***Total time: around 2:30min.***

***[Motivation]***

Empowering daily objects with always-available touch input capability allows us to interact with digital devices via physical surroundings. Most ordinary objects that are reachable, including walls, tables, cups, pens etc. can be leveraged as tangible input interface.

However, current popular approaches to implement always-available input require either to instrument the environment, or to have specially designed sensors on user’s body, which raised the technical burden for ordinary users.

***[Our solution]***

We propose to use existing and emerging smart devices that are worn on users’ hand with motion sensors embedded, such as smart watches, wristbands and smart rings.

***[Show how it works]***

We demonstrate that a motion sensor worn on the wrist or on a finger can accurately detect the distinctive vibrations that occur when a finger swipes over different surface profiles.

Besides working with our daily surroundings, we introduce Vidgets, low-cost 3D printed swipe widgets consisting a number of carefully-designed bumps on its surface that are used to generate unique and recognizable patterns of mechanical vibrations on user’s finger during a swipe motion.

(Our work is different with existing methods, especially acoustic based approaches, in the ways that: 1st, users do not need to wear ad-hoc sensors but using existing smart devices. 2nd, users can interact via either natural surroundings, or instrumented surroundings with synthetic widgets at low cost. 3rd, our approach is less power consuming and more noise resistant. 4th, a same Videget can be used in different ways under various context.)

***[Use scenarios]***

[1] We instrument our prototype system to a local museum where children are able to swipe their fingers on surfaces of exhibiting objects, such as shells. They can feel them and view related educational videos, which will be played automatically when pre-encoded swipes are detected on the children’s smart watches or rings.

[2] Our system can also benefit kitchen environment while we are preparing food. To turn the page of recipe book shown on a tablet, we just need to swipe on the edge of chopping board. We can also switch channels of TV by swiping on plate holder. Using synthetic stripes attached to food bags, we can examine the calories of the food.

[3] Synthetic widgets can also be used for stylus interactions. A user is using drawing app on a tabletop, he can quickly activate menus or functions by swiping on stripes that are attached to the pen, without using the menus that are laid in corners. Rotate the pen and swipe on a different widget can trigger a different function.

[4] We also designed several widgets such as a clip, where users may take a strip with themselves, such as in pockets, on bags, on tables or walls, to either mute phone calls, turn on music volume or switch on and off lights.

[5] When synthetic widgets are not accessible, they may just use surrounding objects, like a cable, keyboard, chair, and even their hands.

***[End]***

Our work demonstrate using existing motion sensors wore on user’s hand to empower daily objects with always-available touch input capability.