Non-Invasive Glucose Monitoring Using Machine Learning Techniques for Diabetics Prediction

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ABSTRACT

Diabetes is one of the major problems in today's world, and it is a major health issue for people of all ages. Regular glucose measurement is a prerequisite for monitoring blood glucose levels and establishing treatment strategies for diabetes. The most common method of measuring glucose levels is an invasive procedure that requires finger-stroking and can be painful and obedient, especially if this happens in daily routine. Machine learning is a sub- field of artificial intelligence, widely described as the ability of a machine to mimic intelligent human behavior. One such method in Machine Learning is data mining. Non-invasive(devices that do not penetrate the patient's body) methods for measuring sugar and presenting classification measurements according to different criteria: size, analyzed media, method used. , opening type, response delay, measurement duration, and access to results using a web application. We set the focus on using the learning machine as a new research and development trend.

Keywords: Diabetes, Finger Pricking, Naive Bayes, Logistic Regression (LR), Prediction, Non-invasive, Machine Learning (ML), Features,

1.INTRODUCTION

Diabetes is a disease that affects the body's ability to produce the hormone insulin, which makes carbohydrate metabolism abnormal and raises blood glucose levels. In diabetes a person often suffers from high blood sugar.

Strengthen thirst, Strengthen hunger and regular urination are some of the symptoms caused by high blood sugar. Many problems occur when diabetes is not treated. Some of the more serious problems include diabetic 1ketoacidosis and nonketotic hyperosmolar coma.

Diabetes is considered to be an important health factor in which blood sugar levels can be controlled. Diabetes is not only affected by a variety of factors such as height, weight, genetic predisposition and insulin but also a major factor in diabetes.

Early detection is the only solution to staying away from problems.In this project, we aim to introduce the available methods of measuring glucose abnormalities, focusing on the use of a reading machine (ML) used to address glucose measurement methods.

In this work, the Naive Bayes and Logistic Regression classification classification algorithms are used and analyzed in a database to determine the diagnosis of diabetes in a patient. The test performance of both algorithms is compared with different scales.

2.RELATED WORKS

This paper introduces a Diabetic Influence Measure (DIM) algorithm based on sugar. A method based on measuring the impact of Disease reads a set of input data. For each data point, the method identifies a list of features from the metadata. If any data features are missed, the data point is deleted [1]. Diabetics patient medical records and different types of algorithms are added in the dataset for experimental analysis. We use logistic regression, random forest, decision tree classifier and gradient boosting to predict whether a patient has diabetes based on diagnostic measurements [2]. We have evaluated the Deep learning model – Deep Neural Network (DNN) in taxonomy and the dataset for the input. Diabetes and non-diabetic patients, data of different age groups and some workers, dividing the cohorts of the dataset [3]. A diabetic inpatient encounter data stream was used to train the self-adaptive models based on incremental learning algorithms. The result indicated that the model can automatically adapt to the newly arrived data.In this project it proposed Naive Bayes, Hoeffding Tree, and Hoeffding Adaptive Tree algorithms were selected to build the candidate self-adaptive models because they are incremental and can work with both numeric and categorical variables [4]. We are focus on a data driven approach. The fact that different subgroups of diabetic patients possess different BG fluctuation patterns, we propose a new BG prediction approach referred to as Clu-RNN based on recurrent neural networks (RNN) by incorporating a pre-process of clustering into the classical RNN [5]. To design a fuzzy expert system to help detect and diagnose the severity of diabetic neuropathy [6]. Type II diabetes is a chronic condition that affects the way our body metabolizes sugar. The body's important source of fuel is now becoming a chronic disease all over the world. It is now very necessary to identify the new potential targets for the drugs which not only control the disease but also can treat it [7]. Data mining is a sub field in the subject of software engineering. It is the methodical procedure of finding examples in huge data sets including techniques at the crossing point of manufactured intelligence, machine learning, insights, and database systems. The goal of the data mining methodology is to think data from a data set and change it into a reasonable structure for further use [8]. Diabetes is known as a metabolic disease. Type 1 diabetes is an anti-immune disease whereby the body's immune system kills off its own insulin producing beta cells in the pancreas. Type 2 diabetes is an advanced state of health in which the body becomes opposed to the usual impacts of insulin and/or progressively loses the capacity to produce adequate amount insulin in the pancreas, and it finally may not be able to produce any insulin [9]. In this paper, we explore the early prediction of diabetes via five different data mining methods including: GMM, SVM, Logistic regression, ELM, ANN. The experiment result proves that ANN (Artificial Neural Network) provides the highest accuracy than other techniques [10].

3.EXISTING SYSTEM

In this existing method is we used SVM Algorithm for calculate that diabetic details. SVM Algorithm is slow process for classify all the given details. In that main disadvantage is time efficiency. Patient's diabetic details start with large-volume, heterogeneous, autonomous sources with distributed and decentralized control, and seek to explore complex and evolving relationships among data.The computer system alone does not guarantee accuracy, and the warehouse data is only as good as the data entry you created.The system is not fully automated, it needs data from the user for a full diagnostic.

4.PROPOSED SYSTEM

In this project we are using naive bayes algorithm. It is a classification technique based on Bayes' Theorem with an assumption of independence among predictors.It assumes that the presence of a particular feature in a class is unrelated to the presence of any other feature.Naive Bayes model is easy to build and particularly useful for very large data sets. Along with simplicity, Naive Bayes is known to outperform even highly sophisticated classification methods.

5.ARCHITECTURE DIAGRAM

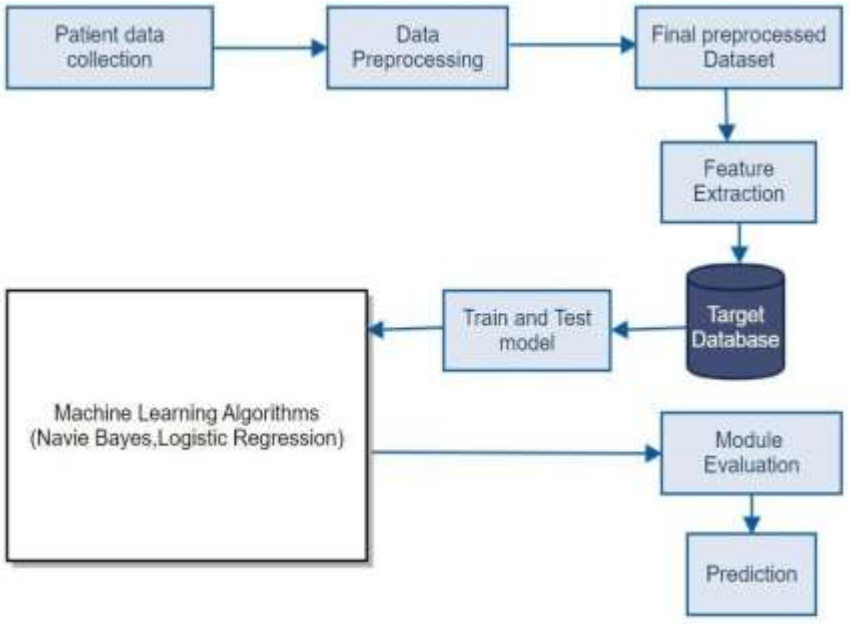

Fig 1: Architechture for diabetics prediction

6.IMPLEMENTATION

The system is divided into four sections. Data pre-processing is the first module, Here the raw diabetic patient data is cleaned and the metadata is appending to it by removing the things which are converted to the integer. So, the data is easy to train. The second module is Feature Extraction,is a process of dimensionality reduction by which an initial set of raw data is reduced to more manageable groups for processing. The third is Module Evaluation in this We apply the machine learning algorithm for testing part and get the accuracy of this model.The fourth module is this module based on Gui part.we create a web page using bootstrap.The web page like (enter the value of blood level, sugar level etc...). Now we get the data's from user to compare the dataset values.Finally it will predict wheather patient is having diabetic or not.

A. MACHINE LEARNING

Machine learning is an artificial intelligence(AI) program that gives systems the ability to automatically learn and develop from experience without being clearly planned. Machine learning focuses on the development of computer programs that can access data and use it for self-study.The learning process begins with observations or data, for example, specific information, or instructions, in order to look at patterns in the data and make better decisions in the future based on the examples we provide.

B. NAVIE BAYES CLASSIFIER

This classifier can also be known as a Generative Learning Model. The classification here is based on Baye's Theorem, it assumes independent predictors. In simple words, this classifier will assume that the existence of specific features in a class is not related to the existence of any other feature. If there is dependency among the features of each other or on the presence of other features, all of these will be considered as an independent contribution to the probability of the output. This classification algorithm is very much useful to large datasets and is very easy to use. When comparing with other classification algorithm Naive Bayes gives more accuracy.

C. LOGISTIC REGRESSION

Logic regression is used for Predictive Learning Model. These data set can have one or more than one independent values. The output is calculated with a data in which there could be two outputs. The aim of this classification algorithm is to find the accuracy.

7. RESULTS

Various experiments were conducted to propose an efficient way of managing the diabetics predictions using machine learning algorithms. The results are extracted by comparing the efficiency in managing files by existing method and the proposed method. Also the efficiency of various management techniques for managing input files is evaluated. The below results and discussions shows the various areas that are being improved or is much more efficient in the proposed system. The Results are shown below.

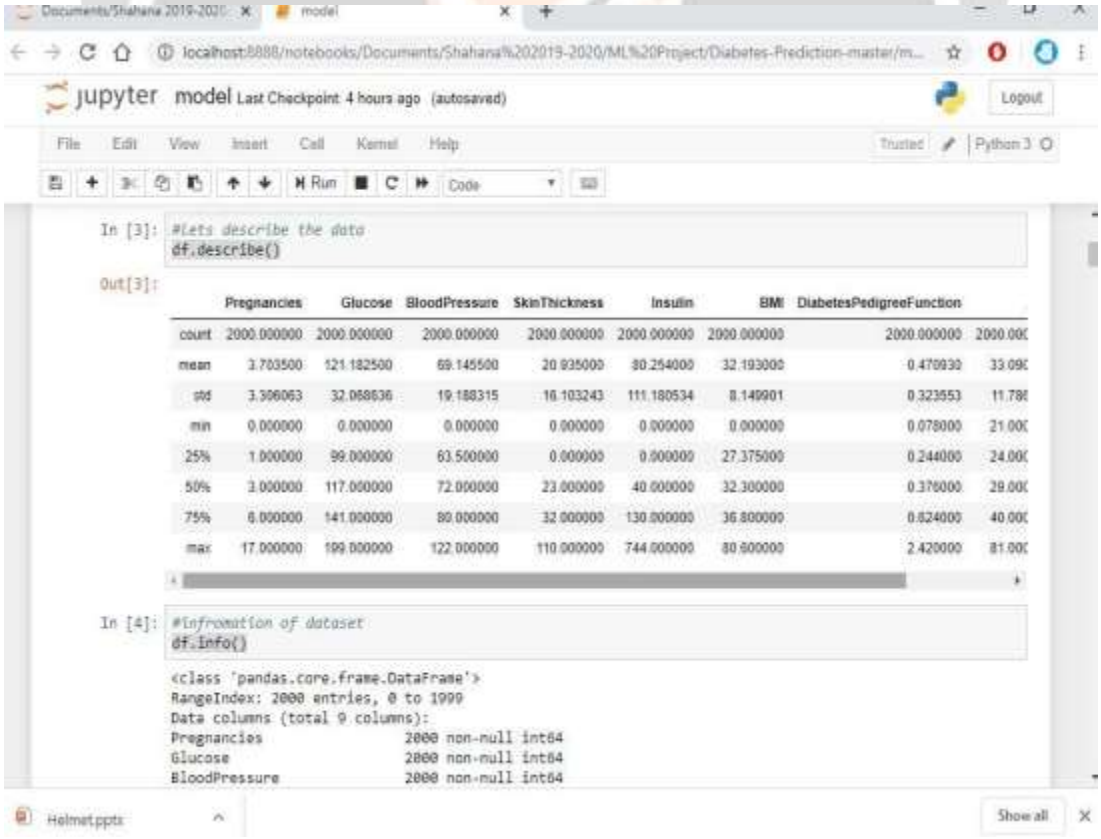

Fig:7.1 Information of Dataset

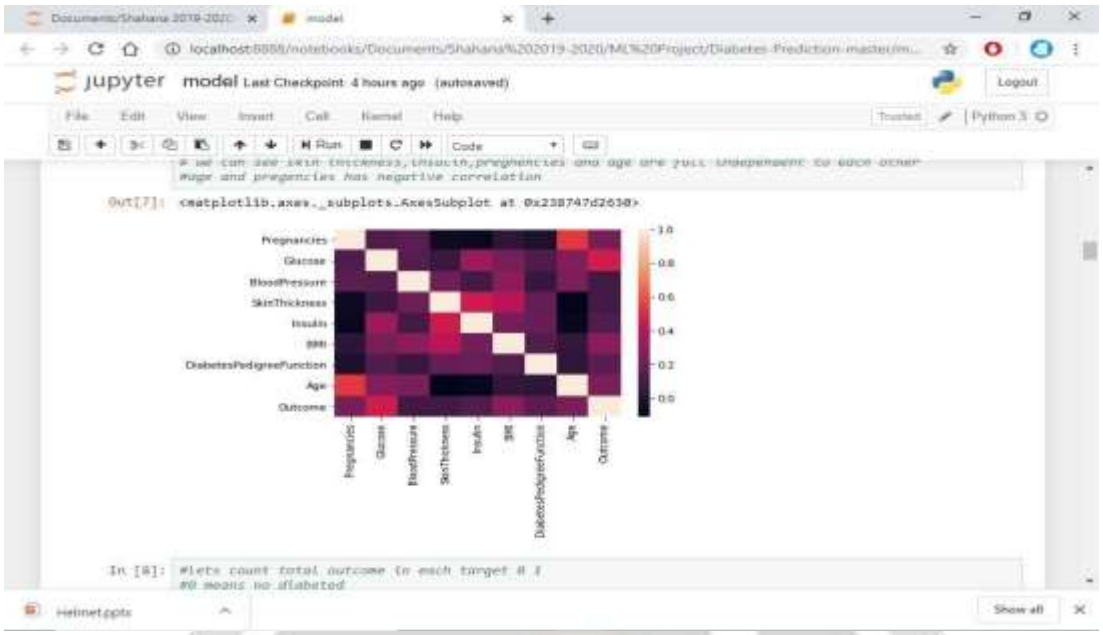

Fig:7.2 Correlation of confusion matrix for attributes

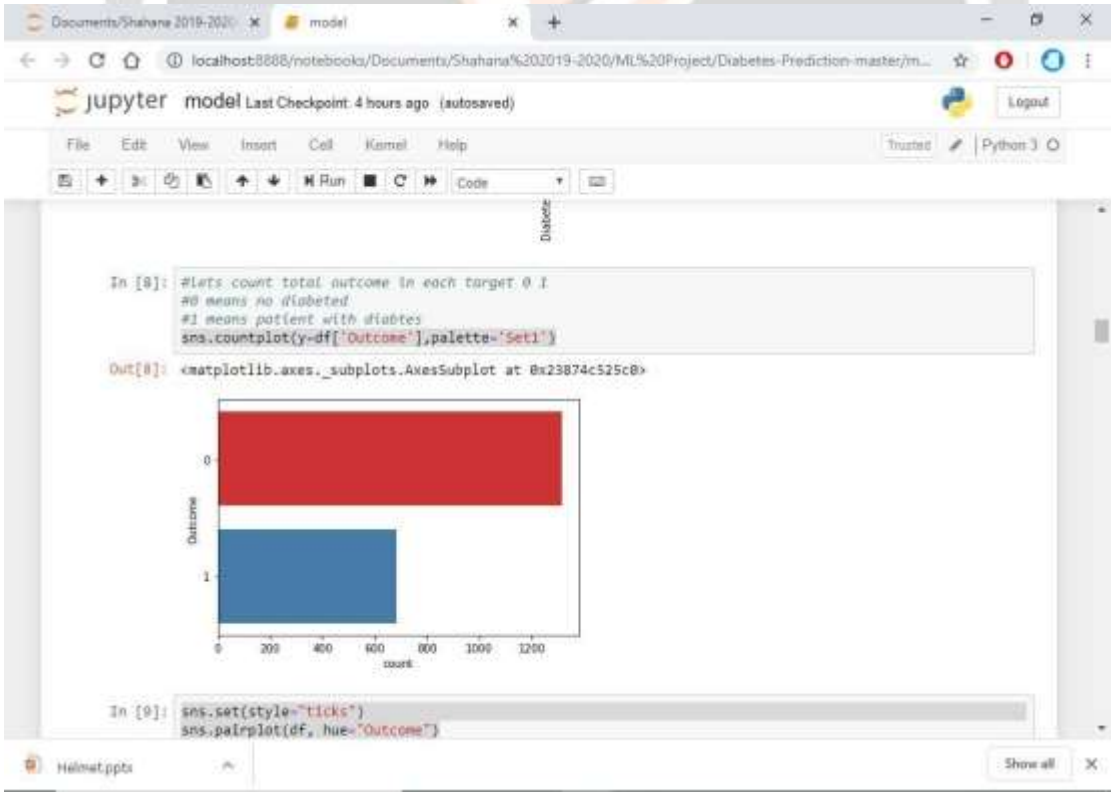

Fig:7.3 Comparison for the outcome of diabetic and non-diabetic patient

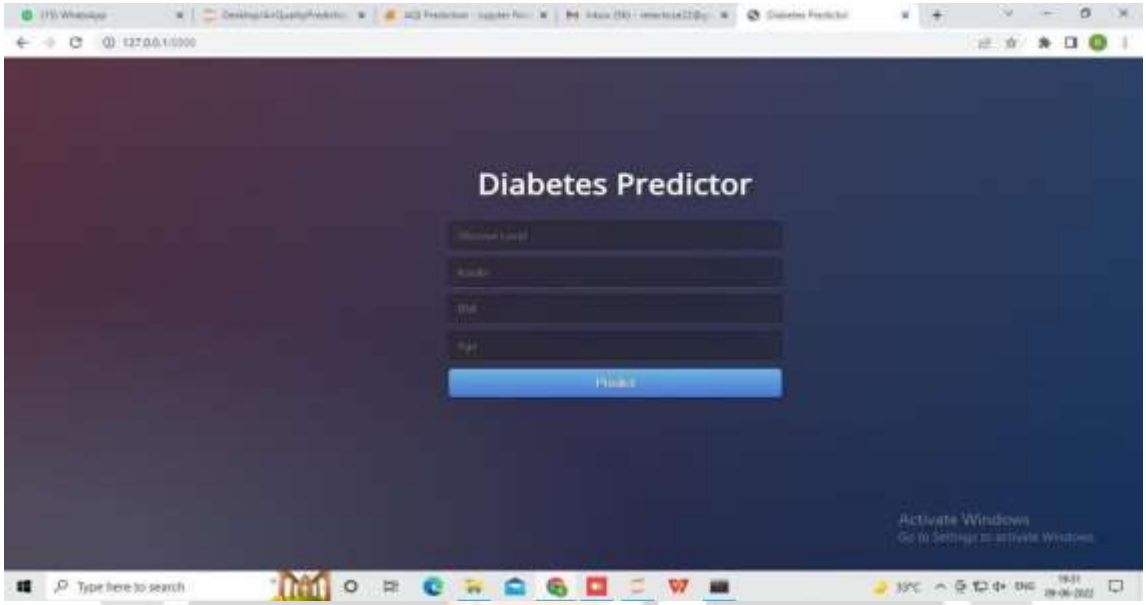

Fig:7.4 User Interface for Diabetic prediction

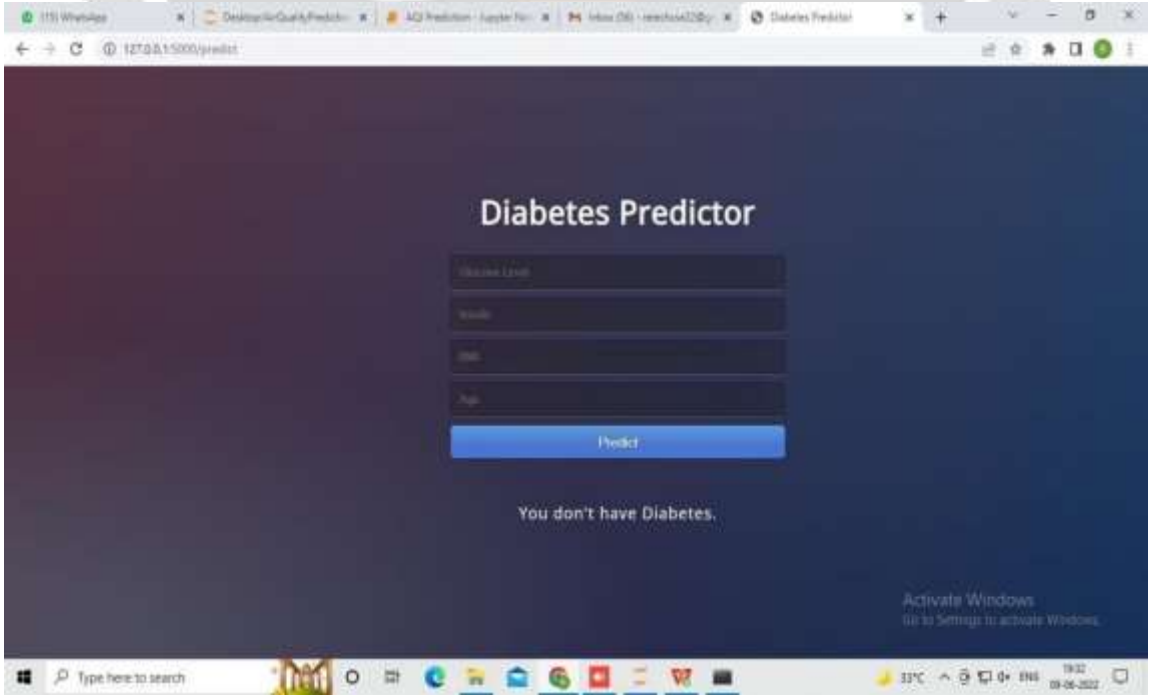

Fig:7.5 User Interface for getting input from user

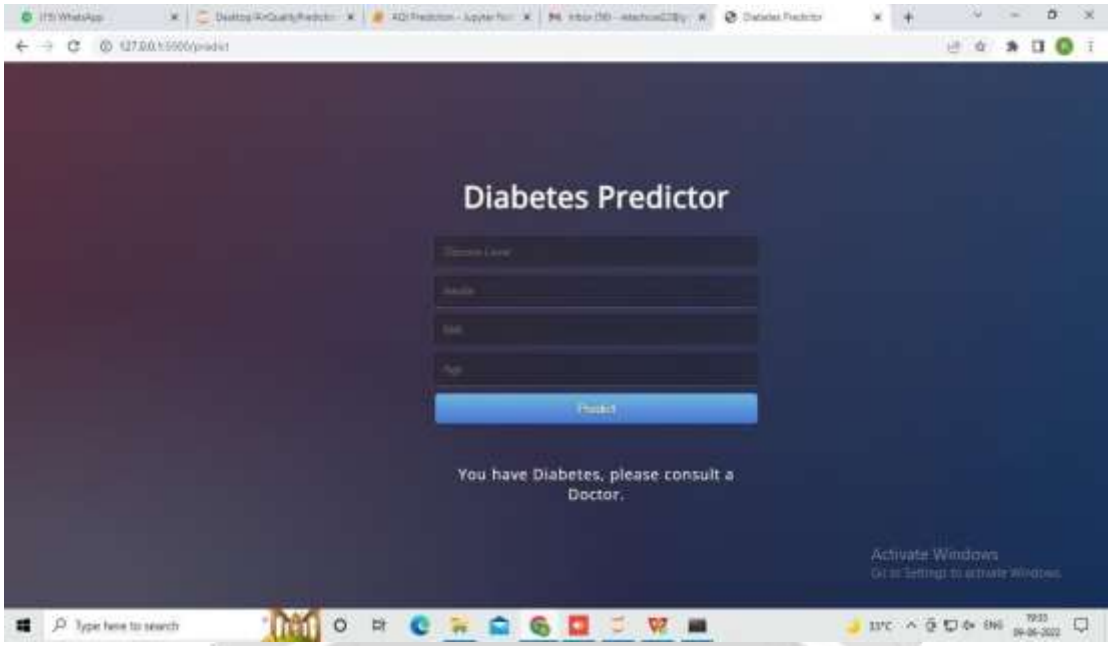

Fig: 7.6 User Interface for prediction

8.CONCLUSION

In our work, analysis is made for diabetes prediction to improve the accuracy by using machine learning classification algorithm .We compared the two prediction model. From, that Naive Bayes classifier achieves higher accuracy than Logistic Regression classifiers. This can be used to select best classifier for predicting diabetes. For future work, it is necessary to bring in hospital's real and latest patients' data for continuous training and optimization and also the quantity of the dataset should be large enough for training and predicting.

9.. REFERENCES

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