

# Feel the thrill

When someone you love is sad or in distress, it's only natural to reach out and touch them, even embrace them. Instinctively, we sense that touch can affect a person's emotions. Scientifically, however, the link between touch and emotions is largely unexplored. That's now beginning to change, with exciting possibilities for enhanced well-being and a world of richer, more fulfilling sensory experiences.

Consider touch for a moment. This sense that we often take for granted is essential to our emotional and physical well-being. It's the earliest sense to emerge as babies develop in the womb, therefore the first bond we create with our mothers. Without it, even basic functions like walking and eating would be almost impossible. And we experience this remarkable sense primarily through the skin, the largest, heaviest organ of all – with up to 50 touch receptors for every square centimeter.

Once the exclusive preserve of living organisms, in recent decades the science of 'haptics' has brought touch to technology – in virtual environments, in robotics and even systems that enable people to handle objects or tasks remotely.

This means anything from flight simulators to robotic hands that can tackle heavy, dangerous industrial tasks. Or systems that can guide military pilots in disorienting situations to those that help surgeons perform delicate procedures.





## Getting physical

Within these, specialists distinguish between haptic/force feedback (interfaces that apply forces or vibrations to the user on a large scale) and tactile feedback, which is based on much smaller movements of the skin. If you're a gamer or home cinema fan, you may have a haptic feedback system at home. The steering wheels that let you experience the force and resistance similar to that of actually driving a racing car or a device that lets you feel the rumble and crack of explosions and gunfire in a virtual video game. These simulators use haptics to enrich your experience.

But what of touch and emotions? Earlier this year, a group led by Matthew Hertenstein of US-based DePauw University published a study into the communication of emotion through touch. In the study, people who were touched consistently distinguished correctly the emotion that the 'touching' person was trying to convey for emotions such as anger, fear, happiness and sadness as well as love, gratitude and sympathy.

Quoted in the New York Times, Hertenstein said: "Most touches were only about five seconds, but in these fleeting moments, we're capable of communicating distinct emotions, just as we are with the face. This is a sophisticated differential signaling system that we haven't previously known about."

## A richer experience

Jan van Erp, a chief scientist in Human Factors at TNO, the Dutch institution for applied scientific research, has worked on tactile systems for training helicopter pilots and for improving sports performance. He believes the link between touch and emotion has wide-ranging potential.

"We know the sense of touch plays an important role in social interactions and emotional relationships, for instance in greetings, with family communication and, of course, in intimate relationships," explains van Erp. "If we find ways to use these powerful communication tools, for example, in the interactions between users and technology or in entertainment, we will be >

able to make experiences much more exciting and enriching – far beyond what is possible with just sound and vision.”

## Part of the action

Some researchers are already developing wearable haptics such as scarves and shirts that simulate hugs and emotionally comforting touch. Meanwhile, at Philips, sensory experience experts have developed an 'emotions jacket' as a platform for studying the link between physical sensations and emotions.

One of the initial areas for exploration involves creating a richer, more immersive cinematic experience. Imagine watching a Kung Fu movie when, suddenly, Bruce Lee is surrounded by dozens of evil henchmen led by their power-mad master. An 'emotions simulator' could really make you feel a part of the action by immersing you in the physicality of the fight. And with something like the emotions jacket, you feel the tension too. It touches your skin enough to get your heart racing, so like the movie hero, you experience a moment of fear before boldly plunging into the fight anyway.

## Creating the mood

“Although on a small-scale, our work shows we can induce emotions while people watch movie clips. The experience is more intense and involving,” says Paul Lemmens of Philips Research.

“But our interest goes much wider. We want to distinguish exactly which stimuli produce a specific emotional effect, so we can unobtrusively help people achieve a desired mood,” he explains. “It could be the thrills of an adventure movie, but also better sleep, greater productivity at work or deeply calming meditation at home.”

Think of a baby crib that soothes a restless baby so that both child and parents get a peaceful night of sleep. If the cot detects that the baby is fidgety or slightly stressed, it produces sensations that reassure the child so it returns to sleep. Or when you are in the dentist's waiting room, a gentle, reassuring touch helps you relax.

So, just as technology and products focus on sound and vision today, in the future, the use of touch could enhance our lives as well, bringing experiences that are even more intense or simply more relaxing. ☞

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## The thrill for real

The 'emotions jacket' technology combines know-how in human perceptions and behavior, with expertise in touch sensors and actuator technologies. The tight-fitting garment incorporates a series of 64 evenly-spaced actuators – based on the vibrating motors used in mobile phones – sewn into the arms and torso.

Using just eight actuators along the length of the sleeve, the jacket can create the sensation that the arm is being tapped or touched in several spots. These actuators vibrate in response to what is happening on screen, so the jacket induces emotions in viewers that are similar to ones experienced by the characters in a film.

