

Visual Design of User Emotion for Online Chat Based on Pattern Recognition

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Abstract. This paper analyzes the emotions that often appear in daily chats, in order to facilitate people to quickly identify each other's emotions in daily chats, a comprehensive user research is done, and the corresponding emotion recognition presentation methods are designed.

Keywords: component, emotion, Emotion recognition, Daily chat.

1. Introduction

Emotion is a very complex concept that affects people's lives, work, and learning. At present, in many fields, because people have neglected or unable to identify emotions, many people have added many inconveniences in daily socialization, and even lead to psychological diseases. For example, when people chat online, often because there is no face-to-face communication, and feel that emotional visualization is particularly important. It can help people quickly identify each other emotions in the online world, so that they can make a better reply program.

The American psychologist James and Danish psychologist Lalan proposed the same emotional theory as the content in 1884 and 1885, which collectively refers to the theory of outer circumference. This theoretical basic view is that emotional stimuli causing physiological responses on the body, and physiological reactions will further lead to the production of emotional experience [1]. That is to say, there is a need to have physiological changes caused by stimulation, and then there is emotions, and emotions are perceptions to the reaction. Therefore, the basis of emotional identification is primarily based on human-characteristic machine learning methods or based on space-dominated methods based on deep neural networks. The key point of emotional visualization is the modeling of emotions. Professor Albert Mehrabian presented the PAD emotion model in 1974, using three dimensions of data (pleasure-aminance) to express emotions [2]. Subsequent 1980, psychologist Robert Plutchik put forward the concept of famous emotional loops, showing the eight basic emotions of human beings with graphics and color: love, trust, fear, surprised, sad, disgusting, anger, expectation [3]. These are well found and reference materials for emotional visualization.

Many researchers have studied micro-chairs in the movies to get emotional maps in the movie, giving people a better viewing experience [4]; there are also some artists to present the emotions to the form of light. Through different light sources, people have better understandings for emotions. Emotional visualization is now being tried to be used in various fields, such as art fields, medical fields, computer fields. And how to present emotions, it is the topic of my discussion. Color is often a good way to show emotions. This has become a design idea, but before the design, I need to conduct user investigation.

2. Equirement Analysis

User experience and emotion recognition:

In order to further understand the user's needs, I have clearly discrete the feasibility and presentation of emotional visualization in instant chat, I have conducted user research. This user has survived men and women containing all ages, and nearly 40 staff involved in different fields, including 14 men, 23 females, and more people in 18-28 age, part of the users participating in the survey are part of the whole day. There is also a part of technicians, salespersons, professionals, etc. are employees who are engaged in all walks of life. Therefore, the resulting data can reflect the true

thoughts of most people, have certain persuasion. Combined with the opinions of the masses, it is also more conducive to the design and production of this paper, and improve the product's mass satisfaction, you can further verify the feasibility of the idea.

According to statistics 2, it is visible, and people often use chat software is instant chat class, WeChat, QQ, etc. At the same time, people will also use short video classes and microblogging classes. It can be seen that our emotional visual design is valid even if WeChat, such as chat software, because such software users are wide, high frequency, can more effectively help people's emotional visualization. This article will perform emotional visualization in the conversation in instant chat software. (Table 1).

Table 1. User research results A

Option	Subtotal	Proportion
Instant chat class, such as WeChat, QQ, etc.	36	97.3%
Weibo class, such as Sina Weibo, Tencent Weibo, etc.	14	37.84%
Short video class, such as small red book, shake, etc.	20	54.05%
Dating, such as Mo Mo, etc.	2	5.41%
Interesting community class, knowing, Douban, Baidu, Post Bar and other professional exchange communities	5	13.51%
Other	1	2.7%
This question is effective in filled in	37	

According to the results of the survey (Table 2-4), most users can occasionally or always have clear emotional expressions in the chat, and very few users have never been. So emotionally expressed in the chat, it will be universally applicable, which can present people's explicit emotions in visualization. And people in daily life have happiness (joy, surprise) and sadness (hesitating, sad), and emotionally visualization can start from the PAD model.

Table 2. User Research Results B

Option	Subtotal	Proportion
Never	1	2.7%
Occasionally	28	75.68%
Allocate	8	21.62%
This question is effective in filled in	37	

Table 3. User research results C

Option	Subtotal	Proportion
Choose Category: such as happiness, sadness, anger, fear, etc.	24	64.86%
Emotional positive and negative dimensions: negative - active	17	45.95%
Emotional strength: calm - strong	13	35.14%
Whether the emotions are subjective for subjective: autonomous-passive	8	21.62%
Other	2	5.41%
This question is effective in filled in	37	

Most users choose emotional categories for most users, while selecting the feelings and intensity. It can be seen that in the user's view, the emotional category makes the user understand the content of emotional visualization. However, due to the lack of professional people in the user, users understand other dimensions, and the mood is closer to life, so this option has a large number of people. Therefore, this question can be selected to be emotionally presented in the same manner and intensity of the public.

Table 4. User research results D

Option	Subtotal	Proportion
Happy (surprise)	33	89.19%
Sadness (melancholy,.)	15	40.54%
Angry (hate)	5	13.54%
Fear (horror, shy, anxiet)	4	10.81%
Other	4	10.81%
Disgust (despise, contempt)	2	5.41%
This question is effective in filled in	37	

For the presence of emotional visual elements of different dimensions, users basically want to be presented in the way with color, curves or dynamic effects, including the most proportion of color and curves. When designing, it can be started from these two aspects.



Figure 1. User Research Results E

From the investigation (Figure 1), we found that most users don't matter and accept the emotions of the other chat content. Only some users think that they cannot be accepted, visible emotional visualization has certain needs, and most users are recognized. Most users think it is necessary to understand the emotions of their information and make it a lot to make a lot of emotional visualization.

People now currently use language, Emoji, and text in chat software [5]. They think that emotional visualization is preferably:

1. Optionally visualize
2. Pay attention to privacy protection
3. No need to be too strong, properly display
4. Simple and remarkable, showing obvious

3. Visual Design for Emotion Of Online Social Network

By understanding the emotional expression needs of users and people's understanding, this article will design emotional visualization from emotions, namely emotional or negative aspects, and

supplemented by emotions to make users more accurately understand the emotions expressed in daily chats. This article visualizes the emotions in chat software from two dimensions: Pleasure-Displeasure, who represents the enthusiasm of the user's emotions or negativeness in the PAD model. The second is a strong-nonarousal, which represents the degree of emotional activation in the PAD model, that is, the user's neurophysiological activation level. [6] (D-Dominance in the PAD model represents the user emotion, is the inner leader, or the external factor leads, and in this design, it is not reflected in this design)

After investigation, it is also possible, and emotional visualization is better allowed by the form of color and curves. According to data, Boyatzis and Varghese (1994) have found that shallow color (for example, yellow) is related to positive emotions (such as happiness, strong), while deeper color (such as gray) is related to negative emotions (such as sadness, anger) [7]. Hemphill (1996) also found that bright colors caused by a positive emotional connection, while deep color is negatively linked, and supports the research results of Boyatzis and Varghese (1994). And integrated user research results, this article uses light orange and gray in the design to express positive emotions and negative emotions. And according to a self-emotion model of the interaction between the researchers of the Mass Institute of Technology: Regeneration Education Teaching Method - Establishing a Learning Partner (An Affective Model of Interplay Between Emotions and Learning: Reengineering Educational Pedagogy—Building a Learning Companion) [8]. Among them, six emotional shafts have different opposite emotions, which are used to represent different emotions, according to the dimension of this design, it is taking one of the positive and negative degrees of joyful emotion and non-pleinary emotions from -1 to 1. (Figure 2.)

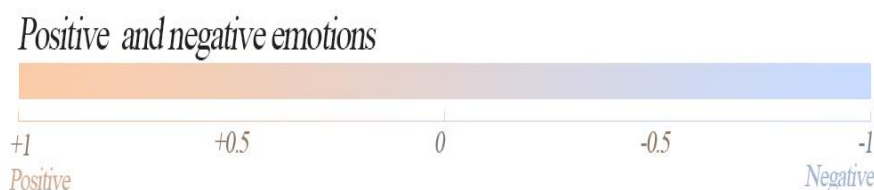



Figure 2. Emotional pleasure visualization


By investing in users, most users choose to use curves to express the strong level of emotion. Therefore, this paper defines the strong degree of emotions to a continuous value from 0 to 1. 0 means the most calm, most stable emotions, 1 means the strongest, most intense emotions. In visualization, a strong degree of value, corresponding to a line of lines within two points, and is reflected by the number of volatility and peaks of two-point curves. That is, the peak of different curves, the higher the peak, the more frequent the movement of the curve, the more intensive the curve, the more emotion; the lower the peak, the more stable the curve movement, the worse the curve, the more calm the mood. In order to facilitate unity, this paper defines the highest point of the curve is 1, the peak height of the curve is determined by the intensity of the mood (a), and the number of fluctuations between the two points is taken from the intensity value by 10. If the strong value of the emotions is 0.68, the peak height of the emotional curve is 0.68, and the number of curve fluctuations between two points is: $0.68 * 10 = 6.8$, and it is taken after 10. As shown in Figure 3, a = 0, a = 0.5, a = 1 curve is shown.

The intensity of the emotion
(Expressed using the degree of line fluctuation)

0:


The intensity of emotions is the lowest, and the lines do not fluctuate

0.5:

 1
The lines fluctuate smoothly with a peak of 1

1:

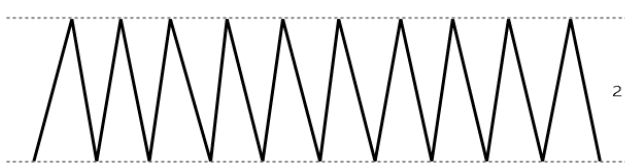
 2
The lines fluctuate sharply with a peak of 2

Figure 3. Emotionally strong visualization

We are a visualization unit in a short sentence (in daily chat, the expression of speech is based on short sentences), when the expression contains multiple short sentences at a time, we have multiple emotional values and strong values in visualization. In order to display a more comprehensive display, this paper selects a set of dialogues, including different strong levels of positive emotions and negative emotions, in the fourth sentences and the sixth sentence, all contain 2 short sentences. As shown in the table 5, we invite 10 users to each expression in the dialogue, give a thinking value and strong value, after we process the data (average, reserve 2 decimal), get the following data, as our visual data input.

Table 5. Visual design content, pleasure, strong degree

NO.	Sentence	Pleasure(P)	Strongness(A)
1	I made it to the final of the speech competition!	+0.95	1
2	Really? Congratulations!	+1	1
3	Yes, I couldn't believe I was selected.	+0.8	0.85
4	You are amazing, cheers for the final! But I wasn't so lucky, I didn't pass the exam.	+0.3~ -0.3	0.5~0.4
5	How so? It's really sad.	-0.8	0.65
6	I don't know why this is happening. I was seriously prepared, but it turned out so badly.	-0.8 ~ -0.95	0.7~0.85
7	Don't be too sad, everything will be fine.	-0.1	0.5
8	I hope so.	0	0

This article is designed with the corresponding two solutions, the plan is to use the color change of the daily chat box to present emotions, and the volatility of the curve at the bottom of the chat box. People can judge the fierce of emotions from the fluctuations and curves of the curve, allowing people to determine the emotions of the other party want to express in time, as shown in Figure 4. Solution 2 is to design love logo on the side of the chat box, love the fluctuation of the curve inside, through the color of love, it reflects the degree of emotional feelings, the fluctuation of the curve and the strong reaction emotion of the curve, as shown in Figure 5. According to the content of the user's investigation, the privacy option is designed, and the user can choose the appropriate permissions according to the individual, as shown in Figure 6.

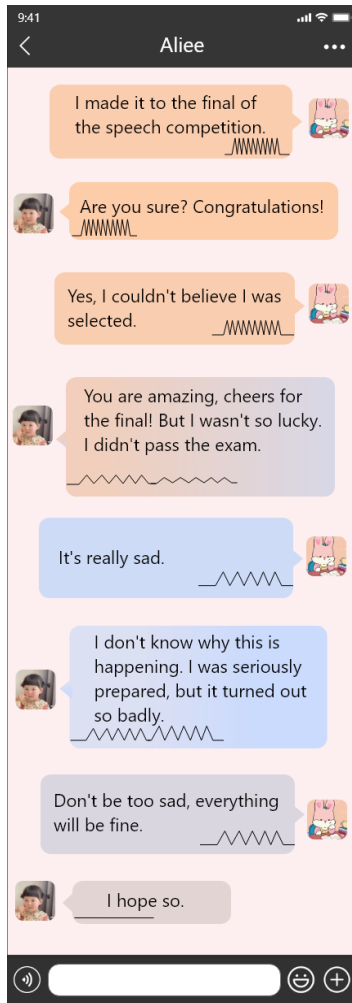


Figure 4. Emotional visualization plan

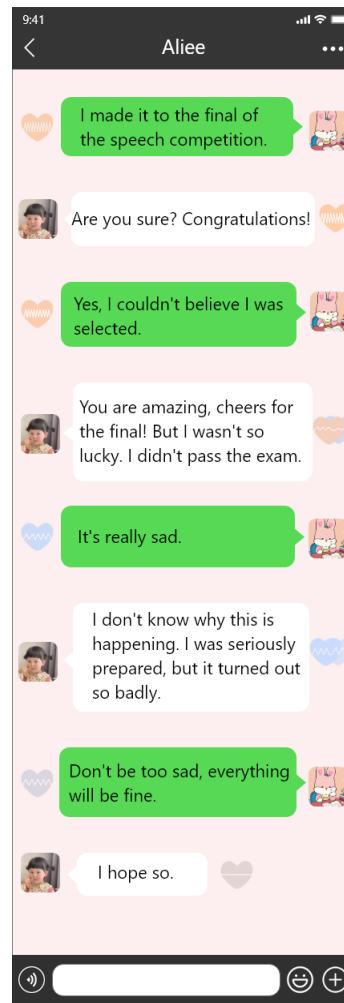


Figure 5. Emotional visualization plan two

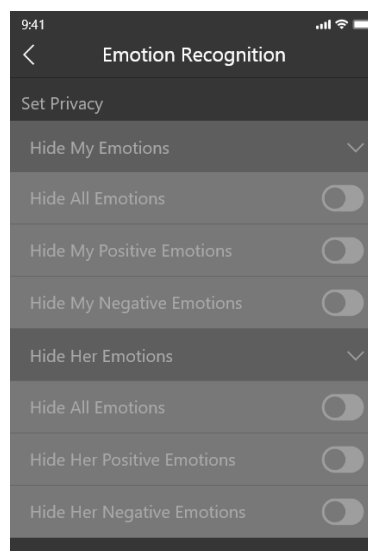


Figure 6. Privacy settings

4. User Study

After two solutions are designed, this paper performs user experiments to verify the feasibility of the design. A total of 15 users participating in the design experiment, including 9 users, 2, 28-38 years old, 38-50 years old, 5 men, 10 women participated in the experiment. We make each sentence into

cards, including text content and visual expression. Before the experiment, we introduced the user to the main idea of design, telling the meaning of the color and curve representation. After the experiment, we show a card that contains content and visual design, allowing users to feedback the answer from the emotions that are felt from the card. For each content, we ask users to fill in the emotional enjoyment (-1 ~ 1) in the questionnaire (-1 ~ 1), and the strongness is strong (0 ~ 1). Finally, the perceptual value filled in use is compared to the emotions we want to express.

Note: The fourth sentence and the sixth sentence are composed of 2 short sentences, so it also contains two emotional plenary values and two emotional strength values. In the design questionnaire, in order to facilitate the user's score, we convert the value of -1 ~ 1 of the emotional pleasure to -10 ~ 10, and the mood is converted from 0 to 1 to 0 ~ 10, therefore, when the score data is analyzed, we also multiply the actual value by 10 afterwards.

For the score of emotional pleasure, from Figure 7, you can see that the emotional pleasure value that the user feels in the general is consistent with the actual value. However, in the fourth sentences and the sixth sentence, since two short sentences are included, different from the actual value, particularly 4-B, 6-A, 6-B. Through the experiment process, we learned that users see the feelings of color in the 4/5/6 sentence and negative emotions, and the fifth sentence has been more than the negative emotion of obvious "SAD". Therefore, this design represents the blue needs to be adjusted. We discussed that it can be reduced in the brightness of the color, while in the contrast of negative and active colors, it is necessary to improve the difference (of course, it may be necessary to consider beauty here. It can also be seen in the contrast between the two programs, and the program is closer to the actual value as compared to the scheme.

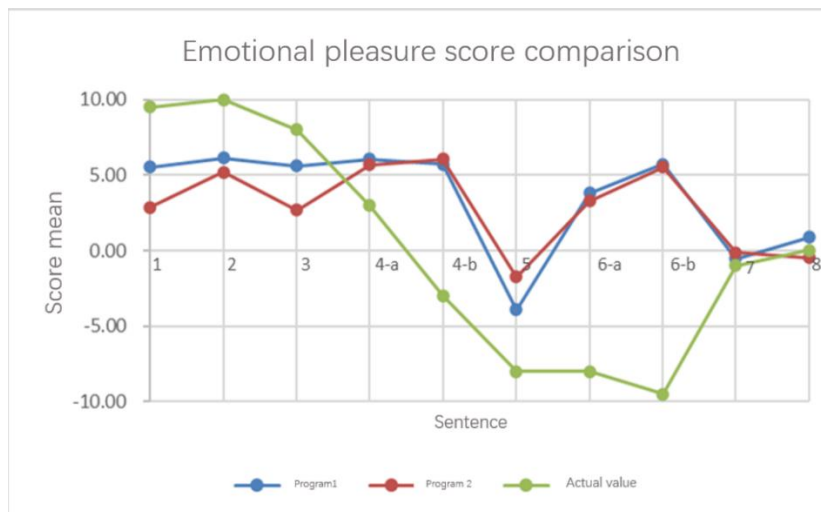


Figure 7. Emotional pleasure score comparison

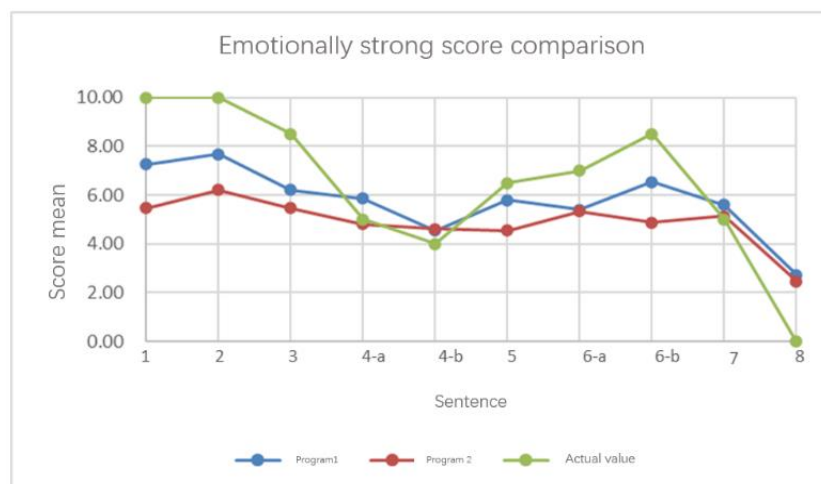


Figure 8. Strong score comparison

For the score of emotionally strong, it can be seen from Figure 8 that the overall trend is consistent with the strong degree of intensity from the design with the actual input. In the contrast of the two programs, it is still closer to the true value.

In the form of emotional expressions present in the scheme, most users can quickly determine the positive and negative positive and negative, curves, and the design of the curve is also helpful to help most users perform emotional intensity identification. For the emotional form of emotion presentation, it is also possible to help most users judge the emotions of the identification of each other. However, in comparison, some users think that the heart-shaped flag is lacking, so it is more deflected as a design. When the user chooses "Which of the two programs is more preferred?", Most users have selected the plan, as shown in Figure 9.

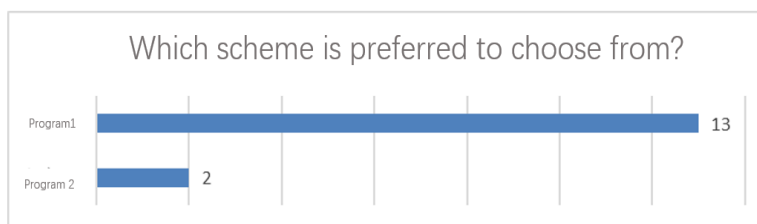


Figure 9. Design plan tendency

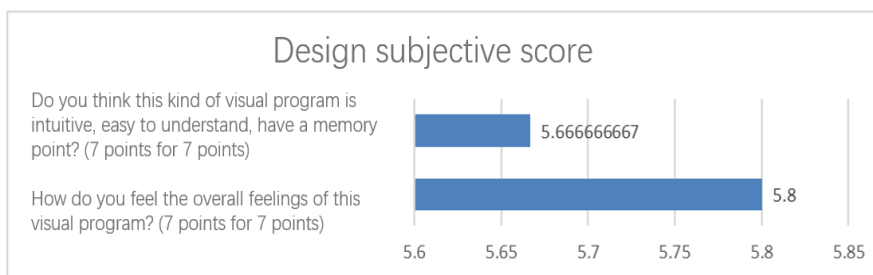


Figure 10. Design subjective score

At the end of the experiment, we let the users have the design plan for two dimensions from the whole, 7 points, and the final average of two problems is 5.5 points, as shown in Figure 10. In the previous experiment, we can see that most of the emotions expressed in the design are consistent with the results of emotional visual, and only one or two statements have different emotions and design. It can be seen that most users can feel the emotions close to the actual expression through a secondary design, thereby verifying the feasibility of the design.

5. Conclusion

Through analysis, we got the following main conclusions:

1. The case is a better emotional visualization. Analyze the reason is that the visual element is large, and the emotional conveys is more obvious.
2. The expression of "The expression of strongness is more advantageous than the expression of emotional pleasure. Analysis, the subjective feeling of color is relatively large, the dimension of the color is also more dimension, and the curve is relatively relatively single; the color is selected, the current design color difference is small.

Emotional visualization can play a very important role in everyday online chat, for example you can help people know more about the mood of each other, you can also understand the emotions contained in your language before you send it, help users instantly adjust. Emotional visualization also has some questions worthy of further research: Designed optimization, especially in color selection, can also express more emotions in combination with dynamic visualization, such as line fluctuations, color changes, etc; emotional understanding is often closely related to the contextual relationship, and we can consider the contextual emotions in the process of identifying emotions; Everyone is inconsistent with the emotional understanding of the same sentence, we can make users

clearly indicate their emotions to adjust the visual results (the same in expression), which can make visualization results more personal characteristics.

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