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Non-Invasive Glucose monitoring system : GlucoCheck

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GlucoCheck: A Non-Invasive Glucose Monitoring system

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Diabetes is a metabolic disorder characterized by elevated blood sugar levels. Monitoring blood glucose levels on a regular basis is critical to maintaining balanced blood sugar levels. Unlike traditional methods where monitoring glucose levels is invasive and harmful, non-invasive glucose monitoring does not involve penetrating the human skin. In our research, we developed a non-invasive glucose monitoring device that does not require any blood sample. Our device is connected to Raspberry Pi that includes optical sensors such as a visible light laser and small camera. When a laser beam is directed towards human tissue, the prototype captures photos of the fingertip. By studying the images using the artificial neural network model, the absorption, reflection qualities, and analysis of the transportation of light across the finger can be used to estimate blood glucose concentration. As part of training and testing the neural network model, we are conducting experiments with 45 human subjects with IRB approval. We would be taking images of the fingertips and earlobes of these test subjects, associating the images with their corresponding blood glucose values, and training the neural network model with this image dataset. We would be evaluating the model's performance by testing it with new fingertip/earlobe images and validating the predictions.