Researchers present a special gel for touchscreen buttons

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GelTouch is a thin gel-based layer that can selectively transition between soft and stiff (up to 25 times stiffer) within seconds to provide multi-touch tactile feedback. Activated areas can be changed continuously and dynamically. We show that GelTouch can be applied to touch screens and that screen elements such as buttons, sliders and virtual thumbsticks can be augmented with tactile guides. This can enable eyes-free interaction (e.g., typing) and improve the user experience of tablets, control panels of cars and appliances, and wearables. Credit: Viktor Miruchna et al. paper

Six researchers from Germany and Denmark co-authored the paper," GelTouch: Localized Tactile Feedback Through Thin, Programmable Gel." If you were missing the press-down experience of finger interaction with your screen then GelTouch might one day be an easy answer.

They said, "We show that GelTouch can be applied to touch screens and that screen elements such as buttons, sliders and virtual thumbsticks can be augmented with tactile guides. This can enable eyes-free interaction (e.g., typing) and improve the user experience of tablets, control panels of cars and appliances, and wearables."

Engadget did the translating: These researchers have come up with a way to create "soft, temporary buttons of pretty much any shape and size, anywhere on a touchscreen display." *MIT Technology Review* similarly explained that "By adding heat, a prototype of a touch screen with a layer of gel on its face can stiffen in specific spots to make temporary buttons."

The technology features something called "thermoresponsive hydrogel"; a device user can activate it selectively to cause the transition between soft and stiff .GelTouch is a thin gel-based layer; the transition from soft to stiff can occur in seconds. The authors refer to "multi—touch tactile feedback."

This is a custom hydrogel (a hydrogel is a highly absorbent type of gel that consists of hydrophilic polymer chains) which alters its viscoelasticity through external stimulation (in the researchers' case, temperature). Explained *Engadget* Reviews Editor Jamie Rigg: To make the changes happen, "the researchers are using a heat-activated gel that's transparent and fluid at room temperature, but hardens into an opaque, defined shape when warmed." The video said the gel is activated when heated above 32 degrees C.

The gel consists of 90 percent water, said the video, and alters its viscoelasticity when activated.

According to their paper, they prepared the gel in a surfactant-free radical polymerization of the monomer N-isopropylacrylamide

(NIPAM) and the cross-linker N,N-methylene-bis-acrylamide (MBA) in water.

As part of their testing, they conducted a user study to show if people can reliably distinguish between activated and non-activated state, and to collect feedback on the tactile sensation of the gel.

Their prototype has a 7-inch touchscreen and tactile square shapes. Their work includes a tactile slider to guide users and virtual thumbstick for playing games.

Of what use is this effort in the real world? The authors set out to address some limitations in a touchscreen era of computer screens. Sectors such as people with visual impairments have a hard time if they lack the experience of feeling for buttons with the fingertips. As such, their GelTouch might find usefulness in cars, on machines, and as part of wearable smart garments.

"Touch screens are versatile and easy to use, but the slick surface isn't great for some tasks —typing more than a quick e-mail, for instance—and becomes pretty useless when your eyes are occupied with other tasks," remarked Rachel Metz in *MIT Technology Review*.

Rigg in *Engadget* said, "it's certainly an interesting concept, and who knows? One day we mightn't need to choose between the clean face of an all-touchscreen smartphone, and the typing prowess of a BlackBerry."