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Health Prediction Using Machine Learning

Shaili Sharma
Associate Software Engineer, Universal Softlab,

shailisharma0212@gmail.com

Abstract- "Smart Health Prediction Using Machine Learning," which is based on predictive modelling, predicts the illness of patients/users based on the symptoms that they supply as input to the system and then delivers a prediction of the condition. There are three different ways to log onto the application: user/patient login, doctor login, and admin login. The device analyses the symptoms provided by the user/patient as input and generates an output depending on the probability of the illness based on the prediction made through the algorithm used by the device. The Naive Bayes Classifier is used to make intelligent health predictions, and it is implemented in this way. The Naive Bayes Classifier calculates the illness % likelihood by taking into account all of the characteristics that have been learned during the training phase of the algorithm. Patients and users gain from an accurate interpretation of illness data since it allows for early disease prediction and a clear view of the condition for the user. Using the chat consultation window, the user/patient may consult with a specialized doctor after delivering the forecast. This method extracts new patterns from historical data by using machine learning algorithms and database management approaches. The accuracy of the forecast can be improved via a machine learning algorithm, and the user/patient will benefit from having quick and straightforward access to the app.

Keywords: - Predictive modeling, Naïve Bayes Classifier

I. INTRODUCTION

When some examples are used in conjunction with other instances, they may use machine learning to generate predictive models. A branch of artificial intelligence advocates the notion that computers can learn from data, recognize patterns, and make judgments with little or no human involvement. It is a programming procedure that utilizes sample data or previously acquired data to optimize outputs with high accuracy. It is also known as machine learning. The machine learning algorithm is divided into two stages: preparation and research. To anticipate the sickness, it is necessary to examine the user's or patient's signs and symptoms record. Machine Learning technology provides a robust application venue in the medical sector for addressing health illness prediction problems based on the user/patient experience, which is a growing area of interest. All indications and illnesses are tracked using machine learning, which we employ to keep track of everything. Machine learning technology assists prediction models in analysing data more quickly and producing valuable findings in a shorter amount of time. With the use of technology, the user/patient may make an educated choice on whether or not to visit a doctor about their specific symptoms, leading to enhanced patient health care. When dealing with a vast quantity of data, the Naive Bayes Classifier approach is used. We also highlighted how symptom data storage paired with data categorization may aid with the administrative, clinical, academic, and educational elements of Disease Prediction from Symptoms for each sub-field of Disease Prediction from Symptoms that we discussed. Several data-gathering concerns that might be explored in the context of health prediction are presented in this paper. [1-5]

II. PROJECT ANALYSIS

Objective: There are options available to help people anticipate their health in advance. However, a degree of risk for chronic illnesses has been discovered after extensive research on the subject matter. On the other hand, these approaches are not extensively employed for illness prediction in the general population. Smart health prediction aids in diagnosing different illnesses by analysing patient symptoms using a perfect fitting Machine Learning Algorithm approach, which is based on artificial intelligence.

Existing Method: The framework predicts chronic illnesses for a specific geographical region and demographic group. Disease Prediction is only applicable to particular illnesses. To predict illness risk, Big Data and the Convolutional Neural Networks Algorithm are employed in this technique. When dealing with S-type data, the method uses Machine Learning methods such as K-nearest neighbours and Decision Trees. For certain disorders, the system has an accuracy rating of 94.8 percent. In a recent study, we simplified machine learning techniques to predict effective chronic disease outbreaks in disease-prone populations to make them more accessible to researchers. We are currently evaluating new prediction models using real-world hospital data from specific regions/areas to improve accuracy. We propose a novel multimodal disease risk prediction method for Convolutional Neural Networks based on structured and unstructured patient/user data. We employ structured and unstructured patient/user data to develop our algorithm. [6-10].

Proposed Method: If someone is genuinely diagnosed with a sickness, they will need to see a doctor or a physician, which will be time-consuming and costly. It may also be difficult for the user to get in touch with physicians and hospitals, making it impossible to discover the sickness. Because of the treatment mentioned above can be completed using an electronic software program that saves time and costs, it may be preferable for the patient if the process is completed efficiently. A smart health prediction is a web-based tool that predicts a user's sickness based on the symptoms that the user/patient is experiencing at the time of the prediction. The data sets for the Smart Health Prediction Framework were gathered from various health-related websites and combined. Based on the symptoms displayed in the web application, the customer will be able to determine the possibility of a disease developing in their body. This project aims to create a web-based platform that can anticipate illness episodes based on various symptom data points collected over time. Users may pick from multiple symptoms and locate illnesses and ailments that have probability estimates attached to them.

Table.1 Efficiency Comparison

Diseases	NB	LR	K*	DT
Breast Cancer Wise	96.25	93.45	96.48	97.18
Breast Cancer	75.36	69.48	74.36	77.83
Dermatomegaly	98.36	97.59	97.25	98.13
Echo Chambers	95.61	95.69	95.98	96.10
Liveries	57.12	69.48	71.29	72.39
Pimaricin Diabetes	73.89	75.98	76.27	77.19
Hematidrosis	72.39	85.65	79.45	81.34
Heart-statlog	83.69	85.69	74.56	81.59
Heart-b	85.74	84.58	78.85	81.29
Hepatitis	82.98	84.25	80.25	79.85
Lung Cancer	54.28	49.85	45.69	41.08
Lymph's	86.94	79.25	84.29	79.68
Osteoporosis	69.38	63.84	65.89	72.36
Tumor	51.84	43.65	39.71	43.58

NB – Naïve Bayes, LR – Linear Regression, K*- Kth Nearest&DT – Decision Tree

We developed a generic technique of illness prediction that was based on a machine learning algorithm. For the identification of patient data, we employed Naive Bayes algorithms since medical data is growing at an exponential pace, necessitating the processing of existing data in order to forecast the specific condition based on symptoms. We were able to get accurate general illness risk prediction as output by using a patient record as an input. This allowed us to grasp better the extent to which disease risk prediction might be predicted. It is possible to anticipate diseases and risks using this technology in a short amount of time and at a cheap cost, allowing for faster illness detection and risk reduction. Figure 1 shows a comparison of the results of the Naive Bayes algorithm and the effects of other algorithms. The accuracy of the Naive Bayes

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algorithm is greater than the accuracy of the different algorithms.

III. ALGORITHM AND ARCHITECTURE

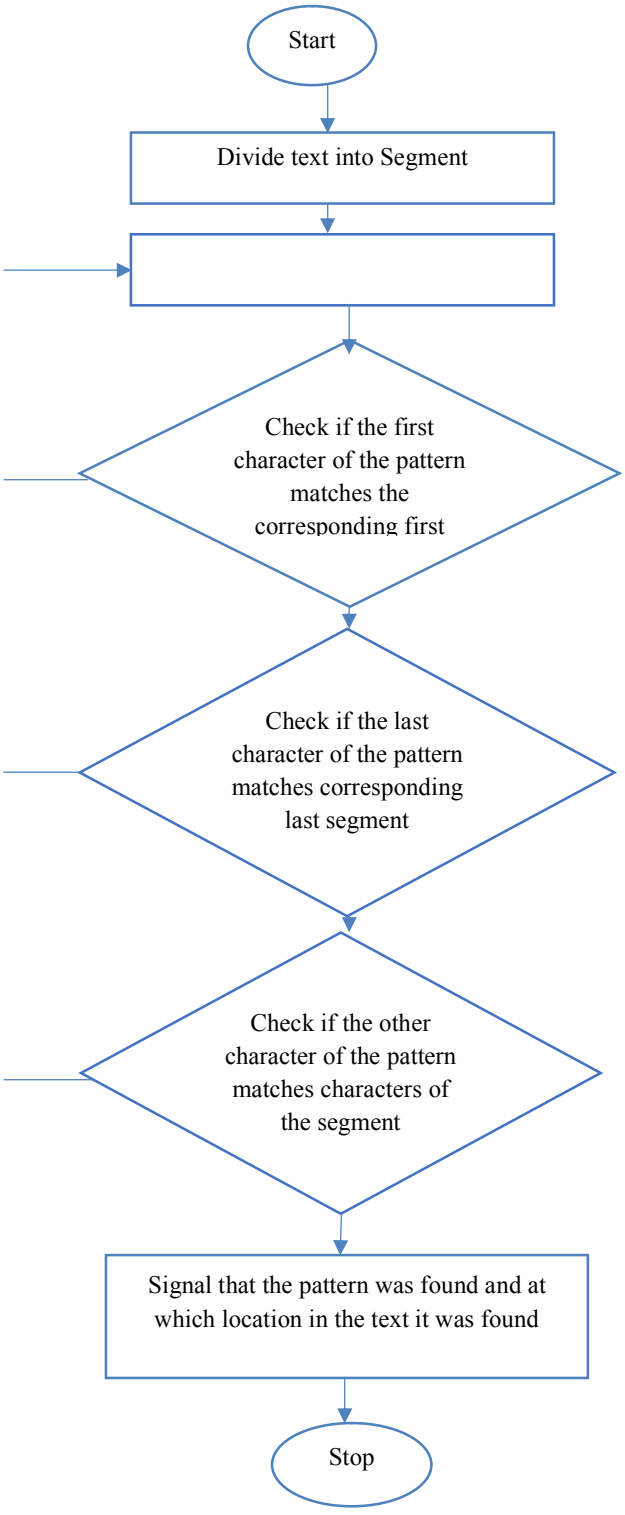

Fig. 1 Flow diagram of proposed model.

1. Naïve Bayes Algorithm: When it comes to constructing models for assigning class labels to issue cases, the Naive Bayes algorithm offers a straightforward and dynamic way for discovering a mapping from problem instance to object. The labels for the classes are picked from a limited number of options. It is a collection of algorithms based on a general idea rather than a single method in particular. According to this concept, the value of each function of all Naive Bayes Classifiers is independent of the value of the values of the other features in the classification process. Fruit may be called an orange, for example, if it is orange in color, round, and around 10cm-15cm in circumference. In addition, the Naive Bayes algorithm considers each attribute to identify whether the fruit is an orange or not.

Despite the fact that there is an infinite number of probability models, the Naive Bayes method performs the best in supervised learning models for certain of them.

2. Architecture One of the objectives of this project is to develop a web-based application forum for the prediction of illness presentations in response to a variety of symptoms and conditions. The user will choose various symptoms, and the gathered collection of datasets will identify illnesses with their probabilistic data based on those symptoms.

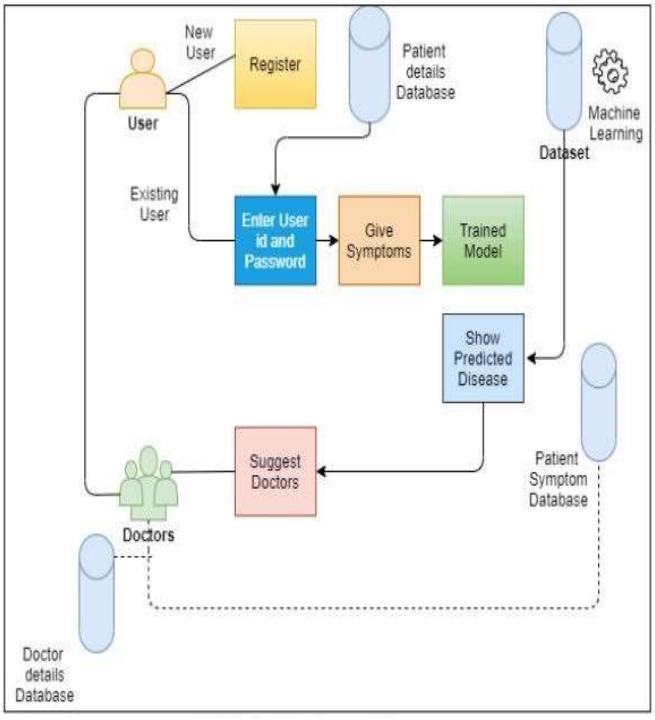

Fig.2: Application Architecture

VI. CONCLUSION

Clinical symptom-associated information may be gathered from historical knowledge in the proposed technique by organizing datasets using the Nave Bayes algorithm, a kind of Bayesian inference. Achieving smart health will only be possible if the system reacts in this manner. These datasets will be compared to the incoming queries, and an Association Rule Mining report will be created as a result of the comparison. The fact that this new solution will be based on actual historical data means that it will deliver accurate and rapid findings, allowing patients to get an emergency diagnosis as soon as possible. Web-based applications, such as the ability to send a doctor remotely for a chat session, are often made available to patients so that they may communicate directly with clinicians. Thus, in the genuine sense, this online system will be predictable and deliver high accuracy while maintaining fairness and consistency.

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