Healthcare Monitoring is Revolutionized by Air-Powered Computer

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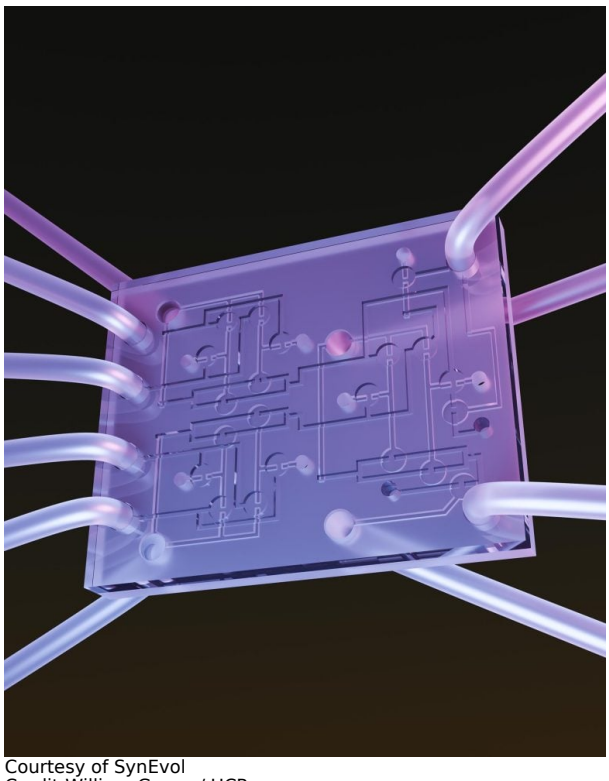
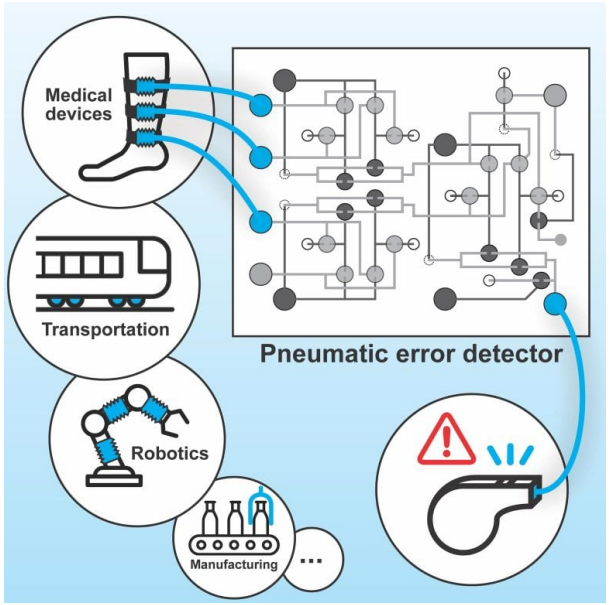


Courtesy of SynEvol
Credit:William Grover/ UCR

An air-powered computer that can identify and sound alarms when specific medical devices malfunction has been created by researchers. By doing away with the requirement for electronic sensors, this gadget streamlines the monitoring procedure and provides a dependable and affordable means of assisting in the prevention of blood clots and strokes.

According to an article published in the journal Device, the computer not only requires air to operate, but it also uses air to emit alerts. When it notices an issue with the life-saving compression machine it is meant to keep an eye on, it promptly sounds a whistle.



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Leg sleeves known as intermittent pneumatic compression, or IPC devices, are designed to pressure a person's legs to improve blood flow by occasionally filling with air. By doing this, clots that cause fatalities, strokes, or clogged blood vessels are avoided. These devices are usually operated and observed by electronics.

"IPC devices are expensive because of all the electronics in them, but they can save lives. Therefore, in order to reduce costs and improve safety, we intended to create a pneumatic device that eliminates some electronics, according to William Grover, UC Riverside associate professor of bioengineering and co-author of the related research.

Compressed air is moved about using pneumatics. This is how IPC devices, bicycle pumps, tire pressure gauges, respirators, and emergency brakes

work aboard freight trains. Grover and his colleagues reasoned that it would be safer to control one pneumatic logic gadget with another.

By computing parity bits, this kind of gadget functions similarly to electronic circuits. Grover stated, "Let me say I want to send a message in ones and zeroes, like 1-0-1, three bits." "People discovered decades ago that they could send these three pieces along with one extra piece of information to ensure the recipient received the correct message."

We refer to that additional bit of data as a parity bit. The bit is a number, which is 1 in the case of an odd number of ones in the message and 0 in the case of an even number of ones. If a message with an even number of bits ends with the number one, it is obvious that there was a mistake in the message. This is how a lot of electronic computers send messages.

An air-powered computer counts ones and zeroes by measuring variations in air pressure passing through twenty-one small valves. The whistle does not blast in the event that there has been no counting error.

If it does blow, the machine needs to be repaired. Grover and his pupils are shown in a video showcasing the air computer cutting an IPC device with a knife, rendering it useless. After a few seconds, the whistle sounds.

This gadget is around the size of a matchbox. It substitutes a computer and a few other sensors, according to Grover. Thus, we can save expenses while still identifying issues with a gadget. Additionally, it could be utilized in conditions with high humidity or high heat that aren't good for electronics.

Air computing has many uses, one of which is IPC device monitoring. Grover's next effort would be to create a machine that could replace the requirement for a work that results in annual fatalities: shifting grain at the top of tall silos.

Grain silos are tall structures filled with wheat or maize that are frequently seen in the Midwest. To level off the interior piles and break up the grains, a person frequently needs to enter using a shovel.

"A startlingly high proportion of fatalities happen when someone becomes stuck when the grain moves. This might be done by a robot in place of a human. However, Grover noted that an electronic robot would not be the greatest option because these silos are explosive and could be destroyed by a single electric spark. "My goal is to create an air-powered robot that can operate in this explosive environment, avoid sparking, and rescue people from harm."

The concept of air-powered computing has existed for a minimum of a century. Air-powered pianos that played music from punched rolls of paper were once manufactured. Pneumatic circuits lost appeal to engineers with the development of modern computing.

Grover observed, "Once a new technology takes hold, we lose sight of other solutions to problems." "This research can demonstrate to the world that there are still applications for ideas that are over a century old today, which is something I find appealing."