Skin icons can tap into promise of smartwatch

October 21 2014, by Nancy Owano

You have heard it before: smartwatches are cool wearables but critics remind us of the fact that their small size makes many actions cumbersome and they question how many people will really have them on their shopping lists. A project at Carnegie Mellon could serve as an interesting lesson that with some imagination and skilled teamwork, the smartwatch-user interaction may not be as limited as one would think. Researchers there want to come up with approaches that expand the interactive envelope around smartwatches, allowing human input to surmount the physical confines of the device.

From the Future Interfaces Group at Carnegie Mellon, which is a research lab working on "emerging use modalities, such as mobile computing, touch interfaces and gestural interaction," comes a proof of concept device called Skin Buttons. These are tiny laser projectors integrated into the smartwatch to render icons on the user's skin. They built their Skin Button projectors from off-the-shelf components costing roughly $5 each.

The buttons are low power; they can have negligible impact on battery life. The icons can be made to be touch-sensitive, which carries the opportunity to expand the interaction region without having to increase the device size, they noted. Commenting, John Biggs, East Coast editor of TechCrunch, said, "By expanding a watch interface off of the physical object you get a bigger palette on which to create and you reduce the need for text and icons on the screen. It's great for folks who can't see well – the icons can be as big as needed."

The team's video shows how the skin buttons can go to work. Projected icons can alert you to a missed phone call or text message. Tapping on an application icon launches the app. In a clock example, they used generic projected icons coupled with small on-screen labels. This allowed skin buttons to be used for a number of functions. With the navigation-centric icon set, they could control apps without touching the screen, navigating comfortably through songs and playlists. Their paper, "Skin Buttons: Cheap, Small, Low-Power and Clickable Fixed-Icon Laser Projections," detailed their setup. Their prototype had four fixed-icon laser projectors with accompanying infrared proximity sensors connected to a Femtoduino board (the smallest arduino clone, according to the Femtoduino site, to "minify" Arduino UNO projects) which communicated over USB with a host computer. Similarly, a 1.5-inch, 280x220 TFT LCD display was driven from the host computer. "We described our proof-of-concept implementation and results from our study, which show that the projections are easily recognized, easily

clicked, and have power requirements approaching commercial feasibility."

Through experiments, they showed that the buttons can have high-touch accuracy and recognizability, and are power-efficient. The authors in the video reported their evaluation results: touch sensing power consumption,1.0 mW; projector power consumption, 19.9 mW; touch sensing accuracy, 96.9%,volume, 0.4cc.

More information: The Future Interfaces Group: www.figlab.com/

Skin Buttons: Cheap, Small, Low-Power and Clickable Fixed-Icon Laser Projections (PDF): www.figlab.com/projects/skinbu … tons/skinbuttons.pdf

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