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GUI For Acute and Chronic Disease Prediction Based on Symptoms Using ML

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Abstract –

In the context of community health and well-being, accurate forecasting plays a key role in determining patient risk. Globally, chronic diseases are a serious problem in the health care sector. According to a medical statement, due to chronic diseases, the mortality rate is rising. People feel unwilling to go to the doctor or have minor symptoms and refuse to go to the doctor. In many cases, however, this slight level of symptoms may pose a significant health risk. As health system is totally going online so the health advice is easily accessible, it would be a best help for users. Therefore, Current health care systems suffering from a lack of dependability and accuracy of the system for predicting chronic diseases.

This program analyses the symptoms the user gives as a result and output would be given disease as a result. This Prediction make by using the Naïve Bayes Classifier Algorithm. In this project, we use a machine-learning algorithm to determine the level of disease by assigning inputs as symptoms.

In the domain of health care forecasting plays a important role in determining the risk of disease in the patient. There is only way to control death is through incurable diseases. diseases are predictable so disease prevention can be done.

Keywords – Chronic and acute Diseases, Machine Learning model, Diseases Prediction System, Naïve Bayes Algorithm

INTRODUCTION

Chronic disease is a very serious problem in health care worldwide and therefore, predicting disease is the easiest task. This project analyses chronic type of diseases using machine learning strategies based on acute and chronic databases. There is a classical diagnostic procedure that is a procedure in which a patient should visit a hospital, undergo various medical tests, and then come to a final result. So, this procedure takes more time. For saving time for the starting diagnostic procedure, we need a chronic disease prediction system that diagnoses the disease by analyzing the threats, this project proposes an automated disease recognition system based on user input.The program takes 5 inputs from the user as a symptoms and gives list of possible diseases. Machine learning (ML) has thus been shown to be effective in supporting decision making and predicting from large amounts of data generated by the healthcare industry. We make good use of machine learning algorithms to successfully predict outbreaks of chronic diseases. Various studies provide only a glimpse into the prediction of ML strategies. There are novel approaches that aim to gain valuable features through machine learning techniques such as the KNN Algorithm, Decision Trees, Logistic Regression, and Naive Bayes (NB) which lead to improved disease prediction. More algorithms are developed to enhance the accuracy of the learning process. So whatever data we have It checks available databases. The prediction model is presented with different combinations of known features and different methods of differentiation.

I. LITERATURE REVIEW

Our application will predict the disease in which gives symptoms as input. Naive Bayesian algorithm will predict the disease. According to our survey, this algorithm proposes high accuracy for the large datasets. The datasets (Set of Information) containing diseases such as labels for each and every disease in which symptoms are given. 75% of the database will be used as training and 25% will be used for data training. So both Training and testing will be done in the database which we have collected and from them we will get desired output as a result.

II. METHODOLOGY/EXPERIMENTAL

As we discussed earlier there are various learning algorithms for predicting chronic diseases such as the as the KNN Algorithm, Decision Trees, Logistic Regression, and Naive Bayes (NB) but in this project, we use Naïve Bayes Algorithm predicts diseases.

- **Naive Bayes (NB)Algorithm:**

The Naïve Bayes (NB) algorithm is a supervised Machine learning algorithm, based on the sight of the Bayes. It is used for all types of solving the division problems. The Naïve Bayes (NB) Classifier is one of the easiest and most accurate classification algorithms that helps to develop fast ML models that can do efficient and fast predictions. It is a system of feasible classification, which can predicts based on the possibilities of an entity.

- **Bayesian Theorem –**

The main aim of the Bayesian theorem is to analyses the class label i.e., disease in our specific tuple project.

Let X be the text containing the symptoms and has a particular concept, such as a tuple of data X (symptoms) belong to a specified category C (disease)

For segmentation problems, we look at the probability that tuple X belongs to category C, as we know the meaning of the X attribute. Conditional opportunities can be calculated using combined opportunities, although they cannot be ruled out.

The method of calculating the Bayes Theorem is as follows:

$$P(A|B) = P(B|A) * P(A) / P(B)$$

P(A) = Probability of A for X. In which X is a Symptom

P(B) = Probability of B for Y. In which Y is a Disease.

- **Datasets used –**

The Collection of information was taken from a study organized at Colombia University. It contains 160 diseases and each disease contains an average of 9-11 symptoms. 75% of the data utilised for training and 25% will be used for tests performed taking into account all of the

included inputs. Existing symptoms of co- morbidity were marked as 1 and remained as 0.

- **GUI used –**
  a. GUI we used in this project is Tkinter Package which is present in python
  b. Tkinter (Package) is a standard python GUI library.
  c. So, integration with Tkinter, it produces and allows fast and easy path to build GUI application.
  d. Tkinter gives a significant User interface to the Tkinter GUI tool kit.
  e. Tkinter gives a significant oriented interface to the Tkinter GUI tool.
- **Requirements –**
  1. Python Language
  2. Any Python IDE/ Interpreter
- **Modules/Packages to import –**
  1. Tkinter
  2. Scikit library
  3. Multinomial NB
  4. NumPy
  5. Pandas
- **Working of the Project –**
  1. This program accepts 5 inputs from the user and it predicts most significant the disease.
  2. This is done by with the help of a database which we have used in project and a ML algorithm.
  3. The algorithm here says Naive Bayes (NB) which works in a possible way.
  4. We have use Scikit Library for classification predictive analytics. we also used multinomial NB as it takes many types of signals.
  5. Contains many drop options where we have achieved a list of symbols.
  6. The user can select any of the five symptoms and by clicking the button disease will appears as a output in text box
- **Block Diagram –**

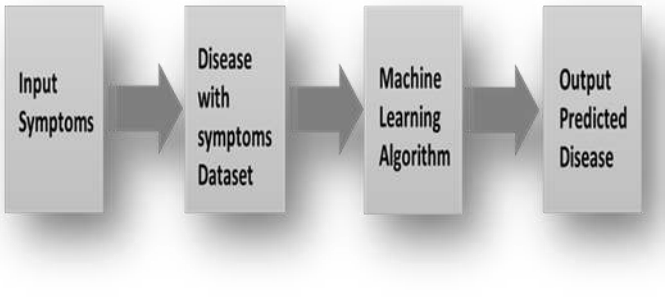
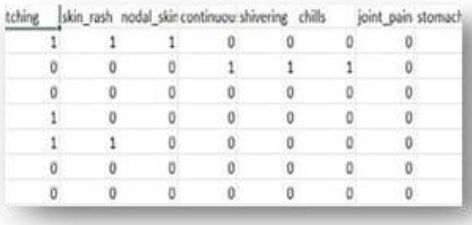


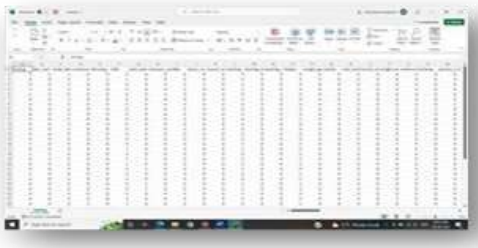
Fig.2.1 Block Diagram of Project

RESULTS AND DISCUSSIONS

- Dataset of this project is taken from study conducted at Columbia University as well as some of them added from different data sources.



tching	skin_rash	nodal_skin	continuou	shivering	chills	joint_pain	stomach
1	1	1	0	0	0	0	
0	0	0	1	1	1	0	
0	0	0	0	0	0	0	
1	0	0	0	0	0	0	
1	1	0	0	0	0	0	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	



- System takes Symptoms from user as a Input. There are 5 options where we have pass a list of symptoms.

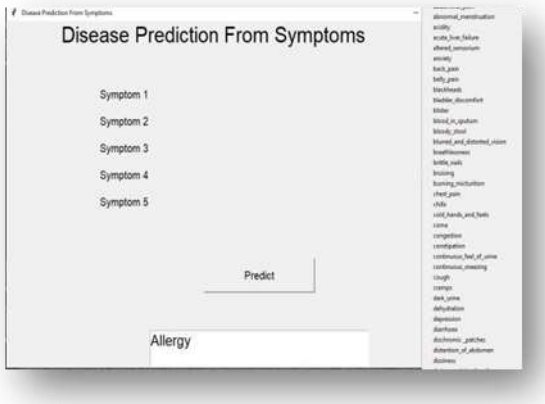


Fig.3.2 Symptoms as an Input

- The user can select maximum five or minimum two symptoms and by clicking the predict button option whatever disease will be predict by system that displays in the text box.

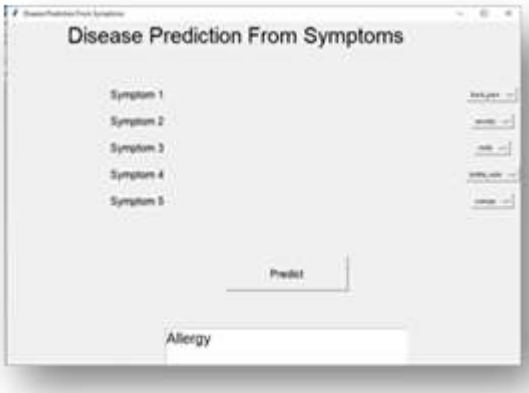


Fig.3.3 Final Output

LIMITATIONS

The main limitation is that this project totally depends upon Dataset that we taken so if there is less data regarding diseases and symptoms so system will not give accurate results also if user choose only 1 or 2 symptoms then results given by model will not be accurate as expected. So Less accuracy will be achieved when a single mark is inserted so if there is an Extra number of symbols, the accuracy is greater. We use only Naïve Bayes Algorithm for predicting Acute and Chronic disease which is biggest limitation for this project. We can use KNN algorithm, Decision Trees, Logistic Regression, Random Forest etc then comparing data that predictions done by these algorithms which will make very accurate disease predictor.

FUTURE SCOPE

As innovations proliferate to open a new door to decisions support decisions in medical care. These models emphasize patient care, accurate diagnosis, and appropriate treatment as well as helping to reduce medical costs.

In this paper, we discuss different Machine learning techniques and their accuracy that other researchers used to diagnose chronic diseases. With the help of such a predictive model, it is possible to diagnose people with the diseases based on their symptoms. In the future, various AI techniques such as in-depth learning, as well as computer comprehension may play an important role in analysing critical and chronic diseases. Various medical reports such as MRIscans, X-rays, etc. can be used as a database for better accuracy.

CONCLUSION

The project is designed so that the system can take the symptoms to the user as input and produce an output that is, predict the disease. The user can select at least one too many symptoms. Doing this project and you will learn a lot of important concepts in machine learning. Also, in these we see different type of Machine learning as well as python libraries for enhancing user's experience. Also going through different models, we can see accuracy and precision of different models like features by applying machine learning techniques such as KNN Algorithm, Decision Trees, Logistic Regression, Random Forest and Naive Bayes (NB). In which we found Naïve Bayes Algorithm accurate than these algorithms and it is easy to implement.

Comparison of these algorithms on the basis of efficiency depends largely on the type of data used. This paper summarizes the details of the most commonly used strategies for predicting a serious and chronic disease using Machine Learning. This will help researchers to select the most suitable algorithm for their specific needs.

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