Precise Medical Treatment

AI-assisted Diabetes Genetic Risk Prediction

Entering the 21st century, life sciences, especially genetic science, have extensively and profoundly affected everyone's healthy life. At the same time, scientists have used an entirely new perspective on genetics to interpret life and explore the nature of the disease. Artificial Intelligence (AI) is capable of processing and analyzing massive medical and health data, acquiring insight through cognitive analysis, serving the government, healthcare institutions, pharmaceutical companies and patients, enabling personalized, evidence-based smart healthcare, driving innovation and delivering value.

For cardiovascular diseases and diabetes mellitus, the annual death toll accounts for 80% of the total deaths. The annual expenditure on chronic diseases accounts for more than 13% of China's public health expenditure. As a common chronic disease, diabetes can not be cured at present, but it can reduce morbidity and improve patients' quality of life through scientific and effective intervention, prevention and treatment. We hope to use artificial intelligence methods and ideas to deal with, analyze, interpret and apply diabetes-related big data to design high-precision, efficient and interpretative algorithms to challenge the scientific problem of the precise prediction of diabetes, providing strong technical support for academia and precision medicine, and helping us to overcome diabetes.

1. **What do we a we want to predict and how do we measure the quality of the prediction?**

   We obtained the diabetic blood glucose forecast for each person, expressed in decimal notation, leaving three digits after the decimal point. The results will be compared with the actual detection results. Taking the mean square error as the evaluation index, the smaller the better, the mean square error is calculated as follows:

   $$f = \frac{1}{2m} \sum_{i=1}^{m} (y'(i) - y(i))^2$$

   Where m is the total number of people, y'_i is the ith person's blood glucose level predicted by the player, and y_i is the ith person's actual blood glucose level.

2. What data do we need to develop a predictor?

The gold standard. We also need the data to judge directly whether the patient is Diabetic. This means that we will need a sample where the label of whatever we want to predict is available. Right now, we have just the blood glucose concentration which is not the direct data to prove whether the patient is Diabetic.