Incendiary reflection: evoking emotion through deformed facial feedback

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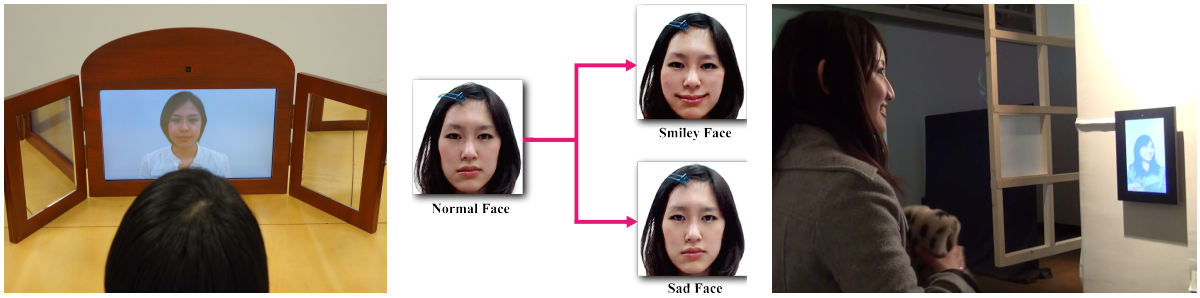

Figure 1: *Left: Incendiary reflection. Center: Deformation of the two types of facial expressions: "Smiley Face" and "Sad Face". Right: User's emotional state is influenced by the feedback of deformed facial expressions.*

1. Introduction

Incendiary reflection aims to create computer-generated emotion by letting people recognize pseudo-generated facial expressions as changes to their own facial expressions (Figure 1, left).

With conventional human-computer interactions, the manipulation subjective elements of experienced emotion is not possible. Thus, emotional experience may not be properly conveyed in such contexts. Emotion is assumed to result from perceiving stimulation from the external environment, such as behaviors or situations, and handling this stimulation internally. Bodily responses, such as heart rate and facial expressions, have been thought to consequently change via an evoked emotion. However, the internal processing mechanisms for evoking an emotion by a relevant stimulus have not been fully clarified. Therefore, evoking emotions by reproducing this process through engineering techniques is extremely difficult.

However, in the field of cognitive science, some researchers argue that recognition of changes within bodily responses unconsciously evokes an emotion. William James best expressed this phenomenon: "We don't laugh because we're happy - we're happy because we laugh." [James. 1950] For example, the facial feedback hypothesis [Tomkins. 1962] indicates that changes to facial expressions affect emotional experience: smiling enhances pleasant feelings while attenuating unpleasant feelings.

We focus on the effect of facial expressions on evoked emotion. We propose a method for manipulating emotional states through feedback of deformed facial expressions in real time.

2. Incendiary reflection

Incendiary reflection consists of a camera, and a display. The camera is used to capture and track a user's face. This system gives feedback of a deformed facial expression by using a mirror-like display.

We developed a method for deforming a user's face and transforming a user's facial expression in real time, using an image-processing technique [Schaefer et al. 2006]. Using this method, we easily and naturally deformed the appearance of a user's face. We generated two facial expressions—"Smiley Face" and "Sad Face"—which represent the positive-negative affect dimension (Figure 1, center).

Furthermore, we conducted a user study to evaluate the effectiveness of deformed facial feedback. Our results showed that this type of feedback could change emotional states; not only positive affect and negative affect but also preference decision [Yoshida et al. 2013]. This suggested that we could artificially manipulate emotional states.

Unlike a mirror, user's gaze direction and his/her gaze direction shown on the display weren't correct exactly in this system configuration. Therefore, this system corrects a user's gaze direction by image processing, and displays it.

3. Visitor Experience

We observed visitors' behavior at the experimental exhibition on December 6th to 10th. About 300 people experienced it (Figure 1, right). There were few audiences who feel uncomfortable to deformed facial expressions. Moreover, many audiences commented that they seemed to be influenced by the changes of their facial expression. Thus we believe that our method for deforming facial expressions was natural enough for audiences to recognize the changes to their expressions, and artificial changes in facial expression can influence the emotional state.

4. Conclusion

We presented the Incendiary reflection, a system for evoking emotion through deformed facial feedback. This system uses a visual feedback of facial expression that is simple but powerful enough for determining one's emotional state. The result of user study and demonstration showed that this system could influence the emotional states.

We also think that our system could be applied to entertainment technology, such as movies, amusement attractions, museum exhibitions, and games, as a direct way to evoke emotion.

Moreover, we believe this system could be used to manipulate impressions on consumer products. For example, if this system was installed in a clothing store fitting room, someone could use this system while trying on clothes; s/he might think that certain clothes are more attractive if s/he is experiencing "Smiley Face" feedback.

References

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