

The Sky is the Limit for Wearable Technology

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3D-Printed Robotized Hand, developed to help amputees.

Kunal Mankodiya, assistant professor of electrical, computer and biomedical engineering at the University of Rhode Island (URI), is creating textiles much different than the ones he helped his family sell as a child in India. Today, Mankodiya's textiles are "smart."

Through his medical technology research, Mankodiya strives to meet crucial problems in the health care industry – among them, long-term monitoring and data synthesis – with affordable, applicable solutions, his smart textiles.

Mankodiya's Wearable Biosensing Lab at URI is working to create wearable systems, such as smart clothes and socks, which can mimic the technology found in hospitals and patient homes. Discreetly woven with an array of sensors, the smart clothes can non-invasively track important patient metrics such as heart rate vital signs, physical activity, falling, walking or other movement difficulties in their daily life.

"There is a huge demand for doing data collection at home," Mankodiya says. "Hospital devices cannot translate to home because they're not made for home monitoring."

This day-to-day tracking is particularly important, Mankodiya says, for patients who had strokes or heart attacks. The textiles gather data on movements and analytics. Mankodiya's lab has also created gloves that can monitor symptoms of patients with Parkinson's disease, and socks that can monitor movement.

"The sky is the limit, but we want to design what will be appropriate," he says.

The devices would not only enable doctors to monitor patients' symptoms remotely, but also allow care to be given with a more in-depth understanding of the patient's history.

"The idea is we can use smart textiles to collect that data, and the data provides a window for medical professionals to see their patients progress," Mankodiya says. "It's important to look at their progress over time. Doctors are unable to see it on a daily basis, so we are trying to bridge this gap in health care."



Wearable Functional Near Infrared Spectroscopy (fNIRS) device is an optical brain monitoring system which uses a highly controlled near infrared light to illuminate the brain from the scalp skin and measure brain activity.