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An Intrusion Detection Model For Forecasting Insulin Dosage

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Abstract: Diabetes Mellitus is a persistent metabolic condition. Diabetic patients could live a normal life with the right blood glucose level (BGL) adjustments, free from the possibility of developing major consequences over time. The majority of diabetic patient's blood glucose levels, however, are not properly handled for a variety of reasons. However, the appropriate insulin dosage is crucial for the healing process. For diabetic individuals to control their BGLs, traditional preventative techniques including maintaining a healthy diet and exercising are crucial. In this study, we predict diabetes using the Gradient Boosting Classifier, and we predict the dosage of insulin for patients who have been identified as having diabetes using the Logistic Regression algorithm. We are using the UCI insulin dosage dataset and the PIMA diabetes dataset to carry out this experiment. With the aforementioned dataset, we are training both algorithms. After training, we will upload a test dataset without a class label, at which point Gradient Boosting will predict the presence of diabetes and Logistic Regression will forecast the amount of insulin to be administered in the event that diabetes is detected by Gradient Boosting.

Key Words: Gradient Boosting, Logistic Regression (LR).

I.INTRODUCTION

The ability to forecast glucose levels could help patients respond appropriately in critical circumstances like hypoglycemia. Therefore, a number of recent studies have looked into cutting-edge data-driven techniques for creating precise predictive models of glucose metabolism. Application of non-linear regression models like artificial neural networks, support vector regression, and Gaussian processes is required due to the nonlinear, dynamic, interactive, and patient-specific nature of the relationship between input variables and glucose levels (i.e., medication, diet, physical activity, stress, etc.).

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II. METHODOLOGY

The purpose of the methodology that was used in this research study is to build the prediction classification rules of the best-performing model (LR, and Gradient Boosting).

Logistic Regression (LR):

Logistic Regression is a classification model. The idea of the algorithm is to map the results of linear functions to sigmoid functions. The linear regression model is a simple mathematical model and easy to implement.

Gradient Boosting:

This method is improved step-by-step using the gradient boosting method and the loss function. To increase accuracy, the errors are identified and corrected. Boosting often verifies models that reduce the loss function derived from trained samples. For the greatest feasible outcome prediction, the errors from these calculations are measured and evaluated. The loss function calculates the range of the detected rate which compares with the desired target. The Onward stepwise process is the most popular method for updating different with various attributes. Reduced loss function and the inclusion of base learners at all levels enhance accuracy.

III. PROCEDURE

In the improvement of models first analyze the dataset of the Diabetic patient's data in the model building primarily first upload the data, read the data then train and test the data to predict the results. According to the results generated first analyze them and generate the graph. The figure-1 illustrates the flow of diabetic patient symptoms model generation.

According to the patient's condition, it is considered to analyze the insulin dosage. As the plot demonstrates patient conditions and the surface are the main causes of two increase in the insulin dosage.

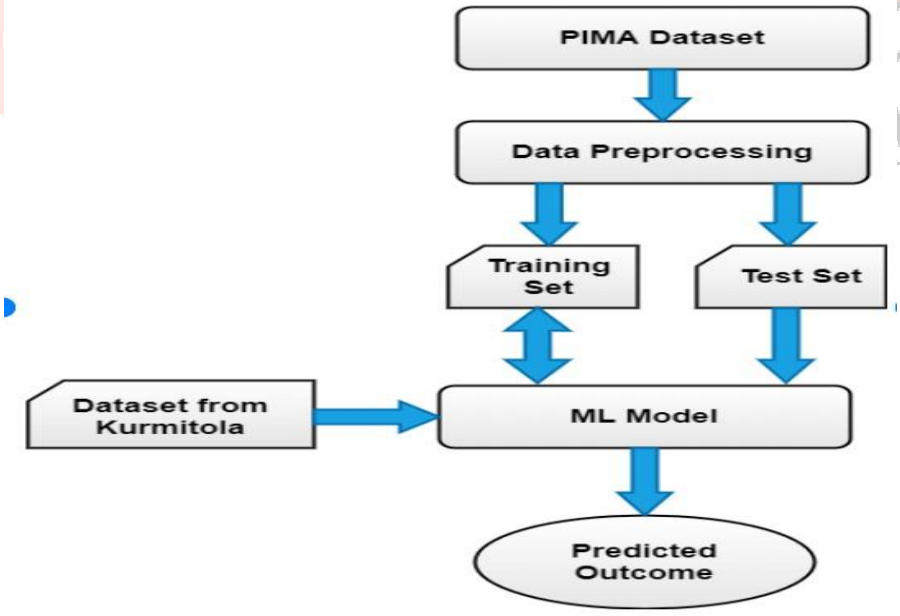

Figure-1: Flow Diagram

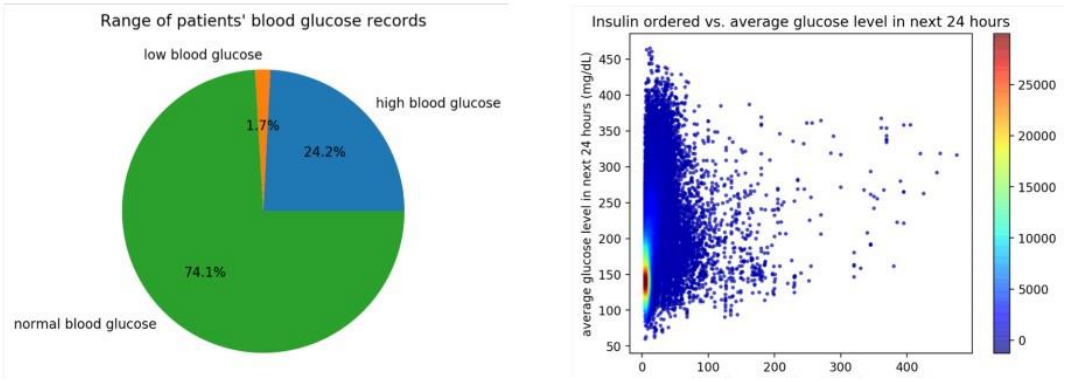

Figure2: Insulin ordered

As for the model development and analysis of the Diabetic patients, the data would be analyzed in different time intervals and age considerations. The time intervals chosen are day-wise, weekly.

IV. RESULT AND DISCUSSION

Machine learning Models for diagnosis of the diabetic patient and predicting insulin dosage

In this project we are using Gradient Boosting Classifier to predict diabetes and then using Logistic Regression algorithm to predict insulin dosage in diabetic detected patients. We use the PIMA diabetes dataset and the UCI insulin dose dataset to carry out this experiment. Gradient Boosting will predict the presence of diabetes and Logistic Regression will predict the amount of insulin to be administered if diabetes is detected by Gradient Boosting. We are training both methodologies using the aforementioned set of data, and once training has been completed, we will attach a test dataset without a class label.

Both dataset available inside Dataset folder and below screen is showing dataset details.

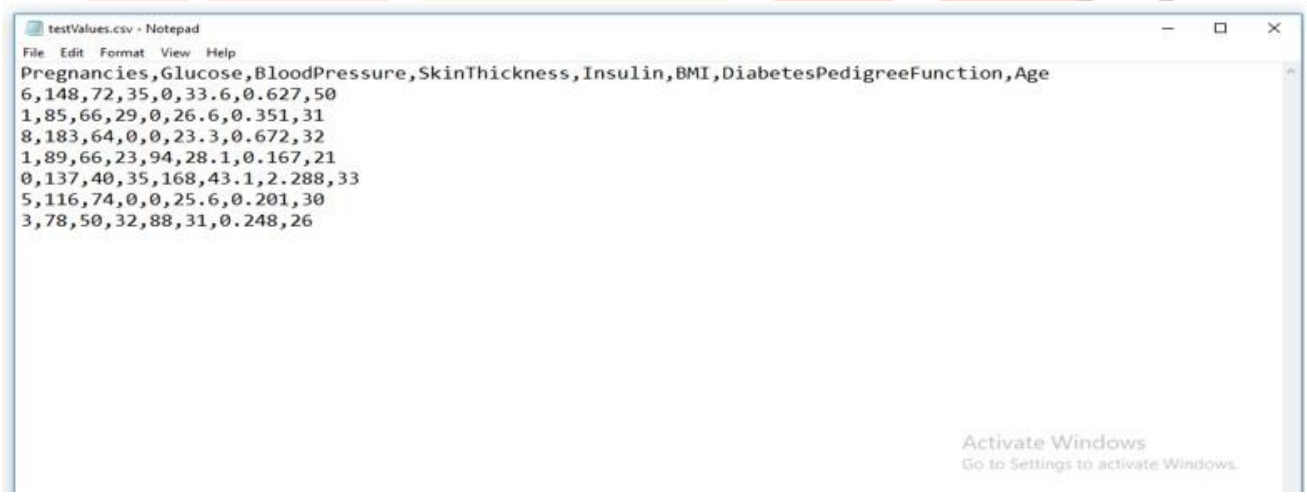

Figure3: Diabetic dataset

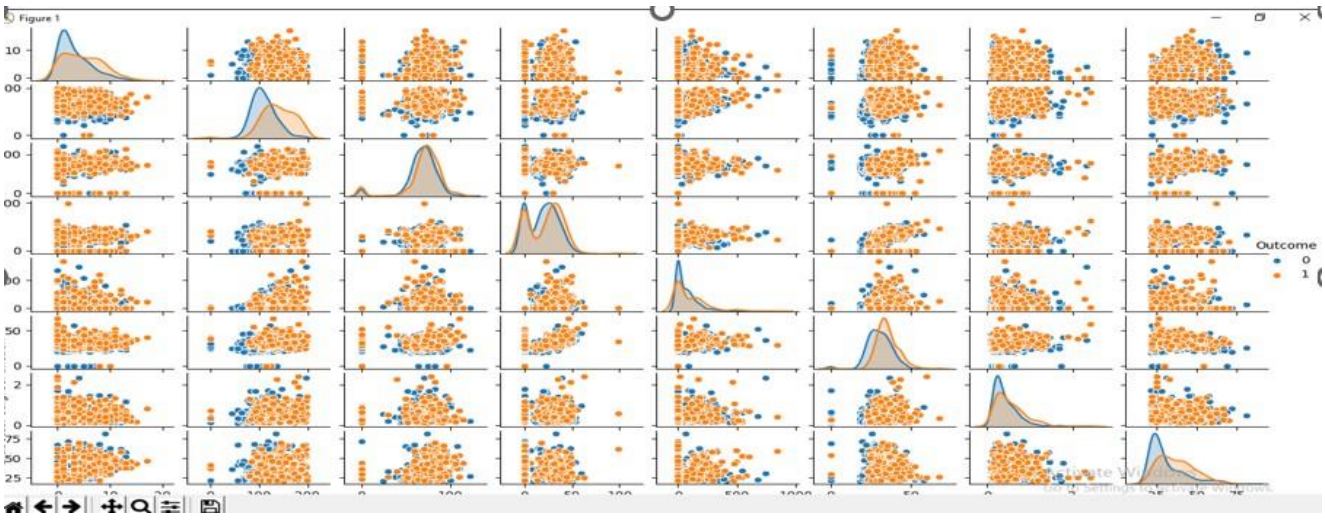

Figure4: Graph

This paper was aimed at modelling neural network for the prediction of amount of insulin dosage suitable for diabetic patients. A gradient boosting model that was developed with BP was applied. The model requires four pieces of patient-specific data: length, weight, blood sugar, and gender. 180 patients' data have been used in several investigations. We are using Gradient boosting to predict diabetes and then applying Logistic Regression Algorithm to predict insulin dosage if diabetes detected by Gradient boosting algorithm. The Gradient boosting model converged fast and gave results with high performance.

V. CONCLUSION

This paper was aimed at modelling neural network for the prediction of amount of insulin dosage suitable for diabetic patients. A gradient boosting algorithm that was trained with BP was applied. The model requires four pieces of patient-specific data: length, weight, blood sugar, & gender. 180 patients' data were utilized in several experiments. We are using Gradient boosting to predict diabetes and then applying Logistic Regression Algorithm to predict insulin dosage if diabetes detected by Gradient boosting algorithm. The Gradient boosting model converged fast and gave results with high performance.

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