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Smart Health Prediction Using Machine Learning

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Abstract

The "Smart Health Prediction Using Machine Learning" system, based on predictive modelling, predicts the disease of patients/users on the basis of the symptoms that the user provides symptoms as an input to the system. The application has three login options: user/patient login, doctor login, and admin login. The device analyses the symptoms given by the user/patient as input and provides the likelihood of the disease as output based on the prediction using the algorithm. Smart health predictions are made by the implementation of the Naïve Bayes Classifier. The Naïve Bayes Classifier measures the disease percentage probability by considering all its features that is trained during the training phase. Exact interpretation of disease data benefits early patient/user disease prediction and provides clear vision about the disease to the user. After a prediction, the user/patient can consult a specialist doctor using a chat consulting window. It uses machine learning algorithms and database management techniques to extract new patterns from historical data. The Forecast Accuracy can improve with the use of a machine learning algorithm and the user/patient will get fast and easy access to the application.

Keywords: Predictive modelling, Naïve Bayes Classifier

1. Introduction

Machine learning is a generative method of producing predictive modelling using certain instances. It's an AI branch that promotes the idea that machines can learn from data, recognise patterns, and make decisions with minimal human intervention. Machine learning is a programming algorithm that uses sample data or previously collected data to optimise results with high accuracy. There are two stages of the machine learning algorithm: preparation and research. The signs and symptom logs of the user/patient are used to predict the illness. Machine Learning technology offers a strong application forum in the medical sector to address health disease prediction concerns based on the user/patient experience. We

use machine learning to keep track of all signs and diseases. Machine learning technology helps predictive models to rapidly analyse data and produce meaningful results more quickly. With the aid of technology, the user/patient may make an informed decision to see a doctor about their particular symptoms, resulting in improved patient health services. The Naïve Bayes Classifier technique is used to analyse a large amount of data obtained. For each sub-field of Disease Predictions, we also demonstrated how symptom data storage combined with data classification can assist the administrative, clinical, academic and educational aspects of Disease Prediction from Symptoms. There are a host of data collection

issues that can be discussed in terms of health prediction.[1-5]

2. Project Analysis

2.1. Objective

There is some sort of resources available to predict smart health. However, chronic diseases have been studied in particular and a level of risk has been identified. However, these methods are not widely used for disease prediction in general disease. Smart health prediction helps in the diagnosis of multiple diseases by analysing patient symptoms using a perfect fitting Machine Learning Algorithm technique.

2.2. Existing Method

The framework predicts chronic diseases for a specific area and population. Disease Prediction is for specific diseases only. In this method, Big Data and Convolutionary Neural Networks Algorithm are used to predict disease risk. The method uses Machine Learning algorithms for S-type data, such as K-nearest neighbours and Decision Tree. The machine has an accuracy value of 94.8 percent for some diseases. In the previous paper, we simplified machine learning algorithms to predict effective chronic disease outbreaks in disease-prone populations. We are testing updated prediction models using real-world hospital data from certain

specific regions/area's. Using structured and unstructured patient/user data, we suggest a new multimodal disease risk prediction algorithm for Convolutionary Neural Networks.[6-10].

2.3. Proposed Method

If someone is actually diagnosed with some sort of disease, they need to see a doctor/physician which is both time consuming and expensive too. It can also be difficult for the user to reach of doctors and hospitals so, the disease cannot be detected. Because, if the above procedure can be done with electronic software application that saves time and resources, it could be better for the patient to do the process runs smoothly. Smart health prediction is a web-based programme that predicts a user's illness based on their symptoms that the user/patient can feel. Data sets for the Smart Health Prediction Framework have been compiled from various health-related websites. The consumer will be able to assess the likelihood of a disease on the basis of the symptoms presented in the web-application. The aim of this project is to create a web platform that can predict disease events based on a range of symptoms. Users can choose from a range of symptoms and find diseases with probabilistic estimates and conditions.

Table.1 Efficiency Comparison

Diseases	NB	LR	K*	DT
Breast Cancer wise	97.30	92.90	95.70	94.50
Breast Cancer	72.70	67.70	73.70	74.20
Dermatomegaly	97.40	96.80	94.50	94.10
Echo Chambers	95.70	94.50	89.30	96.40
Liveries	54.80	68.70	66.80	65.80
Pimaricin Diabetes	75.70	77.40	70.10	74.40
Haematidroses	75.30	74.40	73.70	72.10
Heart-c	83.30	83.70	75.10	77.10
Heart-statlog	84.80	84.00	73.80	75.50
Heart-b	83.90	84.20	77.80	80.20
Hepatitis	83.80	83.80	80.10	79.20
Lung Cancer	53.20	47.20	41.60	40.80
Lymphs	84.90	78.40	83.10	78.20
Postooerasis	68.10	61.10	61.60	69.70
Tumor	49.70	41.60	38.00	41.30
Success Ratio	8\15	5\15	0\15	2\15

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

Focused on a machine learning algorithm, we proposed a general method of disease prediction. We used Naïve Bayes algorithms to identify patient data because medical data are increasing at an exponential rate, requiring the processing of existing data in order to predict exact disease based on symptoms. By having the input as a patient record, we were able to get accurate general disease risk prediction as an output that helped us understand the degree of disease risk prediction. Because of this method, disease prediction and risk prediction could be achieved over a short period of time and at a low cost. In terms of accuracy and time, the results of Naïve Bayes and other algorithms are compared, and the accuracy of the Naïve Bayes algorithm is higher

than the other algorithms mentioned in Figure1.

3. Algorithm and Architecture

3.1. Naïve Bayes Algorithm

The Naïve Bayes algorithm is a simple dynamic method for creating models for assigning class labels to problem instances to find a mapping to object. Class labels are chosen from a finite set of choices. It is a family of algorithms based on a general principle, not a particular algorithm. According to this principle, the value of each function of all Naive Bayes Classifiers is independent of the value of other features. For example, if the fruit is orange, round, and around 10cm-15cm in diameter, we might call it an orange. The Naïve Bayes algorithm also takes into account each feature to determine if the fruit is an orange.

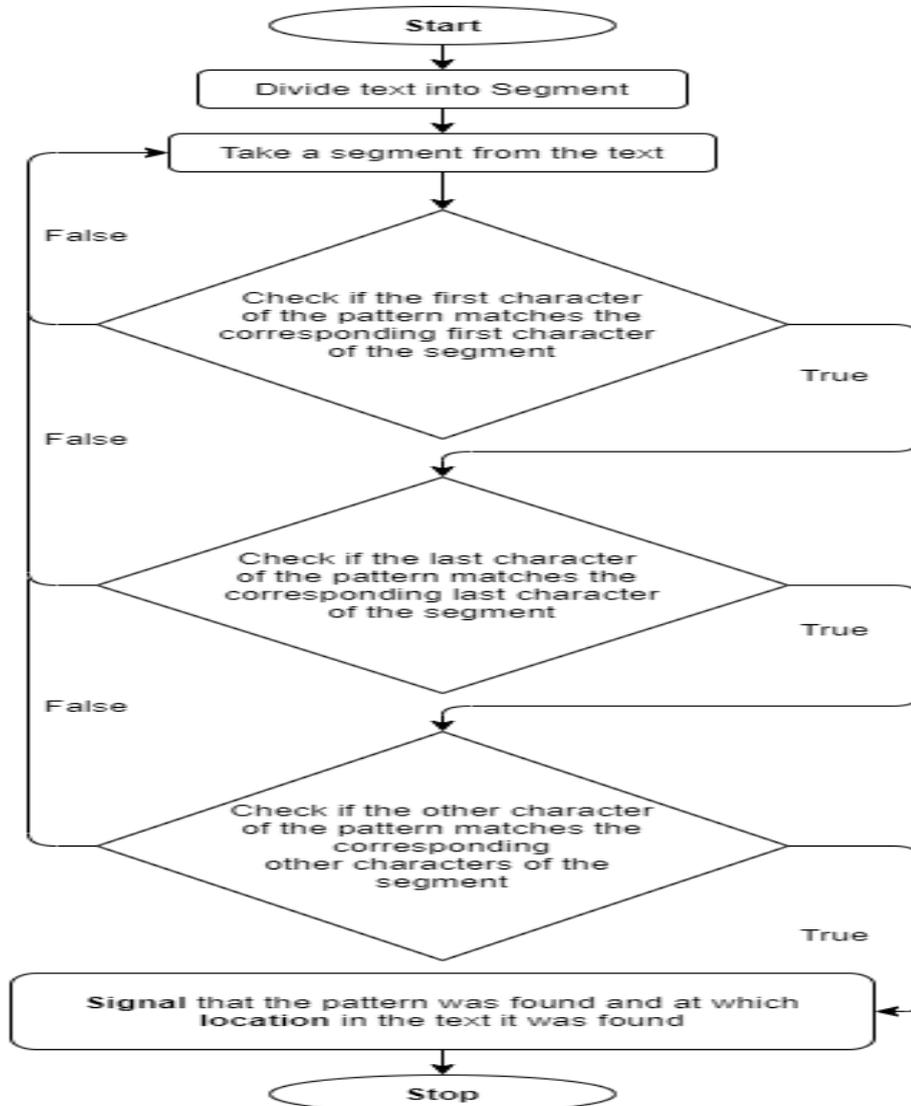


Fig.1: Algorithm Flow Diagram

There are a n-variety of probability models, but for some of them, the Naïve Bayes algorithm performs best in supervised learning model.

3.2. Architecture

The goal of this project is to produce a web application forum for predicting disease manifestations on the basis of different

symptoms and conditions. The user will pick different symptoms and find the diseases with their probabilistic data from the collected set of datasets.

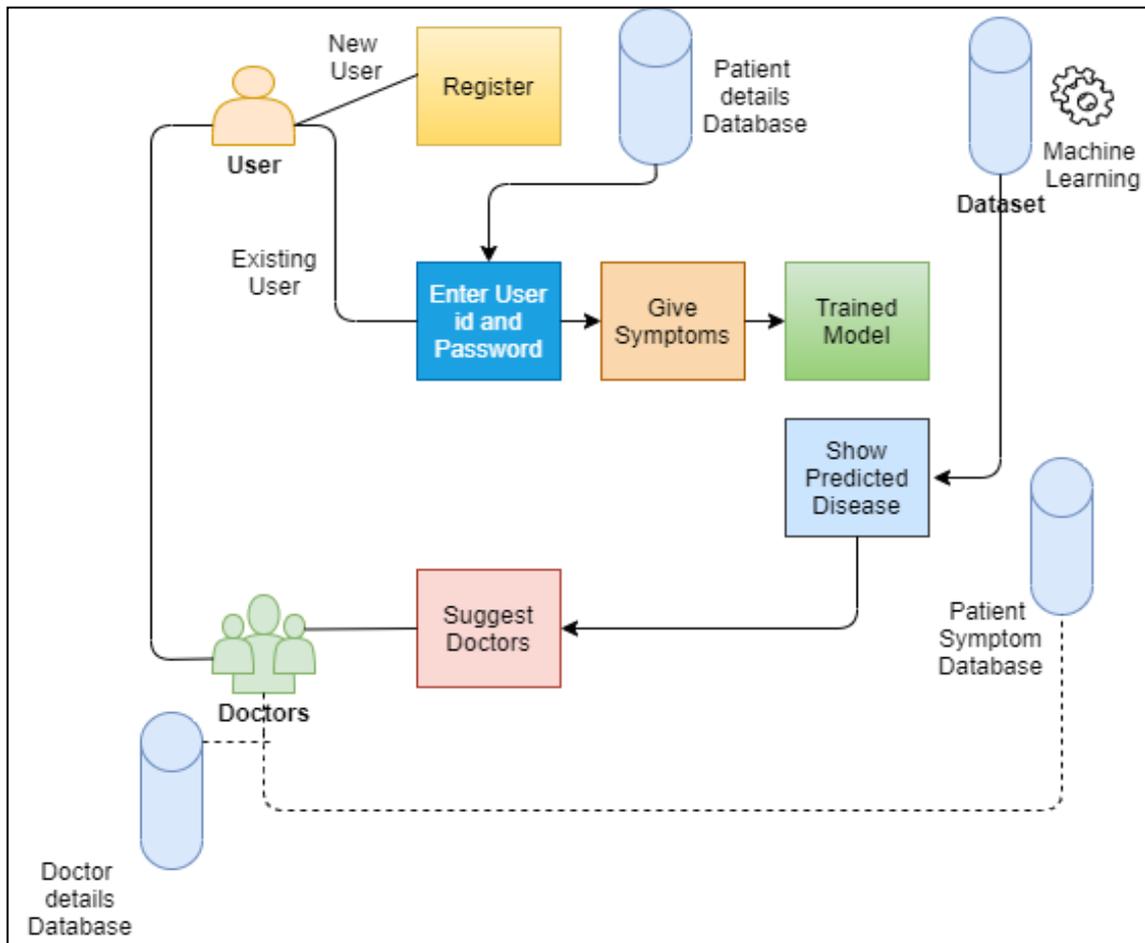


Fig.2: Application Architecture

Conclusion

Required clinical symptom related information can be obtained from historical knowledge in the suggested methodology by planning datasets using the Naïve Bayes algorithm. Smart health can only be achieved if the system responds in this way. These datasets will be compared with the incoming queries and an Association Rule Mining Report will be generated. Given that this new solution will be based on real historical data, it would provide accurate and prompt results that would allow patients to get an urgent diagnosis. Web-Application such as sending a doctor remotely for a chat session are often provided so that patients can speak directly with physicians. As a result, in the true sense, this web system will be predictable

and also produce high accuracy with fairness.

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