

HiTV: Affective Interaction and Feedback Interface for TV

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1 Introduction

TV is one of the most popular entertainment resources in the modern life. It usually occupies the biggest social area in a house, *the living room*, and becomes a center of group entertainment of family members. While people are watching TV, they make and share a lot of affective responses such as screams, cheers, or high-fives. However, these responses cannot affect current TV system. Switching to different channels or turning off the TV is the only way for TV audiences to make affective feedbacks when they don't like the current TV program.

We introduce HiTV that enables affective interaction and feedback capabilities with TV. HiTV encourages people reacting to the TV contents with affective actions with a soft ball. When watching TV, a person can pick up the HiTV soft ball to toss around or throw the ball to hit the TV when s/he doesn't like the character or contents in the TV. As the ball hits the TV, the character inside the TV program will get visually distorted and scream. With HiTV, the interaction and feedback of the TV experience can be greatly enhanced by considering the affective actions of TV audience and fulfilling their expectation from emotional reaction.

The HiTV system consists of a soft ball, which is a graspable interface for people to hold, and a signal box to process the TV signals. Sensors in the soft ball can monitor the emotional reactions from people, including patting, holding tight, or throwing the ball to TV. The signal box creates audio and visual feedbacks to people's reactions, and it can be also connected to the network to share the reactions with others.

2 Expressing Emotions

People tend to switch TV channels for searching TV programs which they are interested in. However, they can only express their emotion by laughing or yielding on their seats, but can do nothing about the TV program. Although TV surveys make statistics by calling people, there is no such a way that TV audience can react to the TV program simultaneously.

While watching TV, some people hold graspable objects such as a pillow, which can be used to express their emotions caused from TV contents; some people squeeze the pillow when they are nervous, and some other people use the pillow to block some scary scenes. When people are getting happy and excited, they usually shake objects at hand for cheering. For scary moments, people tend to hold the pillow tightly. When people feel angry and disgusting, they might have more emotional behaviors, such as trying to hit the TV with an object or yielding. For certain annoying moment, people would switch channels or playing objects at hand more frequently.



Figure 1: A HiTV user is squeezing the softball and the video of TV got ripple distorted. Then the user throws the soft ball to hit the news reporter on his face and he screams.

3 Interactions with the HiTV system

All the emotional reactions to the objects can be used as the input mechanism for HiTV. HiTV takes a physical interface approach to enabling a rich interaction and feedback experience for TV audiences. HiTV provides a soft ball which can be used as a graspable object but different from other common objects in a point of that the reactions to the soft ball affects the TV program and people can interact with TV with it.

HiTV provides extra visual and audio expressions for augmenting existing TV program with user-input affects. When touching, squeezing, or shaking the ball, the pitch and volume of TV audio can be adjusted. At the same time, certain visual effects, i.e. ripples, is overlaying on the original video. As the soft ball hit the TV, the accelerometer detects the collision and sends the signal through RF to the signal box within TV. The audio signals are processed as Sound Pitch, Sound Volume, Audio Effect Duration. So when the ball hit the TV, the original audio will be adjusted according to the strength that ball hit the TV, which expresses the emotion to the TV program. For example, when the ball hit the TV strongly, the voice/sound of TV will become sharper and louder. TV users now can play with the ball in other ways, such as squeeze or stretch, which will act as different filters to the voice/sound of the TV.

4 Conclusion

Passively receiving information from TV has been a cultural phenomenon. HiTV suggests an active and multimodal way to express the emotional feeling of audience. The future work to HiTV is to transmit those local interactions between TVs and audiences back to content providers for real-time or offline contents tailoring. It could provide interactive feedback to TV program. The affective reaction from audience can be also used for switching to popular channels which most audience are happy and excited in. However, these extensions will need more works on hardware, software, and system architecture for the home entertainment.