

System and Method For Detecting Diabetes From Breath Sample Of An Individual

Application Number: 202411028030

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ABSTRACT

Embodiments disclose a method and a non-invasive glucometer system thereof, for detecting diabetes from breath sample of an individual, comprising: an air storage for collecting breath sample of an individual/user, when a user blows into it; a user terminal having a user interface (UI) for entering demographic data and body vitals information of the user; a volatile organic compounds (VOC) analyzer, operably coupled to the air storage, to infuse the breath sample collected in to the VOC analyzer, said VOC analyzer comprising a sensor array chamber having a plurality of embedded electrochemical sensors, said VOC analyzer is configured to: generate corresponding sensor voltages from the plurality of embedded sensors, wherein the sensed output voltages correspond to the concentration of VOCs in the breath sample; determine volatile organic compounds (VOCs) in the breath sample of the user; and transmit sensed output voltages to a processing and controlling unit, in real-time. The processing and controlling unit comprising a microcontroller, said unit is configured to: receive and store, demographic data and body vitals information of the user, from the user terminal; receive and store, the sensed output voltages, from the plurality of embedded sensors; send, the stored combined data set relating to demographic data and body vitals information of the user, and the sensed output voltages, from the plurality of embedded electrochemical sensors, on receiving a breath sample of the user, to train a machine learning (ML) model. The user terminal is configured to receive a diabetes prediction report for a test breath sample, from the trained ML model.

KEY APPLICATION AREAS

- 1.Non-Invasive Diabetes Screening.
- 2.Medical Diagnostics & Point-of-Care Testing.
- 3.Digital Health & AI-Based Healthcare.
- 4.Breath Analysis & VOC Sensing.
- 5.Remote Patient Monitoring & Telemedicine.
- 6.IoT-Based Smart Healthcare Systems.

POTENTIAL USE

- 1.Non-invasive diabetes detection using exhaled breath as an alternative to finger-prick blood tests.
- 2.Early diabetes screening in hospitals, clinics, community health centers, and health camps.
- 3.Home-based glucose monitoring for elderly and chronic diabetic patients using a portable device.
- 4.Real-time AI-powered diabetes prediction by combining breath VOCs with body vitals and demographic data.
- 5.Telemedicine and remote health monitoring through cloud-connected IoT devices with mobile/web reporting.
- 6.Mass screening in rural and resource-limited settings using a low-cost, easy-to-use diagnostic tool.
7. Continuous health data collection and analytics for disease monitoring and preventive healthcare.