NANYANG TECHNOLOGICAL UNIVERSITY

School of Biological Sciences

Reg. No. 200604393R

Research Theme: Artificial Intelligence in Infectious Disease

PhD Research Project Title: Artificial Intelligence-based advisory system for blood sugar management in elderly diabetics

Principal Investigator/Supervisor: Associate Professor Konstantin Pervushin

Co-supervisor/ Collaborator(s) (if any): NA

In the developed world, more than 1 in 3 people have pre-diabetes or have developed diabetes mellitus Type-I or Type-II. Alarmingly, more than 84% of them remain unaware of their condition until wide blood sugar fluctuations start to negatively impact their quality of life. With pre-diabetes, blood sugar levels are raised, but not at the level to meet the clinical diagnosis of Type-2 diabetes (T2D). Pre-diabetes raises your risk for developing overt T2D, heart disease, kidney failure and even stroke. The focal point of this project is to predict sugar levels with AI deep learning model-free approach using continuous blood glucose level (BGL) monitoring (DEXCOM and Abbott wearable devices) as well as responses to insulin injection (for insulinopenic patients), food intake, physical activity, and stress levels. Since our target cohort is the elderly, food intake is quantified through audio recording processing, specifically on patient descriptions on what he/she ate in free speech. The stress levels will be estimated from the audio recordings as well. Prof Chng specializes in speech to text processing for local Singaporean dialects as well as emotional level estimation from free speech even in noisy environments. The prediction is based on the AI-processing of large number of sugar level recordings annotated with the above data and audio recordings. We have already developed a mobile app framework to collect all the data using wearable DEXCOM sensors and mobile phone integrated motion sensors. From audio recordings of patient speech, we hope to extract useful cues to evaluate stress levels and correlate it with continuous BGL measurement using wearable sensors. This will help inform strategy and educational cues for diabetics and prediabetics to manage their sugar level through exercise, food intake and finally insulin injections

Supervisor contact:

If you have questions regarding this project, please email the Principal Investigator:

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Please apply at the following:

Application portal:

https://venus.wis.ntu.edu.sg/GOAL/OnlineApplicationModule/frmOnlineApplication.ASPX