The GH-Method

Accuracy of Predicted PPG by Using AI Glucometer and GH-Method: Math-Physical Medicine (No. 106)

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Abbreviations: T2D: type 2 diabetes; PPG: postprandial plasma glucose; FPG: fasting plasma glucose; AI: artificial intelligence; AIG: AI-based glucometer

1. INTRODUCTION

This article discusses the accuracy of the predicted postprandial plasma glucose (PPG) values using AI-based Glucometer (AIG) via seven clinical cases of type 2 diabetes (T2D) patients.

2. METHODS

Since 2015, the author has conducted his research on glucose, including both fasting plasma glucose (FPG) and PPG. Initially, he utilized signal processing techniques of wave theory to decompose glucose waves (i.e. curve of data) into 19 sub-waves (influential factors) for PPG and five influential factors for FPG. He also calculated the contribution % of each influential factor of glucose.

In 2017, he developed an artificial intelligence (AI) based software (APP or software on both smartphone and PC) using only 8 factors for PPG and 2 factors for FPG. Since PPG contributes around 75% to 80% of HbA1C, he has placed more emphasis on monitoring PPG fluctuations.

He applied optical physics (e.g. frequency, period, and wavelength of waves) to identify the physical characteristics of food and link them with food's nutritional ingredients, specifically carbs and sugar content. Next, he was able to calculate glucose generation through food intake amount. By using his GH Method: math-physical medicine approach, he could bypass the necessity of detailed research of botanical molecular structures and their chemical interactions with food components.

Since mid-2018, he allowed other T2D patients to use his developed AIG product to predict their glucose levels, especially PPG, in order to control their T2D conditions.

3. RESULTS

He has selected seven T2D patients with different collected data size and length of time for this particular study. Among those seven clinical cases, there are patients from three nations (i.e. three dissimilar cooking styles), different diabetes histories (between 10 and 25 years), varying ages (between 45 and 75 years old), and both genders.

Table 1 shows individual accuracies of AI-predicted PPG values using the following simple formula.

Prediction accuracy % = 1- ((Measured PPG - AI predicted PPG) / (Measured PPG))

In summary, the overall average accuracy of these seven clinical cases is 95%. In other words, if a T2D patient's measured PPG was 150 mg/dL, his/her AI predicted PPG would fall within the range of 142.5 mg/dL to 157.5 mg/dL. This kind of prediction accuracy is sufficient to serve as a useful tool for patients to predict and control their diabetes conditions.

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Case 1	95%
Case 2	98%
Case 3	91%
Case 4	91%
Case 5	92%
Case 6	96%
Case 7	99%
Avg. Accuray	95%

Table 1: Predicted PPG accuracy using AI glucometer.

4. CONCLUSION

The author developed this tool with AI capabilities, including auto-learning and auto-correction to make the system smarter and more accurate with additional data input. That was why his own AI prediction accuracy has reached 99.5% based on a relatively large dataset from a period of 1,554 days with 4,662 meals. The author believes that, with additional input data available for each patient and an increased number of users, the AI system will learn more about different types of food automatically and then its prediction accuracy can be further improved.

The next step of his development work includes a higher level of AI capability of providing advice to diabetes patients regarding what part of their selected food and how large of a portion of certain food should be eaten prior to actual food intake.

In summary, this article demonstrates the power and usefulness of GH-Method: math-physical medicine, including AI in the battle against diabetes-fighting.