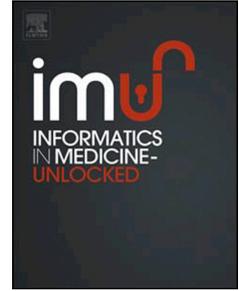


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Type 2 Diabetes Mellitus Prediction Model Based on Data Mining

Han Wu¹, Shengqi Yang^{1,*}, Zhangqin Huang¹, Jian He¹ and Xiaoyi Wang¹

¹Beijing Advanced Innovation Center for Future Internet Technology, Beijing Engineering Research Center for IoT Software and Systems, Beijing University of Technology, Beijing, 100124, China
syang@bjut.edu.cn

Abstract

Due to its continuously increasing occurrence, more and more families are influenced by diabetes mellitus. Most diabetics know little about their health quality or the risk factors they face prior to diagnosis. In this study, we have proposed a novel model based on data mining techniques for predicting type 2 diabetes mellitus (T2DM). The main problems that we are trying to solve are to improve the accuracy of the prediction model, and to make the model adaptive to more than one dataset. Based on a series of preprocessing procedures, the model is comprised of two parts, the improved K-means algorithm and the logistic regression algorithm. The Pima Indians Diabetes Dataset and the Waikato Environment for Knowledge Analysis toolkit were utilized to compare our results with the results from other researchers. The conclusion shows that the model attained a 3.04% higher accuracy of prediction than those of other researchers. Moreover, our model ensures that the dataset quality is sufficient. To further evaluate the performance of our model, we applied it to two other diabetes datasets. Both experiments' results show good performance. As a result, the model is shown to be useful for the realistic health management of diabetes.

Keywords

Hybrid Prediction Model, Data Mining, Diabetes Mellitus

1. Introduction

Diabetes mellitus (DM) is a chronic disease that is characterized by high blood glucose. Nearly half of all diabetics have household heredity factors, which is one of the most important features of DM. Failure of the pancreas to produce enough insulin and the body's inefficient use insulin are both pathologic causes of DM. There are two types of DM. The pathogenesis of type 1 diabetes mellitus (T1DM) is that the pancreas secretes damaged β -cells, preventing it from lowering blood glucose level in time. Insulin resistance and insulin secretion deficiency are the pathogeneses of type 2 diabetes mellitus (T2DM), which is also called non-insulin dependent DM.

In the past 30 years of development in China, with rising number of diabetics, people have started to realize that this chronic disease has deeply impacted every family and everyone's daily life. There is an ascending trend in the proportion of diabetics in the general population, and the growth rate of male diabetics is higher than that of female diabetics, as shown in Fig. 1. According to some official statistics, the number of diabetics in China was nearly 110 million in 2017. This means that China has the largest diabetic population in the world.

Diabetics proportion

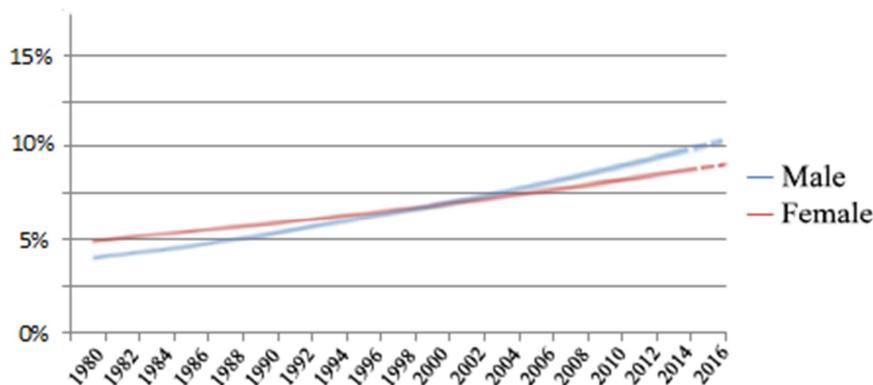


Figure 1. Trend of Diabetics proportion in China

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