Abstract

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Design of High Resolution Low Cost Plantar Pressure Sensing Device Using XactFSR Force Sensing Resistor

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Abstract

Diabetic neuropathy is a debilitating complication of diabetes that is often diagnosed long after irreversible damage has occurred in a patient. Diagnosis of the condition commonly occurs when examinations reveal physical changes in foot structure and ulcers of the foot; such damage reveals the condition but offers no chance at prevention. To better predict diabetic neuropathy and prevent damage, insole pressure sensors can be used to detect the onset of the condition before damage occurs. While several pressure sensing and foot mapping systems are commercially available, each is prohibitively expensive, requires specialized software, or maps a limited portion of the foot. We present an affordable, scalable, high resolution pressure-sensing system that maps the entire foot with a novel force sensor and sensor grid. The grid is based on a matrix array of 0.50 inch (1.27 mm) sensor of interlaced sensing fingers with XactFSR force sensing resistor which accounts for over 600 sensing points. The device offers a solution that is several thousand dollars cheaper than other products, consists of commercially available boards and cables, and provides full mapping of the foot while operating with standardized and open-source software packages. Our system provides emergent economies and regions presenting a high risk of diabetes with a predictive tool that can operate in nearly any environment

Biography

Joshua Partheepan joined College of Engineering Faculty in fall 2017 as Assistant Professor of Power Systems Engineering. He has bachelor's degrees in Electrical and Electronics Engineering from Anna University, India, a master's degree in Power Plant Technologies from University of Strathclyde, UK and a Ph.D. in Systems from USA. His research interests include hydrogen energy storage, renewable energy system modeling and building various circuits for different applications.