Non-Invasive Blood Glucose Monitoring system using Raspberry Pi four

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Abstract

Diabetes is a metabolic disease that causes high blood sugar. It is the most predominating condition in population between 45 and 64. In this population, periodic glucose monitoring is crucial to keep blood glucose levels under control and take appropriate medication. The traditional method for monitoring blood glucose involves the use of a glucometer that requires a blood sample obtained from the person's finger after being pricked. One cannot deny the fact that this method causes discomfort and stress at the sight of puncture. In this research, We propose a Non-Invasive Glucose Monitoring System, which is easy to use, inexpensive and most importantly, does not require any blood samples. Patients will have a simple and effective way to keep Diabetes in control without discomfort. The use of optical sensors has gained much attention in recent years. Taking those sensors and leveraging the capabilities of small cameras, we create a prototype that is connected to a Raspberry Pi. The prototype captures images of the fingertip when a laser beam is directed to human tissue. Blood glucose concentration can be estimated by studying the absorption, reflection properties, and analyzing how the light is transmitted along the finger. An artificial neural network model is proposed to be built and trained by the image dataset obtained to predict blood glucose level. The design includes a smartphone app which will be able to send an alert a physician if needed. This idea will help the diabetes community and make a blueprint for future research.