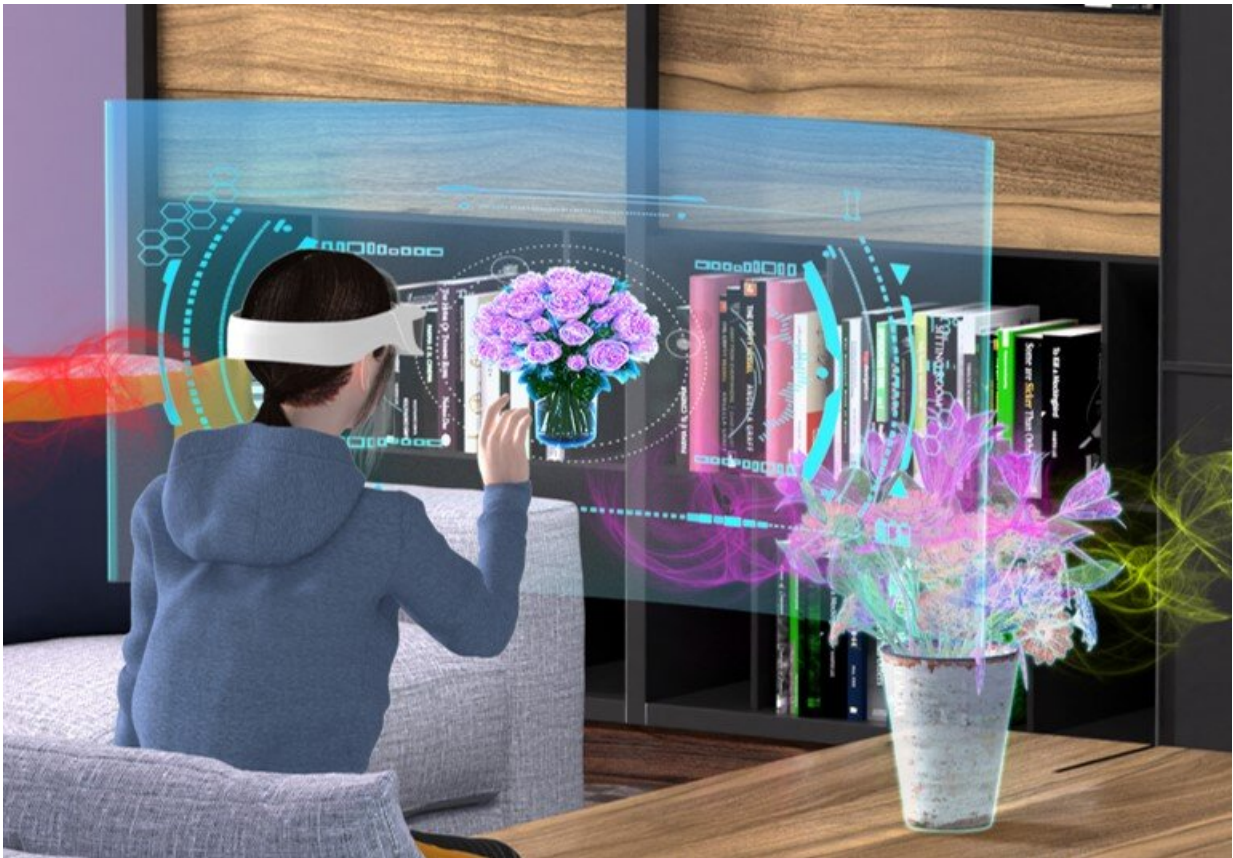


New devices for conveying olfactory stimuli in virtual reality

May 10 2023, by Bob Yirka



Wearable odor generators enable olfactory feedback in VR. Credit: Xinge Yu

A team of biomedical and mechanical engineers at City University of Hong Kong, working with a pair of colleagues from Beihang University and one from Shandong University, has developed two versions of a

system designed to convey olfactory stimuli in virtual reality. Their results are published in *Nature Communications*.

As VR systems become ever more realistic, designers and users have noticed that two of the senses are still very much absent in the [virtual world](#): smell and taste. Much work has been done with the former and a little with the latter, but attempts at both still leave much to be desired.

Most systems designed to add olfaction to VR have involved use of aerosols and atomizers. Unfortunately, adding such materials adds bulk to VR gear and entails bottle filling and cleaning, with less than satisfactory results overall. In this new effort, the research team took a new approach, using paraffin imbued with scents. The scents are released by a tiny heating element.

The team has developed two aromatic system designs; the first is the simplest. It looks like a Band-Aid with two pouches glued on. The patch is affixed to the upper lip and emits two scents. The second system is a soft face mask that emits up to nine scents. Both systems work through use of a temperature-sensing resistor that controls a heating element. The more heat, the stronger the scent released. The systems have magnetic induction coils to pull heat away from the face and to cool the wax quickly when the scent is no longer needed.



Photos of olfactory interfaces with 1, 2 and 9 odor generators. Credit: Xinge Yu

The researchers tested the system with multiple volunteers and multiple types of scents and found [response times](#) to be on average 1.44 seconds. Thirty unique [scents](#) were delivered as expected and none of the volunteers were burned by the devices. The team next plans to tackle the problem of delivering odors at the just the right moment to ensure a realistic VR experience.

More information: Yuhang Li, Soft, miniaturized, wireless olfactory interface for virtual reality, *Nature Communications* (2023). [DOI: 10.1038/s41467-023-37678-4](https://doi.org/10.1038/s41467-023-37678-4)

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