

SideSwipe: UW team uses in-air gestures for phones

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The SideSwipe system. The system leverages the unmodified GSM signal to enable in-air hand gestures both above and on the side of the phone. Credit: Chen Zhao et al.

Researchers from the University of Washington in Seattle have come up with a SideSwipe system that enables in-air gestures above and around a mobile device. This is an interesting way to interact with the phone without using physical buttons or touchscreens. Chen Zhao, Ke-Yu Chen, Md Tanvir Islam Aumi, Shwetak Patel, Matthew Reynolds have joined forces to design their system which, they said, leverages the actual GSM signal to detect hand gestures around the device. "We developed an algorithm to convert the bursty reflected GSM pulses to a continuous signal that can be used for gesture recognition," said the team in their paper. "SideSwipe: Detecting In-air Gestures Around Mobile Devices Using Actual GSM Signals." The paper discusses the prototype which they designed.

For their prototype, they built a receiver with four antenna elements. They put the four antennas on the four edges of PCB board and separately connected them to RF power detectors at the center of the PCB. Since every antenna has a

unique radiation pattern, they said that they were able to get different signal intensity fluctuations from distinct antennas when the user is performing gestures. "In addition, we placed a ground plane on the back of the PCB to enhance the difference in radiation patterns of the antennas."

They could recognize 14 gestures with 87.2% accuracy. (SideSwipe, said New Scientist, comprises an algorithm that recognizes the unique reflections created when fingers interrupt a burst of the radio waves that send information between your phone and the cellphone mast. In tests with 10 volunteers, the program could recognize eight separate taps, four hovers and two sliding gestures with 87 per cent accuracy.)

The idea is to let people control their phones without having to touch them, said Paul Marks in New Scientist on Wednesday. This would help relieve the anxiety of hearing the phone ring in social and work settings where the ring is interrupting a be- quiet room of people. If the phone in one's pocket rings at a meeting, one can just wave fingers to stop the ringing and send the call to voicemail. For music, sliding hand motions can skip, change the volume or silence the music.

The authors discussed the applications in their paper: "Our system can be beneficial when user receives phone call in a non-appropriate situation (e.g., during a meeting). Instead of taking the phone out of her pocket, she can just use hand gesture to respond to the incoming call."

The team envisions three [gestures](#) to control the three modes: enable silent mode with a downward gesture towards the phone, send predefined text with a right swipe gesture, and decline incoming calls by tapping on the [phone](#). SideSwipe can be adapted to future standards such as the LTE network, they said.

More information: Paper - SideSwipe: Detecting

In-air Gestures Around Mobile Devices Using Actual
GSM Signals (PDF):
[www.keyuc.com/research/SideSwipe ...
deSwipe_UIST2014.pdf](http://www.keyuc.com/research/SideSwipe_SideSwipe_UIST2014.pdf)

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