Come, See and Experience Affective Interactive Art

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Emotions play a major role in judging (the use of) products [1]; for example, we can feel great using a product that is not user friendly, but pleasing to the eye. Hence, next to usability other factors also play a role in user experience. In the field of affective computing, systems are being designed that can recognize, interpret, and process emotions [2]. Picard states that computers need the ability to (at least) recognize and express affect to achieve natural and intelligent interaction with humans [2]. Interest shifts from intelligent to sensitive products.

In (interactive) art, affective technologies can also be applied. Expanding research on this topic is interesting in order to acquire more insights in affective computing in different contexts. Therefore Mood Swings, an interactive light installation, was created. The installation consists of eight luminous orbs that react to movement and take on certain colors with distinct movements. In this way users are challenged to express their emotion. Figure 1 depicts a person interacting with Mood Swings.

Figure 1: Mood Swings' luminous orbs in action

The relationship between emotion and movement had been studied in many different ways, e.g. by looking at specific movements of certain body parts, or by studying qualities of body movement (e.g., speed and fluidity of movement).

In general, affect can be labeled in two manners; in discrete or dimensional emotions. Discrete

emotions describe the affective state using basic emotions (e.g., fear, joy, sadness). A widely accepted approach of classifying emotions in a dimensional fashion is described by Russell [3]. He developed a circumplex model of affect that describes emotions in the two dimensions: valence (pleasure-displeasure) and arousal. In [4], this model is transformed to be applicable to affective movements. They applied certain movement characteristics to the circumplex model by Russel, which led to the affective dimensions: velocity (related to arousal) and smoothness (the regularity of a movement, related to valence).

In the design of Mood Swings, the model by Lee, Park, and Nam [4] was incorporated. Arousal is related to the velocity of a movement, with slow movements linked to low arousal and fast movements linked to high arousal. Valence is related to the smoothness of a movement, with smooth movements being pleasant and jerky movements being unpleasant. Users interact with Mood Swings through moving the orbs. The orb's movement patterns are registered through an accelerometer placed inside the orb. Consequently, the orb is used to derive users' emotions. Mood Swings' feedback exists of colored light. Color is chosen because of the strong relation it can have with emotion, as illustrated by well-known expressions such as feeling blue, becoming red with anger, or green with envy.

In [5], Itten's circular color model [6] is adjusted to fit Russell's circumplex model of affect. This transformed color circle is applied in Mood Swings, using six colors in combination with the emotion-movement relation framework of [4]. Six colors are used because results from a user test that investigated the functioning of Mood Swings showed that using more colors made the installation's feedback harder to understand. The actual colors Mood Swings expresses are generated by six LEDs that are placed inside each orb. They react on the accelerometer inside the orb, displaying the color that reflects the emotional state of the user, based on the user's movements; see also Table 1.

Velocity	/	Arousal	Smoothness	/	Valence	Color
Fast	/	High	Jerky	/	Negative	Red
Fast	/	High	Smooth	/	Positive	Orange
Intermediate	/	Neutral	Jerky	/	Negative	Purple
Intermediate	/	Neutral	Smooth	/	Positive	White
Slow	/	Low	Jerky	/	Negative	Blue
Slow	/	Low	Smooth	/	Positive	Green

Table 1: Mood Swings interprets movements in terms of valence and arousal, and subsequently, provides feedback through colors. Mood Swings' translation of these dimensions of emotion to colors is denoted in this table.

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