

# Affective TouchCasting

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## 1 Abstract

The sense of touch is not only informative: certain kinds of touch are directly related to emotions. Haptics can enrich the experience of broadcast media through tactile stimulus that is mapped to emotional response and distributed over the body. This sketch applies affective touch research to haptic broadcast in a wearable device that can record, distribute and play back touch information. TouchCasting augments broadcast media with affective haptics that can be experienced in public as a new form of art.

## 2 Haptic Affect

Most tactile interfaces rely on discrete, abstract feedback despite the distributed and affective nature of touch. Haptic devices are often hand-held, like video game controllers; and abstract, so that a vibration in your hand represents a collision on the screen. Haptic interfaces can be more immersive when distributed over the body through wearable computers [6]. Often the stimulus remains counter-intuitive, as in a system that maps the position of the ball in a televised sports game to a vibrotactile array on the forearm of a viewer [4]. One early concept piece suggests that communicating touch sensations through an abstract interface can make people feel co-present [3]. Haptics can affect some of the same emotions as real contact.

The sense of touch is fundamental to emotional health and development. Therapists have recently begun to apply different types of touch to help treat infants, the elderly, people who are isolated and sufferers of mental illness or trauma. Tactile sensations including brushing, holding, vibration and deep pressure have been effective at reducing anxiety and improving morale in a number of settings [2]. Exploratory touch can arouse lethargic people, and brusque touch can replace relapses and self-mutilation [1]. Touch sensations that connote real-world touch directly affect emotions in ways that can enrich our daily lives.

## 3 Affective TouchCasting

Haptic technology can expand the expressiveness of broadcast media by complementing audiovisual content with touch [5]. Rather than map information to abstract touch sensations, a model of affective touch can inform haptics so that emotions such as arousal and calm are directly targeted. A wearable device capable of simulating various types of recognizable touch as well as recording, playing and transmitting touch information could act as an interface for 'TouchCasting.' We have prototyped such a device in the form of an apparently normal scarf that contains modular flexible haptic actuators and touch sensors (see Fig. 1).



Figure 1: the Affective TouchCasting prototype showing flexible haptic I/O modules (left) in a discrete fashionable scarf (right).

Pilot studies on first-generation prototypes informed the design of actuators and patterns of touch that connote social contact. The second-generation prototype (pictured) records patterns of touch through pressure sensors and replays the sequences in terms of heat, pressure, percussion and stroke through vibrating motors, heat pumps, solenoids and pneumatic chambers. It is designed to replicate the sensations of hugging, stroking and tapping in a way that can be self-administered by squeezing the scarf around one's body. A modular power/data infrastructure is woven into the cloth and connects to the touch I/O modules through conductive snaps. Evaluations of the affective potential of our upcoming prototypes will be conducted in the psychiatric ward of a local hospital. The touch sensations can be paired with broadcast media such as television and movies to provide more powerful emotional experience. The discrete wearable device can also be worn in public, where touch sensations can accompany other portable media such as music and cellular telephony.

## 4 References

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