Smart Health Care Implementation Using Naïve Bayes Algorithm

Harshitha M, Dr. B M Sagar

Abstract—**Heart disease and diabetes are two most commonly found chronic disease that has become a mainstream health issue with the current lifestyle. It is essential to identify the symptoms and treat the disease at early stages. Data mining practices are used in number of applications. It is an exercise of determining a large amount of pre-existing database to produce new information. In health care system data mining renders a vital role to predict the illness with the given symptoms and classify the disease as diabetes or heart disease. The major reason of data mining in health care system is to evolve a new automated tool for determining and diffusing pertinent health care information. Here, the system is fed with various attributes. According to those attributes, the system compares the given symptoms with the actual dataset and predicts the relevant disease based on the user input. In this system, Naïve Bayes algorithm and R tool have been used for prediction and visualization. The goal is to develop a cost-effective and easily accessible healthcare system that can benefit the medical practitioners to combat the prolonged procedures of diagnosis and faster retrieval of results.**

Keyword: **Data Mining, Heart disease, Diabetes, Symptoms, Naïve Bayes algorithm and R tool.**

I. INTRODUCTION

Data mining approaches has been one of the most powerful tools to deal with enormous volume of data [1]. In this fast-growing generation and new emerging technologies data becomes the most vital part of the digital world that can benefit people in various fields. Healthcare is one such discipline that gains crucial importance in every individual lives.

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Every year vast amount of data is generated from health sectors which could be essential when utilized in the right approach. There have been many ongoing researches to provide the most efficient and cost-effective healthcare system to the society. Nonetheless not all the research outcomes have reached the point in achieving the goal. When it comes to the aspect of health of the patient one must be more cautious that the generated system has the right impact towards the treatment of the disease. There may arise a question as to why need of computer assisted healthcare when there are several doctors present in the world? Well there are several reasons to justify this question. In many parts of the world there still exist the lack of physician to examine the concerned disease symptoms in the right approach and the cost of consultation is also increasing drastically. There are many such issues that need to be focused on improving the current system and aiming to deliver the most accurate results to the mankind. Health is the most crucial part of human beings to maintain a healthy society. In this fast-growing generation and rapid change in the lifestyle there have been many life-threatening diseases which may lead to terrible outcomes [9]. Heart disease and diabetes are the most commonly occurring disease under this category. These chronic diseases may occur in any individual irrespective of their age ranging from infants to senior citizens. It ends up basic for everybody to recognize the familiarity of illness in the beginning period and get appropriate prescription. Information mining assumes an imperative job in the medicinal services documented. Information acquisition is an assignment of examining the basic information and extracting important Information with the utilization of computers. Data mining is the technique of discovering and displaying huge volume of information. [2]It is utilized in knowledge detection and presenting it to the people in an effectively reasonable structure. The welfare insurance sectors gather enormous trials of medicinal services information which, sadly, are not "mined" to exhibit a strong decision-making ability [7]. Enforced information mining strategies can help cure this circumstance. Accurate mining approaches can help to combat these issues. Medical analysis is more complex work that requires efficient and accurate execution of the approach. Some of the unfortunate scenarios is that not every physician exhibits the area of expertise in their medical practices and there also exist lack of resource persons at many health organizations. Hence introducing automation into the field of medical diagnosis can be extremely beneficial to medical practitioners. It is feasible for the social insurance businesses to pick up preferred standpoint of

Data mining by utilizing equivalent to a wise suggestive device. It is conceivable to obtain learning and data concerning an infection from the patient explicit put away estimations to the extent medicinal information is concerned. In this way, information mining has formed into an area in human services [6]. It is conceivable to anticipate the productivity of therapeutic medications by structure the information mining applications. The health prediction framework utilizing information mining system naïve Bayes Outcomes prove that this method has a best quality in understanding the targets of the characterized mining objectives.[4] Utilizing medicinal profiles, for example, age, sex, pulse and glucose it can indicates the probability of patients getting a Heart illness or diabetes. It empowers huge information, for example designs, connections between restorative components identified with Heart illness, to be built up. Smart Health system is Web-based, easy to use, versatile, solid and expandable framework. Nonetheless improve the extent of the created framework the utilization of R tool has been integrated to picture the result in the most dependable structure.
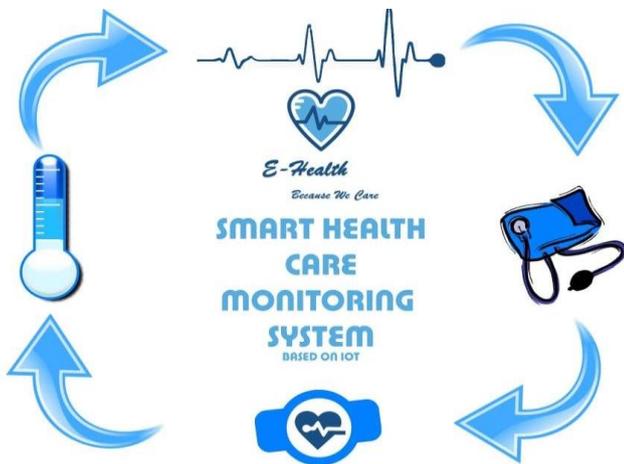
Fig.1: Smart Healthcare

II. RELATED WORK

Data mining has become popular in the field of healthcare organisation that has played a vital role in uncovering the new trends in health organisation. Data mining uses the already existing data from the database and alters it into new researches and results. Data mining uses database management, machine learning, artificial intelligence to evolve new patterns and the information linked through these designs. The main mission is to evolve information by automatic or semi-automatic means. Sujatha R et al., have proposed a review of data mining to forecast healthcare [3]. The study provided a summary of claims of data mining structure, managerial, economic, and medical health care scheme. To determine illness numerous tests are required to be carried out. By means of data mining techniques the rate of tests can be minimised. The decreased number of tests plays a major role in terms of time and performance. K. Gomathi, have developed a structure to estimate multiple disease by data mining

approaches [4]. The approach determines data mining methods that utilized to forecast various types of illness. The study revised various research papers that majorly focus on fore casting heart disease, diabetes and breast cancer. The paper compares j48, decision tree techniques. The result of data mining procedures is beneficiary to health care systems to group the patients with similar illness so that clinical organizations provide them effective treatment [6]. Data mining are cooperative in predicting the duration of stay of patients in health centre, for health analysis and developing an accurate data system [3]. Prashant Tiwari et al., have proposed a health care system which is an android app [5]. That permits the user to get immediate consultation for the concerned disease over a smart health maintenance application. The system is stored by several diseases of associated symptoms. The system permits the operator to share their disease signs and issues.

III. MOTIVATION

The heterogeneous, endless ailments like heart conditions and diabetes generally happen and are expanded among individuals. A large portion of the general population doesn't have a clear idea about the side effects of these illnesses and its ceaseless complications. Various information mining device are utilized to foresee the precision level in various social insurance issue, so we chose to actualize framework which will support to distinguish and anticipate the coronary illness and diabetes. To empower individuals experiencing different manifestations to guarantee the related sickness to their side effects and anticipate the appropriate malady, for example, coronary illness and diabetes in patients. The relationship between these maladies can be broke down dependent on the manifestations that identify with these infections.

IV. METHODOLOGY

The methodology is to implement a smart health care prediction system that make use of data mining technique which include Naïve Bayes algorithm, this procedure can be expressed as "Knowledge Discovery Process", this process includes the following steps:

A. Data Selection

Information are gathered from websites and the data valid to our persistence are sorted and stored.

B. Data Pre-processing

This approach is a part of data mining that comprises of altering raw data into a clear format [10]. Practical information is commonly partial, uneven, and/or missing in certain behaviours, and is expected to contain many errors.

C. Naïve Bayes Algorithm

Bayes' hypothesis transfers on the limited and fringe conceivable outcomes of two irregular occasions. Typically utilized to figure out the scenarios for the given insights. Suppose, a patient seems to have certain indications. Bayes' hypothesis can be employed to progress the likelihood that a proposed determination is right, assumed that perception. In exact terms, Bayes classifier receive the proximity of a specific element of a

class is inconsequential to the closeness of some other element. For instance, a product can be observed as an apple in the event that it is red in colour, round shaped. Despite the fact that these highlights rely upon the presence of different highlights, an innocent Bayes classifier considers these properties to freely add to the likelihood that this organic product is an apple. [8] Contingent upon the exact idea of the likelihood model, credulous Bayes classifiers can be prepared in all respects effectively in an administered picking up setting. Naive Bayes classifiers often process much better in complicated environment. Here independent aspects are considered with the end goal of expectation or event of the occasion.
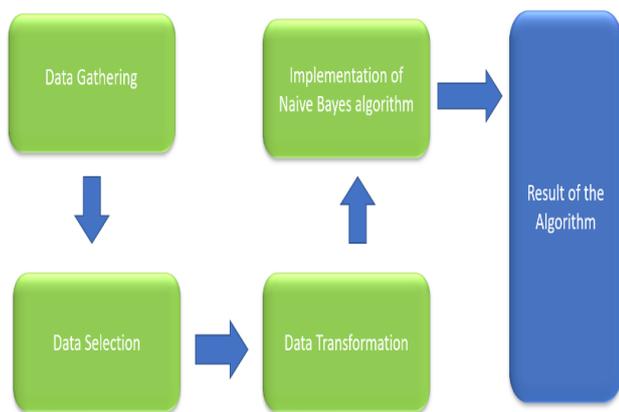
Fig. 2: System Architecture

V. RESULTS

The result of the analysis is to examine essential patterns to predict and classify whether the symptoms of the patient indicate as heart disease or diabetes or neither of these. The results are displayed using R shiny which is an open source package in R to provide most powerful web application framework. The following screenshots shows the predicted disease to the given attribute values.
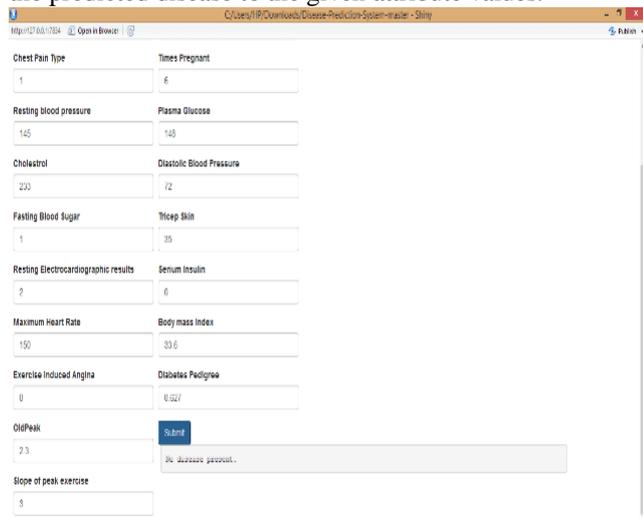
Fig. 3: A Screenshot showing no disease present

Figure 3 displays the output as no disease present as the given attribute values does not match the dataset values and it is considered as no heart disease or diabetes is present.
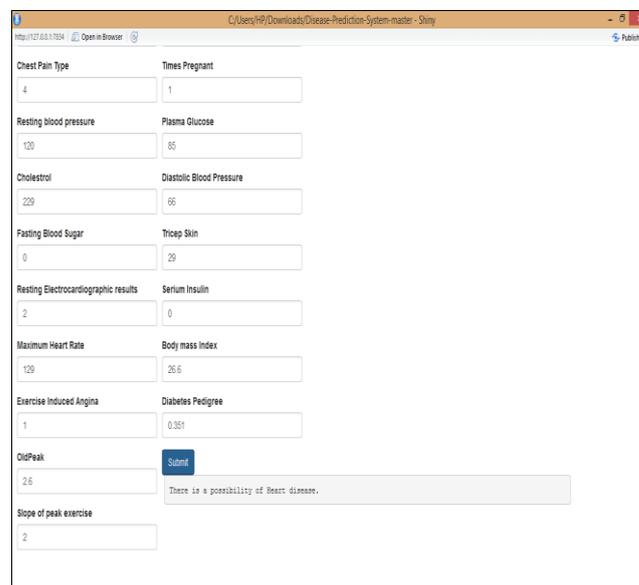
Fig. 4: A Screenshot showing possibility of Heart disease

Figure 4 is showing the possibility of heart disease as the given user input matches the suitable symptoms of heart disease from the dataset.
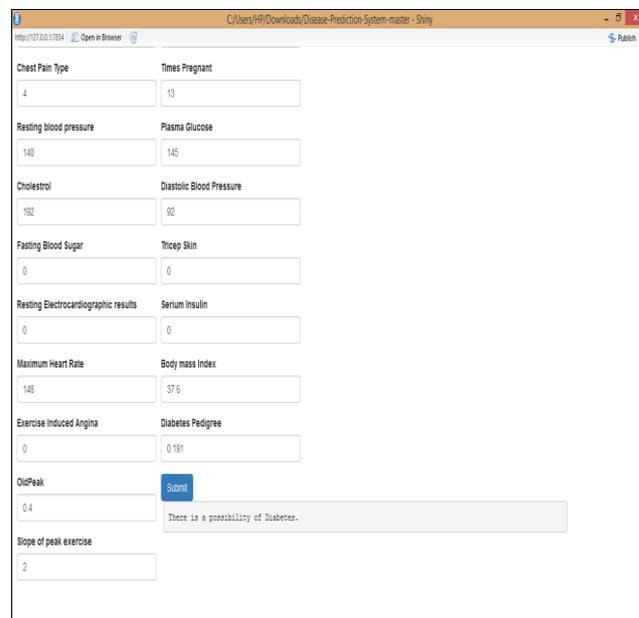
Fig. 5: A Screenshot showing the possibility of diabetes

Figure 5 is showing the possibility of diabetes as the given user input matches the suitable symptoms of diabetes from the dataset.

VI. CONCLUSION

Data mining has incredible inference for zone of medicinal field, and it express to far reaching process that desires intensive understanding of requirements in

clinical administrations. Information acquired with the application of strategies of data mining can be utilized to make productive choices which improvise the achievement of clinical association and wellbeing of the patients. Data mining requires suitable innovation and systematic strategies, just as frameworks for detailing and following which can empower estimating of results. The framework would definitely decrease the human exertion, diminish the expense and time imperative as far as HR and skill, and increment the analytic precision. The expectation of illnesses utilizing Data Mining applications is a difficult and dangerous undertaking as the information found are boisterous, unessential and huge as well. In this situation, information mining instruments prove to be useful in investigating of learning of the therapeutic information and it is very fascinating. The framework is observed to be effective to anticipate coronary illness or diabetes.

VII. REFERENCE

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