Chapter 7

Use of Orange Data Mining Toolbox for Data Analysis in Clinical Decision Making: The Diagnosis of Diabetes Disease

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ABSTRACT

Diabetes is a life-long illness which occurs as a result of lack of insulin hormone or ineffectiveness of insulin hormone. Blood sugar, fructosamine, and hemoglobin A1c (HbA1c) values are widely used for diagnosis of this disease. Although the role of insulin in diagnosing diabetes is great, the HbA1c value is more accurate. This is because HbA1c value gives information about the past two or three months of blood sugar in the treatment of diabetes. This study aims to estimate the HbA1c value with high accuracy. Follow-up data of diabetic patients were used as data. The Orange data mining software is used because it is easy to use in the modeling phase and contains many methods. In this context, the chapter aims to develop an effective prediction model by using a large number of feature selection and classification methods. The results show that the proposed model successfully predicts the HbA1c parameter. In addition, determination of the parameters that are effective in the diagnosis of diabetes has been carried out with the feature selection methods.

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INTRODUCTION

Nowadays, diabetes is becoming one of the most serious diseases. Incidence frequency of diabetes which is increasing in the world varies from one community to another based on age, gender, race, dietary habits, genetic characteristics and environmental factors. According to the data obtained from World Health Organization, 108 million diabetics are thought to be in the world in 1980, it is estimated as 422 million in 2014. The global prevalence of diabetes has almost doubled from 4.7% to 8.5% from 1980 to 2014 (World Health Organization, 2016). Unfortunately, every year, about 1.5 million people lose their lives due to diabetes. One of the most important reasons for this increase can be thought as increase in overweight or obese people resulting from malnutrition and sedentary life. According to the data obtained from the same report, 1 out of 3 adults over 18 years old are overweight and 1 out of 10 adults are obese (World Health Organization, 2016). According to the obtained data and the results obtained from the scientific studies, the risk factors of diabetes can be summarized as shown in Figure 1.

Figure 1. Risk factors of diabetes
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