FACILITATION SUPPORT FOR ON-LINE FOCUS GROUP DISCUSSIONS BY MESSAGE FEATURE MAP

Noriko Imafuji Yasui[1], Shunsuke Saruwatari[1], Xavier Llorà[2] and David E. Goldberg[1]
[1]*IlliGAL, University of Illinois at Urbana-Champaign, 104 S.Mathews Ave., Urbana, IL 61801, U.S.A.*

[2]*NCSA, University of Illinois at Urbana-Champaign, 1205 W.Clark St., Urbana, IL 61801, U.S.A.*

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Abstract: Face-to-face focus group discussion has been one of the reliable approaches for collecting variety of ideas and opinions for building marketing strategy, even though various network-based communication tools have been available. This is due to complications in facilitation of on-line discussions. The goal of this paper is to maximize the profit from on-line focus group discussions by supporting facilitators' task. In this paper, we propose a message feature map and two metrics for measuring message feature; centrality and novelty. The message feature map plots discussion messages on centrality-novelty plane, and gives us intuitive understanding of the discussions in various aspects. Reporting experimental results by using real data collected in on-line focus group discussions, we discuss how we can utilize the message feature map for the effective facilitation.

1 INTRODUCTION

For these years, network-based communication has come into wide use. People can easily access various types of communication tools and use them for obtaining information, exchanging opinions and propagating ideas. An objective of the focus group discussions is to collect wide range of opinions and ideas. *Variety* of ideas and opinions is highly valued. In case of the on-line, we can obtain wide variety of many ideas by having multiple discussions simultaneously with various groups of diverse people.

The goal of this paper is to maximize the profit from on-line focus group discussions by supporting discussion facilitators' task. We propose a *message feature map*, which is a visualization method for intuitive understanding of discussion status in various aspects. The message feature map plots each message on the plane of the axes with the two metrics; *centrality* and *novelty* of each message. *Centrality* indicates how much each message is center (or conversely, peripheral) in the discussion. *Novelty* tells us how much each message contains novel (or conversely, conventional) ideas.

2 MESSAGE FEATURE MAP

Success in on-line facilitation highly depends on how quickly and easily they can analyze the discussions in various aspects. This section proposes a *message feature map*. After we introduce two metrics for measuring message feature, we describe a classification of message characteristics into four types.

2.1 Measuring Message Feature

Centrality. This centrality metric measures how much messages are center, conversely peripheral, in the discussion. Suppose a discussion can be represented by a sequence of messages $(m_1, m_2, \cdots, m_n)$. By using the KEE algorithm ((Imafuji Y. et al., 2007)), we calculate the score for each message k times with different sets of messages. The message centrality is obtained as the highest score in the k message scores. Let M be a message score vector obtained by the KEE algorithm, and $M(m_i)$ be the score for the message m_i. Denote the centrality of the message m_i by $c(m_i)$, $c(m_i)$ is defined by $c(m_i) = \max_{i \leq j < i+k} M_j(m_i)$, $(0 \leq c(m_i) < 1)$, where $M_j(m_i)$ is a score of the message m_i by the calculation for a set of k messages $\{m_{j-k+1}, \cdots, m_{j-1}, m_j\}$.

Novelty. This novelty metric measures how much messages include something new; ideas, topics, opinions and etc. We assume that the message is novel, if the messages contains a lot of terms which are not previously used. Thus, we employ the simplest and the easiest way for measuring novelty, that is, count-

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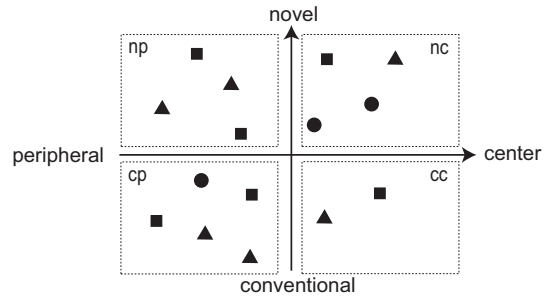

Figure 1: Sample of the message feature map; plotting messages on centrality (horizontal axis)- novelty (vertical axis) plane. Four plotted areas are called np (upper-left), nc (upper-right), cc (lower-right), and cp (lower-left).

ing the number of new terms in each message. We define a *new term* in a message as a term which is not appeared in some previous messages. If the novelty of the message (or the message novelty, for short) is high, the message would contain something new, and initiate a new topic. Conversely, the low novelty indicates the message would be following the existing topic, or the message would be of no importance (in case of the short messages).

Suppose a discussion can be represented by a sequence of messages $(m_1, m_2, \cdots, m_n)$. Denote the novelty of the message m_i by $n(m_i)$, $n(m_i)$ is defined by $n(m_i) = N^l(m_i)$, where $N^l(m_i)$ is a number terms which are not existed in a set of the messages $\{m_{i-l}, \cdots, m_{i-1}\}$. The novelty is also transformed so that the values are in the range of -1 to 1.

2.2 Message Feature Classification

The message feature map plots each message on centrality-novelty plane. The Figure 1 is a sample of a message feature map. The horizontal axis indicates the centrality and the vertical axis indicates the novelty. In this sample, messages are plotted with different colors (and shapes) for each discussant.

As seen in the figure, the message feature map is divided into four areas; np (upper-left), nc (upper-right), cc (lower-right), and cp (lower-left). The followings are the plotted areas and the characteristic of the messages plotted in each area.

np -*Potential chances*. The messages plotted in this area have high novelties and low centralities. The messages of this type have new, but rare ideas, opinions, topics and etc, which any other discussant is not paying attention, nor talking about those topics any further. These messages may turn out to be sources of the ideas for new product or services in enterprises.

nc -*Topic triggers*. The messages plotted in this area have high novelties and high centralities. The messages of this type lead new topics. The messages bring new ideas or topics to the discussions. Originating from this message, the current discussion topics are shifted to the topics of these messages. The leads to discussion mainstream can be detected by observing these messages.

cc -*Topic followers*. The messages plotted in this area have low novelties and high centralities. The messages of this type give more ideas or deeper insights on the current topics. The discussion topics are somehow converged by these messages. The discussion mainstream can be detected by observing these messages.

cp -*Trifles*. The messages plotted in this area have low novelties and low centralities. The messages of this type do not influence on the discussion going. The message content doesn't have any specific topic. Questions by discussion facilitators, yes and no answers, and simply, short messages are plotted in this area. The discussion is inactive if many messages are plotted in this area.

3 EMPIRICAL STUDY

In the previous section, we proposed the message feature map, and described the message classification on the message feature map. This section studies empirically how the message feature map supports facilitators' task. The discussion data (78 messages by six participants) was collected from the focus group discussions held on March 2005. The goal of the discussions was to identify *"future scenarios for cell phone usages and the features that will make them popular among consumers"*. The data consists of a sequence of messages (arranged in time order). A message consists of message id, time, title, author name, replying message id, and message content.

3.1 Effective Facilitation

Figure 2 depicts the message feature map using data derived from one of the discussion group. The horizontal axis and the vertical axis represent message centrality and novelty, respectively. In this experiment, we used $k = 10$ for the centrality, and $l = 10$ for the novelty. Each message is colored (or shaped) differently for each participant.

The biggest advantage of the message feature map is its comprehensibility. By looking at the map from different angles, facilitators' important work load, especially, *analyzing* and *controlling*, can be relieved. Here are some effective use examples for the facilitation support.

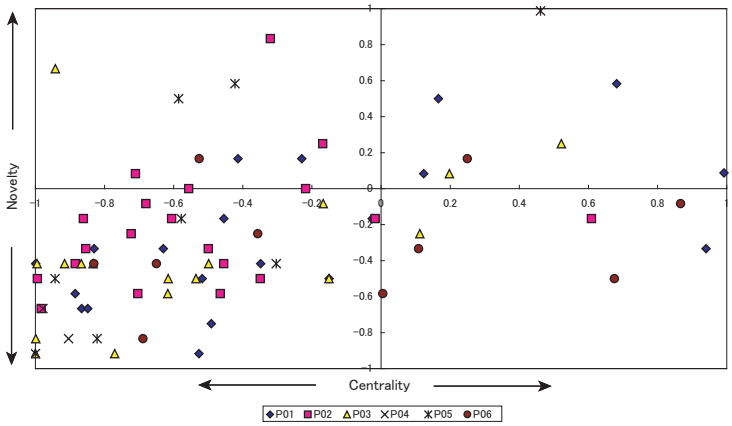

Figure 2: Message feature map derived from a real on-line focus group discussion. Each plot indicates a message, and each plot shape represent each discussion participant.

Screening Messages. The more discussion groups the facilitators have to take care, the more impractical they read all the message contents. The message feature map tells intuitively which messages they should focus on.

The messages plotted in the np area are containing many variable minority opinions and ideas. If the facilitators want to find rare, but creative ideas, they should take a look at these messages. In the experiment, there was a message "*one of the biggest things I see for cell phones ... is money withdrawal. By linking your cell phone and debit card, you could buy stuff using cell phone and PIN number*". Although any other participants never mentioned about debit cards on phones, this idea might have potential into practice.

The messages plotted in the righter area contain major topics that many other participants are talking about. If the facilitators want to find mainstream ideas which are supported by many people, they should take a look at these messages. In the experiment, one of the messages plotted in nc area was about camera function on cell phone, which had not been popular in US yet at the time of the discussion, and actually became popular a while after the discussion.

Monitoring Participants. One of the biggest advantages of the on-line focus group discussions is the participants' accessibility. We can have a series of discussions with various groups of participants by strategically changing or grouping together some participants. The message feature map gives us a quick grasp behavior tendency of each participant.

For the example of Figure 2, four messages out of eight in the nc area were by participant P01. We could have an assumption that P01 was good at generating new topics. P02 wrote as many messages as P01 wrote, but the messages by P01 are mostly plotted in the cc area. This observation indicates that P01 has more potential of idea generation than P02 does. The messages by P05 are not as many as P01 and P02, but some of the messages are plotted in upper. P05 might display his creativity when his interests match the discussion topics.

Controlling Discussion. One of the most critical essences for success in discussions is to keep the discussions excited and the participants active. To do so, the facilitators have to pay attentions to discussion activeness and make sure that all the participants actively enjoy the discussions. The message feature map tells clearly when the discussion is getting stagnant.

Figure 3 shows the three message feature maps (extracted from Figure 2); from 18th to 27th messages (left), from 28th to 37th message (center) and from 38th to 47th (right). The messages in both left and right maps are plotted over four areas, which mean the discussion was very active during the periods. Especially, some messages in the right map are plotted quite upper, which means the discussion was very productive during the period. On the other hand, most of the messages from 28th to 37th are plotted in the area cc, which indicates that the discussion was contracting and getting stagnant. If many messages come to be plotted in the area cc, the facilitators have to swing into action by asking something or talking to the participants, whose messages are plotted in upper area, for instance.

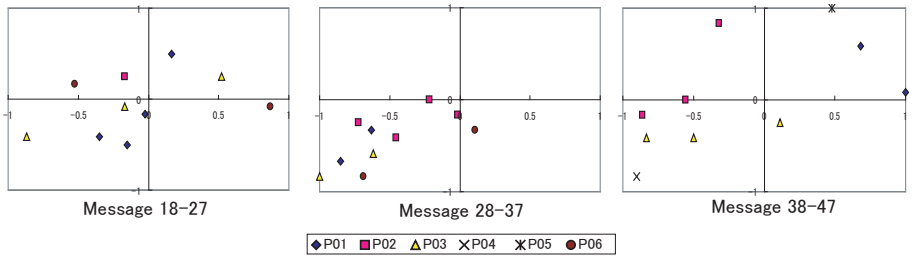

Figure 3: Message feature maps for the messages 18th-27th (left), 28th-37th (middle), and 38th-47th (right).

4 CONCLUSIONS

In this paper, we proposed a message feature map, which was a visualization for plotting discussion messages on a plane with two axes. We also introduced two metrics; *centrality* and *novelty*. This map gave us an intuitive understanding and quick grasp of discussion status. We showed the experimental results with using the data collected in a real on-line focus group discussion, and presented some scenarios for facilitation support usages by the message feature maps.

Our future works include to build a message transition model which tells how message status transit on the message feature map, and to simulate discussion for a given set of participants. Discussion simulation will be a very useful tool for discussion planning - determining the discussion goal, grouping the people, building strategic facilitation scenarios.

5 RELATED WORKS

Several tools for on-line focus group discussions have been introduced for these years (Zoomerang Online Focus http://info.zoomerang.com/prodserv/onlinefocus.htm, GMI Focus Group Software https://www.gmi-mr.com/net-mr/online-focus-groups.php, and e-Focusgroups http://www.efocusgroups.co.uk/). For example, MarketTools, Inc. has launched Zoomerang Online Focus, which is a web-based solution that helps marketers conduct focus group research on-line. One of its selling points is that it provides highly skilled and trained facilitators (, which they call moderators). Our work aims to have profitable on-line focus group discussions without depending on facilitators' skills.

Various methods have been proposed for finding important terms from text (key phrases (Witten et al., 1999), topic words (Lawrie et al., 2001)). Some works have focused on finding key persons in text-based communication (Kamimaeda et al., 2005; Reich et al., 2002), and on exploring social networks of network-based communication (Zhou et al., 2006). These are very effective and high quality analyses, which give us deep insight into each aspect. In order to analyze in various aspects, they need to use multiple analyses and compare them. This might be time-consuming work for facilitators. Our goal is to propose methods or tools which give us multi informative analysis on a single output.

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