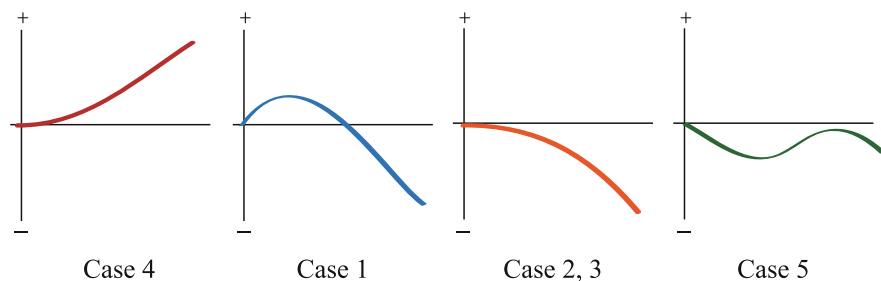
Fig. 27.6 Classes of each cases

27.3.3 Discussion

In this study, we might call this kind of movement described in Case 5 as "Enjyo announcement." There is some possibility of doing this case Enjyo impress for information diffusion.

Based on the above, we classified five cases into four patterns below (Fig. 27.6);

1. $Y(t)$ continues to rise (Case 4),
2. $Y(t)$ temporarily rises but Enjyo breaks out through disclosure of hidden information (Case 1),
3. $Y(t)$ goes straight downhill and Enjyo never stops (Case 2, 3),
4. $Y(t)$ drops in the beginning but starts rising when some measures are taken (Case 5)

Just as in the fourth pattern, it will be essential to take measures against Enjyo. Moreover, to achieve this signification for calculating $Y(t)$ in crowd, the similarity of behavior was observed (the similarity of upper and lower graphs in Figs. 27.1, 27.2, 27.3, 27.4, and 27.5).

27.3.4 Future Works

To reveal the motivations of each user on Informing, we are planning some experiments in the laboratory. Let X denotes an event that can make news, and let X_χ an opinion or interpretation of an individual or a group. We define X_χ as,

$$X_\chi = \mathscr{T}_\chi (X) , \tag{27.6}$$

where the operator $\mathscr{T}_\chi$ denotes information transmission which includes the subjective of χ. Informing occurs due to the intervention of a person or a group during the process of information transmission. Let it assume that there are two senders
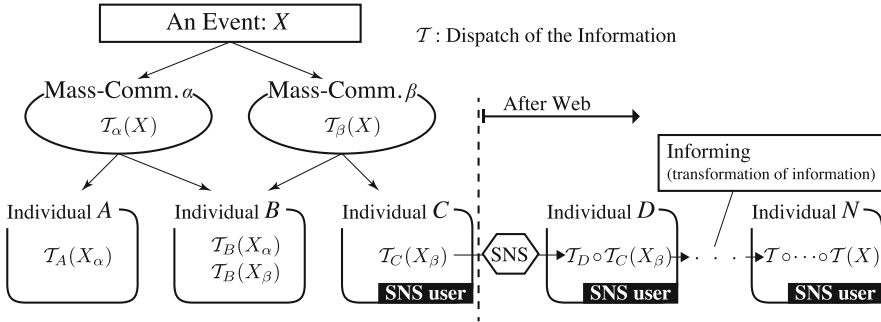
Fig. 27.7 Schematic diagram of "Informing"

of information (mass media α and β), and three individuals (A, B, and C) forming public opinion. The individual A receives the information only from the mass media α, the individual C only from the mass media β, the individual B from both α and β. The opinions and interpretations of each person can be expressed by the following formula;

$$X_A = \mathscr{T}_A(X_\alpha) = \mathscr{T}_A \circ \mathscr{T}_\alpha(X) \,,$$
$$X_C = \mathscr{T}_C(X_\beta) = \mathscr{T}_C \circ \mathscr{T}_\beta(X) \,,$$
$$X_B = \mathscr{T}_B(X_\alpha + X_\beta) = \mathscr{T}_B \circ \mathscr{T}_\alpha(X) \oplus \mathscr{T}_B \circ \mathscr{T}_\beta(X) \,. \qquad (27.7)$$

The public opinion would be average of the formula. However, since anybody can easily disseminate information today, Informing of the information happens. Naturally, the opinions and interpretations of the individual N should be formed after passing through the subjective eyes of a number of people, which can be expressed by the following formula;

$$X_N = \mathscr{T} \circ \cdots \circ \mathscr{T}(X) \,. \qquad (27.8)$$

Figure 27.7 shows the conceptual diagram of "Informing."

27.4 Conclusion

In this study, we tried to numerically analyze and model some cases of Enjyo as well as to classify them by using the data on SNS. For achieving our purpose, we proposed a method of measuring a state of Enjyo and applied the case study method for analysis. With this method, the process of the analysis is likely to be influenced by one's subjective interpretation or assessment. Therefore, we also tried to facilitate its efficiency and accuracy with random sampling. As a result, several patterns of

Enjyo were identified. Moreover, one of the cases of appropriate Enjyo extinction was observed.

From my viewpoint as a journalist, information making the rounds on the web or SNS seems to transform itself and reach its conclusion much faster than the speed of mass media coverage. Our challenge for the future is to develop a method of predicting an outbreak of Enjyo seen in the culture of "vertically-structured" and "read-the-atmosphere" society, Japan, through analyzing some extracted web data (e.g. tweets), which will hopefully be like weather forecast services.

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