

Researchers study influence of cultural factors on gesture design

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Imagine changing the TV channel with a wave of your hand or turning

on the car radio with a twist of your wrist.

Freehand [gesture](#)-based interfaces in interactive systems are becoming more common, but what if your preferred way to gesture a command—say, changing the TV to channel 10—significantly differed from that of a user from another culture? Would the system recognize your command?

Researchers from the Penn State College of Information Sciences and Technology and their collaborators explored this question and found that some gesture choices are significantly influenced by the cultural backgrounds of participants.

"Certain cultures may prefer particular gestures and we may see a difference, but there is common ground between cultures choosing some gestures for the same kind of purposes and actions," said Xiaolong "Luke" Zhang, associate professor of information sciences and technology and principal investigator of the study. "So we wanted to find out what can be shared among the different cultures, and what the differences are among [different cultures](#) to design better products."

In their study, the researchers asked American and Chinese participants to perform their preferred gestures for different commands in three separate settings: answering a [phone call](#) in the car, rotating an object in a virtual reality environment, and muting the television.

The team found that while many preferred commands were similar among both cultural groups, there were some gesture choices that differed significantly between the groups. For example, most American participants used a thumbs up gesture to confirm a task in the virtual reality environment, while Chinese participants preferred to make an OK sign with their fingers. To reject a phone call in the car, most American participants made a horizontal movement across their neck

with a flat hand, similar to a "cut" motion, while Chinese participants waved a hand back and forth to reject the call. Additionally, in Chinese culture, one hand can represent digits above five, while in American culture an individual can only represent numbers one to five using one hand.

"This project is one of the first kind of research to study the existence of cultural influence and the use of preferences of hand gestures," said Zhang. "We provide [empirical evidence](#) to show indeed that we should be aware of the existence of this matter."

On the other [hand](#), Zhang said, from the perspective of design, the study shows that certain gestures can be common across multiple cultures, while other gestures can be very different.

"Designers have to be careful when delivering products to different markets," he said. "(This work could inform companies) to enable users customize the gesture commands, rather than have them pick something that is unnatural to learn from the perspective of the [culture](#)."

More information: Huiyue Wu et al, Influence of cultural factors on freehand gesture design, *International Journal of Human-Computer Studies* (2020). [DOI: 10.1016/j.ijhcs.2020.102502](https://doi.org/10.1016/j.ijhcs.2020.102502)

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