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## **Kennesaw State University researchers find noninvasive blood glucose monitoring measure**

Prototype proves 79% accurate.

KENNESAW, Ga. (1 November 2022)— Kennesaw State University researchers have discovered a new noninvasive way to measure and monitor blood glucose levels in diabetic patients.

Though a partnership with Marquette University in Milwaukee, KSU's departments of; Information Technology, Software Engineering and Game Development, and Exercise Science and Sports Management, have found its prototype device in monitoring glucose levels 79% accurate.

“Diabetes affects nearly one out of 10 people in the United States,” said Dr. Maria Valero, lead researcher and assistant professor in the College of Computing and Software Engineering, Department of Information Technology at KSU. “We are excited to make progress in finding more safe and effective means to measure these levels.”

Diabetic patients typically monitor their glucose levels by analyzing a drop of blood drawn from a finger prick using an electronic device known as a glucometer. With KSU's development in the Raspberry Pi camera, blood will no longer be needed to monitor glucose levels.

The prototype developed using TensorFlow, Keras, and Python code, consists of a small clip that can be positioned on a finger or earlobe. The laser is attached on the top half and the camera on the bottom. As visible light laser passes through skin tissue capturing absorption, the Raspberry Pi camera captures a set of images. According to the study, “Glucose concentration is then estimated by an artificial neural network model.”

Valero, whose research interests include IoT for smart healthcare, found that by using Raspberry Pi, blood glucose levels obtained by the prototype were 79% accurate when analyzing images from the finger. When images were taken from the ear, accuracy declined to 62%.

While future studies are needed to address limitations, Valero said this prototype can be used to avoid blood and multiple finger pricks.

“It's an affordable device,” said Valero. “If successful, this will be life-changing for the diabetic community.”

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### **About Kennesaw State University**

Founded in 1963, Kennesaw State University is the second-largest university by enrollment in Georgia. KSU houses 11 academic colleges with over 180 degrees and programs. With 41,181

(Fall 2020) students, 2,000 administrative staff, and 1,004 academic staff, KSU's annual endowment was \$100 million last year.

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