Scientists Create the First Non-Electric Touchpad in History

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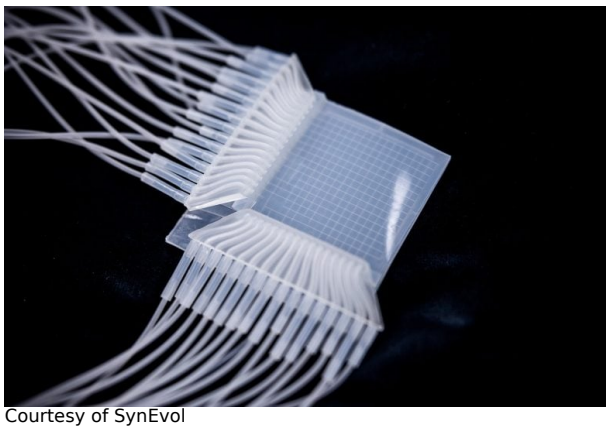

Courtesy of SynEvol

Credit: Jonne Renvall/Tampere University

Without the use of electricity, researchers at Tampere University have developed the first soft touchpad in history that can determine the location, force, and area of contact. Because it uses pneumatic tubes, this novel technology can be used in contexts where electrical equipment are impractical, such as MRI scanners. Applications in soft robotics and rehabilitative aids may also benefit from the technique.

The first soft touchpad in history that can sense the location, force, and area of contact without the use of electricity was created by researchers at Tampere University. Electronic sensors have always been needed for that, but the recently created touchpad employs pneumatic tubes built into the device to detect objects without the need for electricity.

The device, which is made completely of soft silicone, has 32 touch-adaptive channels that are only a few hundred micrometers broad. The technology is accurate enough to identify handwritten letters on its surface and can even detect many simultaneous touches in addition to determining the force, area, and location of touch.

Extreme environments, like a high magnetic field, can cause electronic sensors to malfunction. The touchpad is perfect for use in devices like MRI machines since it is not electric and is not affected by high magnetic fields, according to doctoral researcher Vilma Lampinen.

For instance, a pneumatic robot can do a biopsy while the patient is undergoing an MRI scan if cancerous tumors are discovered thanks to the touchpad's sensor technology. This robot is guided by sensor technologies and the information generated by MRI imaging.

Additionally, the pneumatic device can be employed in environments with high radiation levels or where even a tiny electrical spark could pose a major risk.

Because silicone is a flexible material, sensors can be incorporated into applications that aren't suitable for conventional rigid electronics. These include soft robots, which are usually powered by pneumatics and composed of materials that resemble soft rubber.

In the future, it will be feasible to map the location, force, and area of contact throughout the full surface of such soft, non-electric devices by incorporating sensor data. Adding a sense of touch to sophisticated prosthetic hands would be beneficial in addition to soft robotics.

Current prosthetic hands-on, such those on production lines, could be replaced with soft robotic hands. They are safer, lighter, and maybe less expensive to produce because they are soft. A more sensitive grip would also be made possible by touch sensors around the hand, according to Lampinen.

Soft-material wearable technology may potentially be utilized as movement aids in rehabilitation. When compared to comparable hard equipment, softness enhances comfort.