

Ants in the Pants

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1. Introduction

Nobody likes to imagine that insects are crawling over them. Many of us would become horrified to realize that a feeling ticklishness on the skin was caused by insects.

However, many of us have had the experience of playing with ants when we were children. This might indicate that an apparently disagreeable sensation can sometimes change to being a funny, thrilling, or even a pleasant experience. The aim of our work is to highlight this fact, and to create a new entertainment that we have, named “Ants in the Pants” (Figure 1). This is a system composed of a visual display with a touch sensor and a wearable tactile display.



Figure 1. Ants in the Pants

2. Exposition

2.1. Ticklish tactile display

We made our original tactile display (Figure 2) because the stimulus given by the legs and antennas of an insect are actually a very soft tickle that previous tactile displays have not been able to generate.

Our tactile display is a glove with a matrix of motors inside. Brushes made up of two fishing lines with some elasticity are attached to the motors. In this way a realistic “insect’s legs” feeling can be realized. The brushes touch the skin when the motor rotates. After giving the stimulus, the motor rotates backward. The glove covers and wraps the hand and forearm, with the stimulating points are arranged on the back of the hand and forearm.

The distance between each motor (20mm) is set to be shorter than the two-point discrimination thresholds on the arm [1]. By using this distance, spatially continuous motion can be expressed.



Figure 2. Ticklish tactile display

2.2. Interactive system

One can see many ants living in the visual display. When one's hand is placed on the display with the glove, its position is detected by the touch sensor and the ants gather around the hand. Just after the ant reaches the hand and then disappears, one begins to feel a sensation, as if the ant is crawling up your arm. As ants have a habit of climbing up almost anything, once they started moving on one's hand they would soon move up to the arm. When the hand is raised, the crawl back onto the hand. Then if one puts one's hand back on the display for a while, more ants will enter into the glove. A good feature is that if the user feels bad or sick, by shaking the hand, the ants are shaken off.

3. Conclusion

We proposed a new entertainment system that we call “Ants in the Pants” to produce a thrilling sensation that imparts a feeling that “Insects are crawling over the user’s body”. To achieve this, we developed a new wearable tactile interface and combined it with a visual display with a touch sensor to create an interactive system.

We have already tested the system with more than 300 people. Although some users said “It is creepy”, almost everyone tried it again and again. This indicates that our system succeeded in changing an apparently unpleasant situation into a new and addictive entertainment.

References

1. Weinstein, S., “Intensive and extensive aspects of tactile sensitivity as a function of body part, sex and laterality”, in D. R. Kenshalo (Ed.), “The skin senses”, Springfield, Ill.: C. C. Thomas, Pub. pp.195-222, 1968.