

Analysis on Relationship between Smiley and Emotional Word Included in Chat Text

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Abstract. In this research, we analyze the relationships between smileys and emotional words in chat text aiming to apply these relationships to an embodied character chat system. Smileys add various meanings, especially mental information to plain chat texts to make our text communication successful. We focus on the way to use smileys and emotional words so that we can estimate the chat atmospheres. We performed an experiment to investigate the relationships between smileys and emotional words in chat dialogue.

1 Introduction

Online communication system such as e-mail, a chat system, a remote meeting system, and a distance learning, becomes a common tool for people. Now we can communicate with people using a graphical chat system that agents talk in virtual 3D space in place of users.

Users obtain messages by watching embodied character's actions as well as by reading plain texts in a chat system that employs a embodied character. A character in the chat systems plays a role as an agent of a user not only to express the user's emotional states or intentions which cannot be displayed by a chat message, but also to make the chat alive. As the result, it becomes clear what meaning the user implies for the chat messages.

In order to control actions of embodied characters, users need to input texts or click a button consciously at the each timing. It is a troublesome task for a chat user. Therefore, a character chat system is required that the nonverbal expressions are automatically controlled according to the dialogue atmosphere and input chat messages.

Previous works on controlling nonverbal expressions of embodied characters mainly discuss the consistency of nonverbal expressions with the speech utterances or the goal of conversation for each agent [1][2]. However, when we consider dialogues between a pair of embodied characters, we need to consider the interdependences between nonverbal expressions displayed by those two characters.

Emotional words and smileys add nonverbal information variously to text messages and express the user's emotional state just as embodied characters add. So, we focus on the relationships between emotional words and smileys aiming to apply these relationships to an embodied character chat system in the remainder of this article.

2 Related Researches on a Chat System with Embodied Characters and Nonverbal Expressions

In most current graphical communication systems, a user should choose and specify the character's action explicitly, or a system focuses on the consistency of nonverbal expressions with the speech utterances. Cassell[1] proposed an agent system which interpreted user's inputs and generated responses automatically with nonverbal expressions to be fulfilled according to the desired function. This research focused on the relation between spoken words of users and responses of the agent which show words or actions. However, it is reported in the field of social psychology that there are some interdependences between nonverbal expressions displayed by "each person" in daily conversations [3]-[6].

It has been investigated in social psychology what features are found in nonverbal expressions given by humans during their conversation. In the experiments by Matarazzo, noddings by the listeners in a conversation encouraged utterances of the speakers. As the result, animated conversation between the speakers and the listeners is realized [5]. In another experiments by Dimberg, facial expressions of the test subjects were affected by those of their partners [6]. The subjects smiled when their partners gave smiles to them, whereas they gave expressions of tension when their partners had angry faces. These results imply there are positive correlations or synchronicities between the nonverbal expressions given by the conversation partners. Table. 1 illustrates these positive correlations by *.

Table 1. Interdependences between nonverbal expressions of different persons

		person A			
		gaze	smile	nodding	speech
person B	gaze	*			*
	smile		*		*
	nodding				*
	speech	*	*	*	*

By employing the knowledge in social psychology we aim to realize automatic actions of embodied characters. People substitute smiley for nonverbal expressions in a text communication. That means we can estimate mental states of a user by the usage of smileys and emotional words.

3 Nonverbal Expressions Shown by Smiley and Emotional Words

3.1 Goal

In the most current graphical chat systems, users should choose and specify the character's actions explicitly. By employing the knowledge described in the previous section, we aim to realize automatic actions and reactions of embodied characters in order to make users' chat alive. It is preferable that character's actions and reactions can be produced by users' messages because users attend to only their chat and it is very troublesome for users to set manually all actions and reactions at each message during their chat. We will apply the interdependences between nonverbal expressions described in section 2 to the actions of embodied agents in chat system.

3.2 Emotional Words and Frequently Used Smileys

People can interpret a smiley variously so they use and receive smileys in many ways. In order to investigate the relationship between smileys and emotional words, we collected smileys which were generally used in a text communication and the emotional words remembered by the smileys.

At first, we collected in total 151 kinds of smileys from a smiley list registered with IME2007. Fig. 1 shows a part of the smileys. We asked 7 college students who ordinarily used smileys in text communications to answer whether they knew the meanings of the smileys and used those. It was 9 kinds of smileys that more than 5 subjects replied they often used the smileys and it was 48 kinds of smileys they had not used at all. I show the 9 kinds of smileys mentioned above at Table. 2.

(**^)^v (^o^) (*_*)(T_T)
 (-_-)zzz (-"-) m(_ _)m
 (·_··;| (´·ω·) Σ(*Д*|||)

Fig. 1. Example of smiley

Table 2. Frequently-selected smileys

(1)(^^)	(2)(^_^)	(3)(^-^)
(4)(^^)/	(5)(^_^)/	(6)(-_-;)
(7)(T_T)	(8)m(_ _)m	(9)orz

Next, we indicated the subjects to write the words associated with the 9 smileys when they converted from Kanji to the 9 smileys and to categorize the 9 smileys into 35 emotional word categories [7] in Table.3 and into 8 basic emotions [8]. The 8 basic emotions include “delight”, “grief”, “affection”, “aversive”, “fear”, “rage”, “amazement”, and “caution”.

Table 3. Emotional word category

dislike	disappointment	pleasure	hatred	humiliation
anger	uneasy	doubt	warmth	pain
intolerance	fear	jealousy	unpleasant	insult
sorrow	pride	loneliness	regret	curiosity
patience	admiration	satisfaction	consideration	boredom
wonder	idly	happiness	respects	love
joy	hesitation	shame	indecent	pity

4 Experimental Results

4.1 Categorized Result

The subjects had a tendency to choose “delight” and “affection” among 8 basic emotions for the smiley (1) - (5). They also associated the smiley (1) - (3) with the emotional words expressing friendly such as pleasure, joy and satisfaction. As for the smiley (4) and (5), joy, pleasure and satisfaction were given as the smiley (1) - (3), but consideration and warmth were chosen, too. It became clear that these emotional categories are indispensable in the chat. The smiley (4) and (5) showed approximately the same result, but it is revealed that the expression of emotion was stronger in (5). If a smiley expresses a same mental state, we should reflect the strength of the emotion in an embodied character of a chat system according to the situation.

Many subjects categorized the smiley (6) into “grief” of 8 basic emotions but there was some subjects chose uneasiness, fear, pity, pain and unpleasant. It is thought that this smiley depends on context greatly. As the smiley (6), information except the smiley is necessary for estimate of feelings.

The smiley (7) shows a person sheds tears. Most of subjects got hold of a same image for the smiley (7) and they selected “grief” and sorrow. As for the smiley (8), “grief” was mainly selected however some subjects chose “affection” and “aversive”. It was the smiley (9) that answers was divided most. They selected “delight”, “affection”, “grief” and “aversive” among 8 basic feelings. They tend to choose sorrow, loneliness and regret for the smiley (8), and to choose disappointment, uneasy, hesitation, regret and pain for the smiley (9). The words associated with the smiley (8) are “I’m sorry” and “I apologize” such as words to express a feeling of the apology, “Thank you in advance” such as words to make a request, and, “Thank you” such as words to be given thanks to.

4.2 Smileys in Chat Texts

We performed second examination to investigate how the smiley used in real chat conversations and what kind of smiley appeared.

Experimental subjects were 10 college students: they were divided into 5 pairs. They connected to the chat server from different rooms. We instructed them to exchange chat messages freely for 15 minutes. They can only use plain text and

smileys in the chat system. We show them the list of smileys which more than 3 subjects answered they frequently used, in previous subsection's experiment. Add to the above direction, we announced they had not to use smiley when they think it was not necessary to input smileys.

As a result, we obtain 234 sentences and 55 smileys. 67.3% of appeared smileys can be categorized (1) – (5) in Table. 2, 12.7% smileys are members of (9) and 7.3% smileys are (7). A total of 87.3% of the smileys that were appeared in the chat texts, so these smileys and the basic emotions associated with the smileys are essential feature to chat smoothly and emotionally.

4.3 Future Work

As a future work, we will add the above direction to a chat system that employs embodied characters. As discussed in section 2, the actions of characters are not only determined by messages of a user but also the actions of the conversation partner character. For example when one character laughs by a message of the user that employs the character, the partner character should smile back without a text reply of the chat partner.

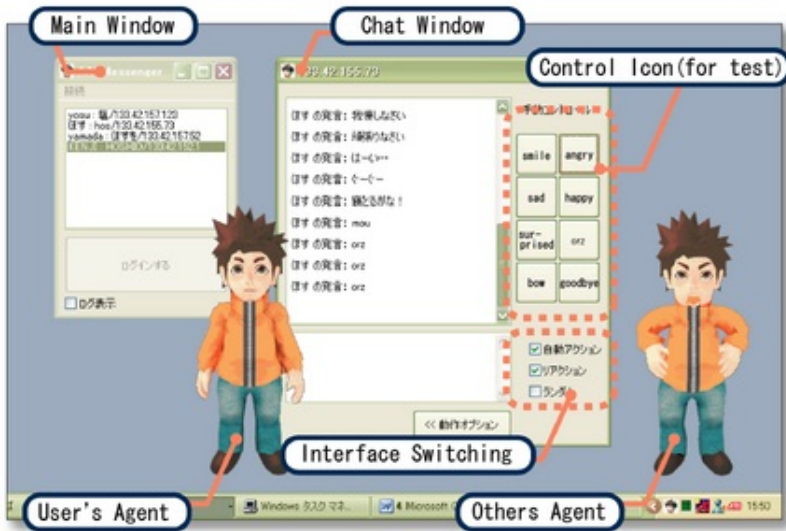


Fig. 2. Overview of a chat system that employs embodied characters

We have proposed a chat system that has embodied characters. Fig. 2 is the overview of our chat system. The main window shows information about login users. In the chat window, a log of users' chat is shown. A user's agent character and the chat partner's agent character variously act according to the users' input chat texts. When a message includes the keywords corresponding to "think", the partner character shows a reaction to stimulate their dialogue according to the research by

Matarazzo. From the indication mentioned in section 2, we intend to reflect these relationships between an action and a reaction.

5 Conclusions

In this article, we investigated the relationships between smileys and emotional words to apply to an embodied character chat system. In the experiments, it is revealed that the basic emotions “delight”, “affection” and “grief” are most frequently appeared in daily chat conversations so we should make the embodied character act to satisfy the relationships among nonverbal expressions, and relationships between emotional words and smileys.

Finally, we should plan to investigate whether atmospheres produced by actions of embodied characters based on smileys are accordance with real atmospheres of chat conversations.

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