**SKINPUT**

**Chris Harrison** at Carnegie Mellon University and **Dan Morris** and **Desney Tan** at Microsoft's research lab in Redmond, Washington, recently came up with their [**latest invention**](http://www.infoniac.com/latest-invention.html) called **Skinput**, which represents a skin-based interface that makes it possible for a person to use his or her palm as a touchscreen.

The Skinput can be used to play games, control various devices, make phone calls and surf the Internet. The invention features a keyboard, menu and a number of other graphics that appear of the user's palm and forearm. The graphics are generated by a **pico projector that in incorporated in an armband**.

When the user touches a certain point on his or her palm, the [**acoustic detector**](http://www.infoniac.com/search/index.html?q=acoustic+detector&cx=partner-pub-3262283838900528%3Aujk9fhos9r8&cof=FORID%3A10&sa.x=43&sa.y=10#1092) in the armband identifies the part that was activated and performs the respective action. Scientists explain that the differences in bone density, size and mass, along with filtering effects from a person's soft tissues and joints, imply that various locations on the user's skin have different acoustic features. It is worth mentioning that the acoustic detector used in this invention is able to identify five skin locations, registering an **accuracy of about 95.5 percent**.

Using **wireless technology**, the researchers' latest invention can convey the signals to a cell phone, iPod or computer. The system was tested by 20 volunteers who gave a positive response to the device and its ability to provide fast navigation.

Researchers look forward to present their latest invention in April at the **Computer-Human Interaction conference** which will take

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Microsoft ([NSDQ: MSFT](http://finance.intomobile.com/intomobile?Page=QUOTE&Ticker=MSFT)) is working on a new flesh-control input technology called “skinput.” But, it’s not what you’re (probably) thinking. While it might be possible to one day adapt this tech to more, shall we say, “erotic” applications, the first iteration of the skinput technology focuses on using the flesh as input controls for mobile devices. The implication here is that everything from smartphones to music players to computers could be controlled with a simple double-click on your forearm.

Skinput technology works by “listening” for the sounds made by your finger tapping on a particular part of your body. Since skin, joint and bone density are highly variable on any normal human being, those taps are associated with different acoustic profiles – tapping close to your wrist would result in a slightly different “sound” than tapping closer to the elbow. The demo you see in the video below projects a control interface onto a forearm, giving the user a visual guide as to where to tap.

So far, Microsoft and researcher Chris Harrison, from [Carnegie Mellon University](http://www.cmu.edu/), have been able to use their flesh-control technology to play a game of Tetris and to control an iPod. In the future, though, skinput tech might completely change the way you think about double-clicking your lady’s mouse. Sorry, couldn’t resist.

Microsoft will unveil their skinput tech in April.



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* Think touchscreens are cool?  What about touchskins?  Skinscreens?  However you decide to coin the term, Chris Harrison – former
* intern with Microsoft Research and  “Skinput” developer – wants the process of navigating personal technology \*literally\* in the palm of your hand.
* If you’re confused (or scared), here’s how “Skinput” works:  with the help of an arm-mounted pico-projector and a Bluetooth connection, the palm and forearm of the user’s body becomes the navigation center of their phone, MP3 player, or other personal technology item.  Keyboards/keypads are projected onto the user’s skin which, in turn, respond to touch/tap motions.  While touch is a key component to the function of “Skinput,” much of the accuracy lies in its ability to distinguish between specific, inaudible sounds generated by particular motions in the skin and bone of one’s arm.
* In addition to the keyboard projection, “Skinput” also responds to various hand gestures, all of which can be programmed per desired function – tap fingers together to answer phone calls, rotate your wrist to scroll up and down, close your fist to exit programs, etc.
* According to Harrison, “Skinput” has been under development and testing for the past 8 months, but won’t be commercially available for another 2 to 7 years.  Keep an eye – or an arm – out.
* And Mr. Jobs called his device “magical”?
* Touchscreens may be popular both in science fiction and real life as the symbol of next-gen technology, but an innovation called Skinput suggests the true interface of the future might be us.
* Microsoft and Carnegie Mellon University unveiled Skinput recently, showing how it can turn your own body into a touchscreen interface.

Skinput uses a series of sensors to track where a user taps on his arm. Previous attempts at using projected interfaces used motion-tracking to determine where a person taps. Skinput uses a different and novel technique: It "listens" to the vibrations in your body.

Tapping on different parts of your arm creates different kinds of vibrations depending on the amount and shape of bones, tendons and muscle in that specific area. Skinput sensors can track those vibrations using an armband and discern where the user tapped.

"Accuracy is already good, in the high 90s percent accuracy for finger input," said project team member Chris Harrison, from Carnegie Mellon's Human-Computer Interaction Institute.

"The arm band is a crude prototype,” Harrison said. “The next generation could be made considerably smaller – likely easily fitting into a wristwatch."

From there it's fairly simple to associate those tappable areas with different commands in an interface, just as different [keystrokes and mouse clicks](http://www.technewsdaily.com/a-rundown-of-tablets-competing-with-the-apple-ipad-100127-0117/) perform different functions on a computer.

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When coupled with a small projector, Skinput can simulate a menu interface like the ones used in other kinds of electronics. Tapping on different areas of the arm and hand allow users to scroll through menus and select options.

Skinput could also be used without a visual interface. For instance, with an MP3 player one doesn't need a visual menu to stop, pause, play, advance to the next track or change the volume. Different areas on the arm and fingers simulate common commands for these tasks, and a user could tap them without even needing to look.

Skinput is the product of a collaboration between Carnegie Mellon's Harrison and Desny Tan and Dan Morris of Microsoft Research. For now, Skinput is only a proof-of-concept for alternate ways to interface with electronics, but the team isn't ruling out that it could

* become a commercial product someday.
* Harrison also pointed out that the next generation of miniature projectors will be small enough to fit in a wristwatch, making Skinput a complete and portable system that could be hooked up to any compatible electronics no matter where the user goes.
* Besides being bulky, the prototype has a few other kinks that need to be worked out. For instance, over time the accuracy of interpreting where the user taps can degrade.
* "We (the researchers) have worn it for extended periods of time," Harrison told TechNewsDaily. "But it does occasionally need to be retrained.  As we collect more data, and make the machine learning classifiers more robust, this problem will hopefully reduce."
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* Skinput, and similar sensor devices developed by the team could have applications beyond simple menu screens. Tan [recently demoed](http://channel9.msdn.com/TechFest/Natural-User-Interfaces-with-Physiological-Sensing/) a Skinput-like interface that allowed him to play Guitar Hero, a popular music game, without the requisite plastic guitar controller. The results were still a little crude, but impressive because it proved the viability of game controllers that don't require physical controls.
* This is especially relevant considering the [Project Natal technology](http://www.livescience.com/technology/etc/090602-virtual-boy-will-talk-and-play-with-you.html) Microsoft is developing for the gaming industry and which has been gathering a lot of attention. Despite working in vastly different ways, both systems focus on letting users [play games with their own bodies](http://www.technewsdaily.com/the-future-of-video-game-input-muscle-sensors-0072/), without the need for accessories and game controllers.
* We could soon be using our own skin as a type of touchscreen to interact with our gadgets if “Skinput” ever gets to market.
* Skinput is basically a system of using a tiny projector to display a screen onto your forearm or hand which you can then tap with your finger to navigate menus.
* Skinput’s creator, Chris Harrison, who is a PhD student in computer science at Carnegie Mellon, said he came up with the idea for Skinput as an easier way to interact with gadgets we carry around like mobile phones and iPods.
* “The human body is the ultimate input device” Mr Harrison told the BBC.
* The science behind it is relatively simple, well in theory it is anyway. When you tap your arm with your finger, it sends waves of energy along your skin and through your body and depending on the sound, a location can be pinpointed which can then be linked to a function.
* So for example, using sensors and software you could have simple functions on your music player such as start, stop, rewind, fast forward etc. that are pinned to different locations on your arm.
* “The wonderful thing about the human body is that we are familiar with it” Mr Harrison said.
* “Proprioception means that even if I spin you around in circles and tell you to touch your fingertips behind your back, you’ll be able to do it.”
* “That gives people a lot more accuracy then we have ever had with a mouse”.
* It’s still in the very early stages but the potential advantages of Skinput appear to be enormous.
* As Mr Harrison rightly points out, gadgets can’t really get much smaller as we would be unable to interact with them.
* I mean people with larger fingers already have enough trouble navigating tiny buttons and keyboards on mobile phones. With Skinput that problem disappears.
* “In the future your hand could be your iPhone and your handset could be watch-sized on your wrist” explained the Skinput creator.
* He reckons it could be used with Bluetooth to operate a phone that’s in your pocket, or to control your music player.
* Wow! Like it!