ABSTRACT:

Diabetes Mellitus is among critical diseases and lots of people are suffering from this disease. Age, obesity, lack of exercise, hereditary diabetes, living style, bad diet, high blood pressure, etc. can cause Diabetes Mellitus. People having diabetes have high risk of diseases like heart disease, kidney disease, stroke, eye problem, nerve damage, etc. Current practice in hospital is to collect required information for diabetes diagnosis through various tests and appropriate treatment is provided based on diagnosis. Big Data Analytics plays an significant role in healthcare industries. Healthcare industries have large volume databases. Using big data analytics one can study huge datasets and find hidden information, hidden patterns to discover knowledge from the data and predict outcomes accordingly. In existing method, the classification and prediction accuracy is not so high. In this paper, we have proposed a diabetes prediction model for better classification of diabetes which includes few external factors responsible for diabetes along with regular factors like Glucose, BMI, Age, Insulin, etc. Classification accuracy is boosted with new dataset compared to existing dataset. Further with imposed a pipeline model for diabetes prediction intended towards improving the accuracy of classification.

1. INTRODUCTION

Healthcare sectors have large volume databases. Such databases may contain structured, semi-structured or unstructured data. Big data analytics is the process which analyses huge data sets and reveals hidden information, hidden patterns to discover knowledge from the given data. Considering the current scenario, in developing countries like India, Diabetic Mellitus (DM) has become a very severe disease. Diabetic Mellitus (DM) is classified as Non-Communicable Disease (NCB) and many people are suffering from it. Around 425 million people suffer from diabetes according to 2017 statistics. Approximately 2-5 million patients every year lose their lives due to diabetes. It is said that by 2045 this will rise to 629 million.[1] Diabetes Mellitus (DM) is classified asType-1 known as Insulin-Dependent Diabetes Mellitus (IDDM). Inability of human's body to generate sufficient insulin is the reason behind this type of DM and hence it is required to inject insulin to a patient. Type-2 also known as Non-Insulin-Dependent Diabetes Mellitus (NIDDM). This type of Diabetes is seen when body cells are not able to use insulin properly.Type-3 Gestational Diabetes, increase in blood sugar level in pregnant woman where diabetes is not detected earlier results in this type of diabetes. DM has long term complications associated with it. Also, there are high risks of various health problems for a diabetic person. A technique called, Predictive Analysis, incorporates a variety of machine learning algorithms, data mining techniques and statistical methods that uses current and past data to find knowledge and predict future events. By applying predictive analysis on healthcare data, significant decisions can be taken and predictions can be made. Predictive analytics can be done using machine learning and regression technique. Predictive analytics aims at diagnosing the disease with best possible accuracy, enhancing patient care, optimizing resources along with improving clinical

outcomes.[1] Machine learning is considered to be one of the most important artificial intelligence features supports development of computer systems having the ability to acquire knowledge from past experiences with no need of programming for every case. Machine learning is considered to be a dire need of today's situation in order to eliminate human efforts by supporting automation with minimum flaws. Existing method for diabetes detection is uses lab tests such as fasting blood glucose and oral glucose tolerance. However, this method is time consuming. This paper focuses on building predictive model using machine learning algorithms and data mining techniques for diabetes prediction. The paper is organized as followsSection II-gives literature review of the work done on diabetes prediction earlier and taxonomy of machine learning algorithms. Section III-presents motivation behind working on this topic. Section IV gives diabetes prediction proposed model is discussed. Section V gives results of experiment followed by Conclusion and References.

2. LITERATURE SURVEY

2.1 Predictive Analysis of Diabetic Patient Data Using Machine Learning and Hadoop

Authors: Gauri D. Kalyankar, Shivananda R. Poojara and Nagaraj

V. Dharwadkar

Abstract: Now days from health care industries large volume of data is generating. It is necessary to collect, store and process this data to discover knowledge from it and utilize it to take significant decisions. Diabetic Mellitus (DM) is from the Non Communicable Diseases (NCD), and lots of people are suffering from it. Now days, for developing countries such as India, DM has become a big health issue. The DM is one of the critical diseases which has long term complications associated with it and also follows with various health problems. With the help of technology, it is necessary to build a system that store and analyze the diabetic data and predict possible risks accordingly. Predictive analysis is a method that integrates various data mining techniques, machine learning algorithms and statistics that use current and past data sets to gain insight and predict future risks. In this work machine learning algorithm in Hadoop MapReduce environment are implemented for Pima Indian diabetes data set to find out missing values in it and to discover patterns from it. This work will be able to predict types of diabetes are widespread, related future risks and according to the risk level of patient the type of treatment can be provided.**=_b v2.2 Prediction of Diabetes Based on Personal Lifestyle Indicators**

Authors: Ayush Anand and Divya Shakti **Abstract:** Diabetes Mellitus or Diabetes has been portrayed as worse than Cancer and HIV (Human Immunodeficiency Virus). It develops when there are high blood sugar levels over a prolonged period. Recently, it has been quoted as a risk factor for developing Alzheimer, and a leading cause for blindness & kidney failure. Prevention of the disease is a hot topic for research in the healthcare community. Many techniques have been discovered to find the causes of diabetes and cure it. This research paper is a discussion on establishing a relationship between diabetes risk likely to be developed from a person's daily lifestyle activities such as his/her eating habits, sleeping habits, physical activity along with other indicators like BMI (Body Mass Index), waist circumference etc. Initially, a Chi-Squared Test of Independence was performed followed by application of the CART (Classification and Regression Trees) machine learning algorithm on the data and finally using Cross-Validation, the bias in the results was removed.

2.3 Predictive Analytics in Health Care Using Machine Learning Tools and Techniques

Authors: B. Nithya and Dr. V. Ilango

Abstract: When we have a huge data set on which we would like to perform predictive analysis or pattern recognition, machine learning is the way to go. Machine Learning (ML) is the fastest rising arena in computer science, and health informatics is of extreme challenge. The aim of Machine Learning is to develop algorithms which can learn and progress over time and can be used for predictions. Machine Learning practices are widely used in various fields and primarily health care industry has been benefitted a lot through machine learning prediction techniques. It offers a variety of alerting and risk

management decision support tools, targeted at improving patients' safety and healthcare quality. With the need to reduce healthcare costs and the movement towards personalized healthcare, the healthcare industry faces challenges in the essential areas like, electronic record management, data integration, and computer aided diagnoses and disease predictions. Machine Learning offers a wide range of tools, techniques, and frameworks to address these challenges. This paper depicts the study on various prediction techniques and tools for Machine Learning in practice. A glimpse on the applications of Machine Learning in various domains are also discussed here by highlighting on its prominence role in health care industry.

2.4 Diagnosis of Diabetes Using Classification Mining Techniques

Authors: Aiswarya Iyer, S. Jeyalatha and Ronak Sumbaly

Abstract: Diabetes has affected over 246 million people worldwide with a majority of them being women. According to the WHO report, by 2025 this number is expected to rise to over 380 million. The disease has been named the fifth deadliest disease in the United States with no imminent cure in sight. With the rise of information technology and its continued advent into the medical and healthcare sector, the cases of diabetes as well as their symptoms are well documented. This paper aims at finding solutions to diagnose the disease by analyzing the patterns found in the data through classification analysis by employing Decision Tree and Naïve Bayes algorithms. The research hopes to propose a quicker and more efficient technique of diagnosing the disease, leading to timely treatment of the patients.

3. SYSTEM ANALYSIS

3.1 EXISTING SYSTEM:

In existing method, the classification and prediction accuracy is not so high. Healthcare industries have large volume databases. Using big data analytics one can study huge datasets and find hidden information, hidden patterns to discover knowledge from the data and predict outcomes accordingly. Huge number of people is becoming its victim every day and many are unaware if they have it or not. There are two types of diabetes. Diabetes mellitus and diabetes. The test conducted to detect diabetes is physical examination and blood sugar test. More research is required to stop this disease. Machine learning and cloud computing will play a major role in the research related work to detect and timely cure it for the people. Diabetes specially affects the elderly and obese people. Diabetes can cause other variety of health problems like heart attack, kidney failure, high blood pressure and diabetic foot syndrome.

Disadvantages:

- In existing method, the classification and prediction accuracy is not so high.

3.2 PROPOSED SYSTEM:

Diabetes can be controlled if it is predicted earlier. To achieve this goal this project work we will do early prediction of Diabetes in a human body or a patient for a higher accuracy through applying, Various Machine Learning Techniques. Machine learning techniques Provide better result for prediction by constructing models from datasets collected from patients. In this work we will use Machine Learning Classification and ensemble techniques on a dataset

to predict diabetes. Which are Gradient Boosting (GB) and Logistic Regression Algorithms. The accuracy is different for every model when compared to other models. The Project work gives the accurate or higher accuracy model shows that the model is capable of predicting diabetes effectively. Our Result shows that Random Forest achieved higher accuracy compared to other machine learning techniques.

Advantages:

- Gradient Boosting will predict presence of diabetes and Logistic Regression will predict insulin dosage if diabetes detected by Gradient Boosting.

3.3 SYSTEM REQUIREMENTS:

HARDWARE REQUIREMENTS:

- System : Pentium IV 2.4 GHz.
- Hard Disk : 40 GB.
- Floppy Drive : 1.44 Mb.
- Monitor : 15 VGA Colour.
- Mouse : Logitech.
- Ram : 512 Mb.

SOFTWARE REQUIREMENTS:

- **Operating System:** Windows
- **Coding Language**: Python 3.7

3.4 SYSTEM STUDY

FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

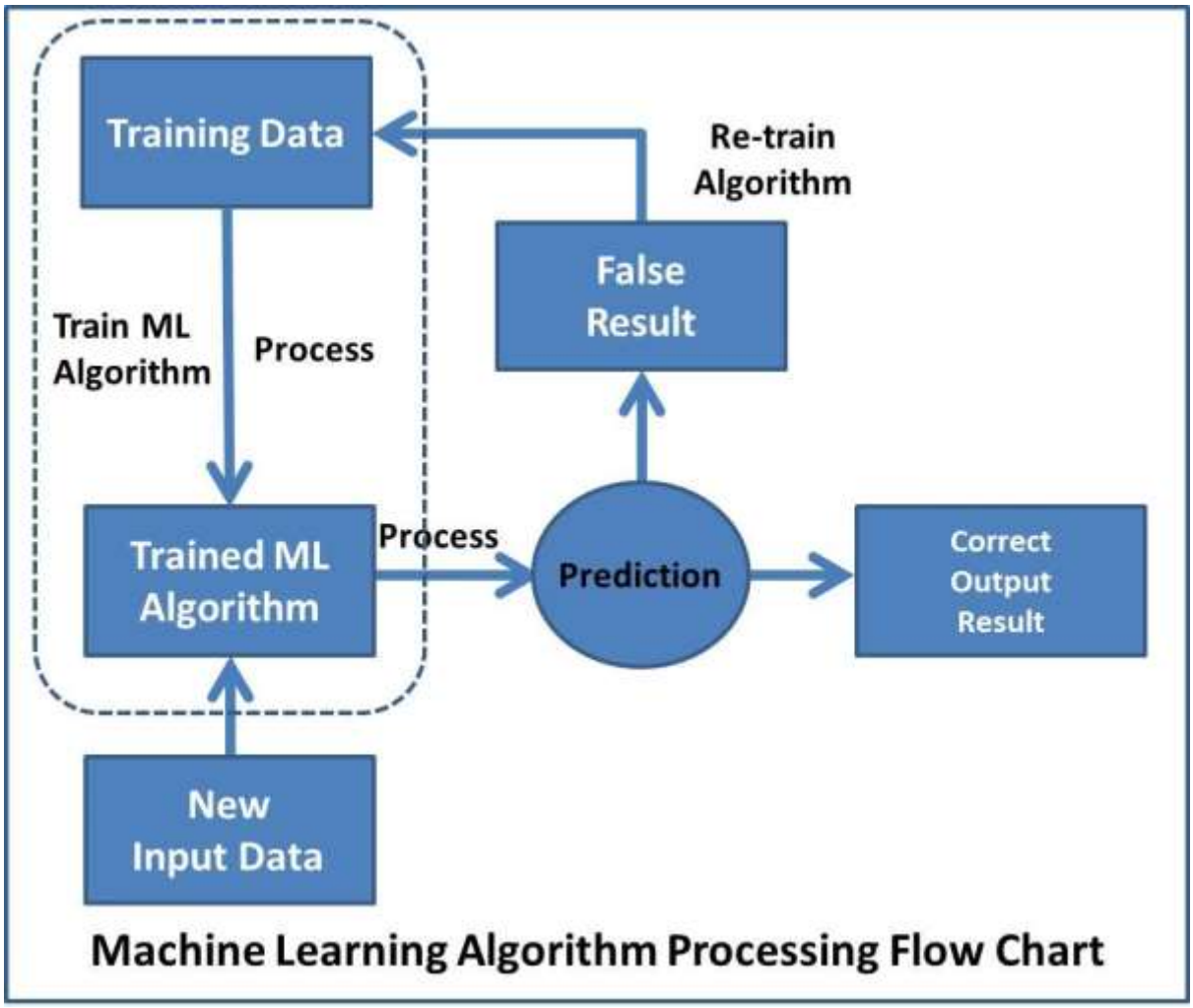
- ECONOMICAL FEASIBILITY
- TECHNICAL FEASIBILITY
- SOCIAL FEASIBILITY

ECONOMICAL FEASIBILITY

This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

4.SYSTEM DESIGN

4.1Architecture diagram



4.2DATA FLOW DIAGRAM:

1. The DFD is also called as bubble chart. It is a simple graphical formalism that can be used to represent a system in terms of input data to the system, various processing carried out on this data, and the output data is generated by this system.
2. The data flow diagram (DFD) is one of the most important modeling tools. It is used to model the system components. These components