Monitoring of Healthcare Management System Using Proper Diet and Diagnosis

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Abstract

Nowadays, health diseases are increasing day by day due to life style, hereditary. Especially, chronic diseases have become more common these days .i.e. life of people is at risk. This paper gives the survey about different classification techniques used for predicting the probable disease of the person based on symptoms entered by the user. Accuracy of the system is high when using more number of attributes. Classifying data is one of the most common tasks in Machine learning. Machine learning provides one of the main features for extracting knowledge from large databases from enterprises operational databases. Machine Learning in Medical Health Care is an emerging field of very high importance for providing prognosis and a deeper understanding of medical data. Most machine learning methods depend on a set of features that define the behavior of the learning algorithm and directly or indirectly influence the performance as well as the complexity of resulting models.

Keywords: Naïve Bayes, Decision Tree, Machine Learning, Databases, Prognosis, Medical Data.

Introduction

There has been an increase in the number of patients with various diseases every year where diet and exercise is one of the major factors. Treating disease and recommending the diet and exercise is required to efficiently manage health conditions of patients. Some non-modifiable factors also are there like smoking, drinking conjointly reason for the occurrence of chronic diseases. If an individual is not healthy it will first affect his or her family and then the society. Some risk factors are High vital sign, sterol, Age, Poor diet, Smoking. Once blood vessels are overstretched, the chance level of the blood vessels is augmented. This results in the vital sign. Vital sign is often measured in terms of heartbeat and pulsation. Pulse indicates the pressure within the arteries once the guts muscle contracts and pulsation indicate the pressure within the arteries once the guts muscle is in resting state.

History of Healthcare Management System

Healthcare management has huge demand these days as it really helps in managing a hospital

or a medical office they collect, store, retrieve and exchange patient healthcare information more efficiently and enable enhanced patient care. Although, there were some earlier health care systems they lacked interaction with users and instantaneity and besides some could not provide automated diet and exercise suggestions. Hence there was huge need to follow a proper methodology along with efficient planning so that we can design a system which is extremely useful and readily available to people as mostly all have access to internet.

Sha Avison describes a methodology as "a collection of procedures, techniques, tools and documentation aids which will help systems developers in their effort to produce a new information system".

Before the introduction of software development methodologies, systems were often poorly designed and inappropriate to the users' needs as greater emphasis was always placed on programming. Without any clear structure it was also difficult to estimate project completion dates and software development projects almost always overran. Although still an issue today, it is less of a problem than before the introduction of methodologies.

Methodologies provide a more systematic approach to software development, clearly defining tasks and giving greater management control, to avoid cost and schedule overruns. It is therefore essential that my project follow a methodology and this section will review a number of methodologies available.

Waterfall model divides the development into six discrete stages that cover every process required to develop a computer system. This enables management to take greater control over the process at each stage and also enable management to make more accurate predictions of desired schedules, thus preventing project delays and cost overruns.

The six stages of development include:

➢ Feasibility study
➢ Systems analysis
➢ System design
➢ Implementation
➢ Test
➢ Review and maintenance.

Each stage is distinctly defined with a set of sub tasks and processes ensuring that all aspects of development are covered. A stage must therefore be completed fully before moving onto the next stage. i.e. no two stages can run asynchronously.

The advantage of using this model is that the user is clearly involved in the development. The user is involving at both the Systems Investigation and Implementation stages. At the Systems Investigation stage the user is involved to establish the user requirements and needs of the system and again at the Implementation stage for user testing and entering data. As previously highlighted user involvement is critical to the success of the system.

The drawback of this development model excludes changes in user requirements. The six distinct stages make the model inflexible to incorporate a change in user requirements throughout the development process. This may then mean that by the end of the development the system no longer has any real use to the user.

An adaptation to this model that includes the opportunity to return to the previous stage in order to review the work carried out can overcome this problem. This is known as a Waterfall model with iterative feedback. This model allows the developer to revisit the design stage or requirements stage and incorporate any user requirement changes that may occur during development. It can however make it more difficult to predict the project schedule and there will be no clear end to each stage.

As the result, there is a constant need to upgrade our system to the latest technologies so that we can fulfill the ever-changing user requirements as soon as possible.

Technologies Used in Healthcare System

Research on data mining has given rise to the formulation of several data mining algorithms. These algorithms can be directly used on a dataset to create some models or to draw some vital conclusions and inferences from that dataset. Some data mining algorithms are Decision tree, Naïve Bayes, k-means, artificial neural network etc.

Biologically inspired Neural Network (multilayer perceptron) and can be used to represent complex nonlinear functions. It contains multiple hidden layers between the input and output layers. The connections of the biological neuron are represented as weights. A positive weight indicates an excitatory connection and negative values indicates inhibitory connections. All inputs are modified by a weight and summed (linear combination). Finally, an activation function manages the amplitude or range of the output. For example, an acceptable range of output is generally between 0 and 1, or it could be −1 and 1. Artificial networks can be used for adaptive control, applications and predictive modeling where they can be trained via a dataset and they try to find solution in the same way a human brain would.

Naive Bayes classifiers are a collection of classification algorithms who have their foundation on Bayes' Theorem. Naïve Bayes (NB) models are extremely popular in machine learning applications, due to their simplicity in allowing each and every attribute to contribute towards the final decision equally and independently from the other attributes. Thus, we can say that NB is a kind of optimal classifier, which can always give a outcome whose error is the minimum. NB classifiers need less training data and are highly scalable. Besides, they can handle continuous and discrete data.
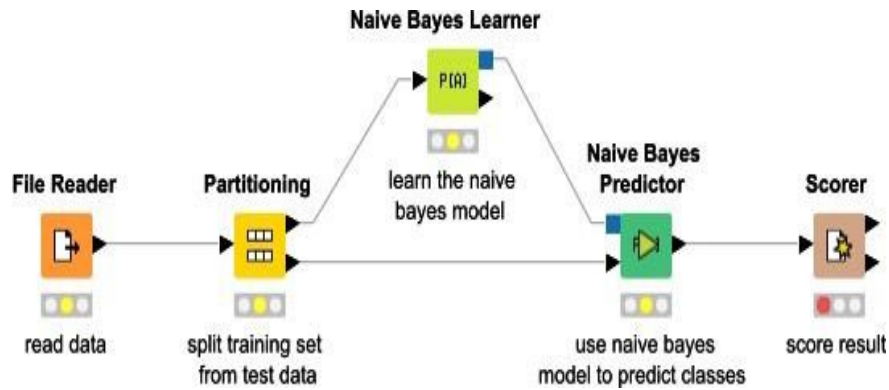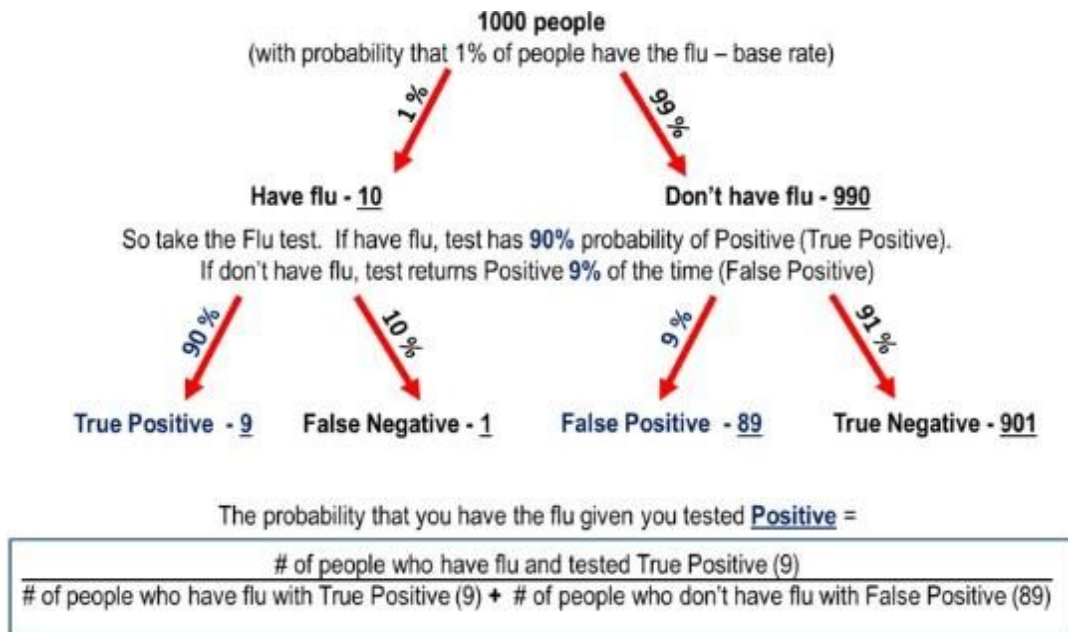
Figure 1: working of Basic Naive Bayes classifier

Figure 2: Basic example of Naive Bayes algorithm

A Decision tree, popular tool in machine learning, is a flowchart like tree structure or tree like graph, where each internal node denotes a test on an attribute, each branch represents an outcome of the test, and every leaf node (terminal node) has a class label. Decision trees are able to generate understandable rules as they are the pictorial representation of algorithm. Decision trees are mostly used in many fields including decision analysis to help and identify a approach that will   most likely reach the target. Tree based methods give the predictive models a high accuracy, stability and ease of interpretation.
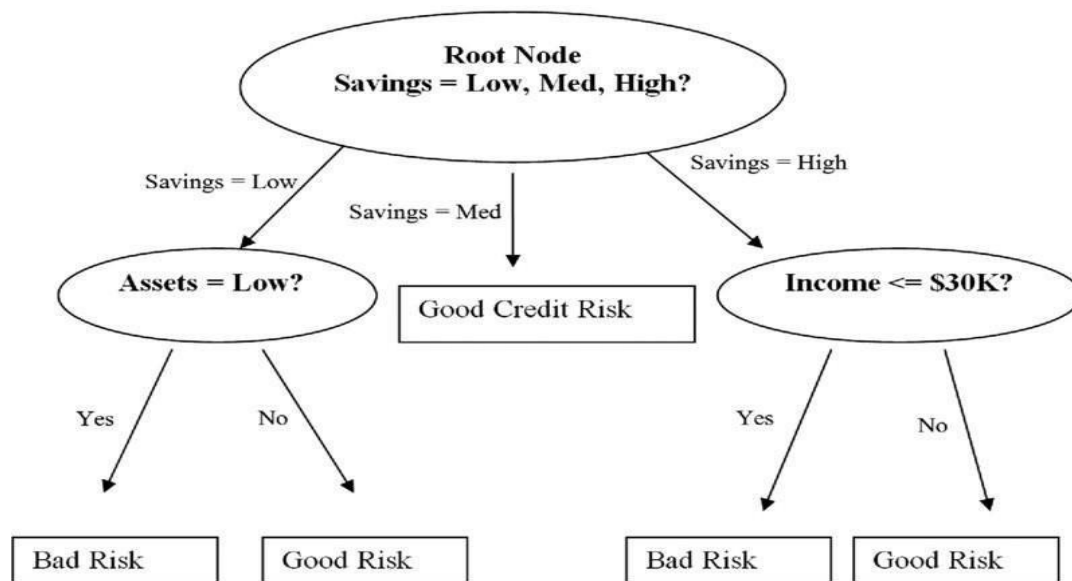
Figure 3: Example of Decision Tree

Structure of its Working

Basically, research based on some of the new modifications as compared to previous methodology which includes various technologies to improve the prediction of disease and provides more accuracy in result. Those modifications are as follows:

➢ Increasing dataset of patients to improve the accuracy
➢ Symptoms and lab test entries to be maintained for future purpose
➢ Time to time notifications for patient health and checkup reminder
➢ Linking the patient with majority of doctor so as to find out the best result for diet and diagnosis
➢ Scanning and automatically entry of lab test reports to reduce the time required while entering manually.
➢ Meditation and yoga videos to be available with patient login page.
➢ Emergency causalities to be handle with proper procedure.
➢ History about the disease for a user can be kept as a log and recommendation can be implemented for medications.

Advantages

➢ Increases Accuracy: As it reduces the human effort then it definitely saves out time. Accuracy is the primary factor which can be achieved through newer technology.
➢ Enhance Data Collection
➢ Improve security: Now, if we have a system that all these things are interconnected then we can make the system more secure and efficient.
➢ The system can be easily available to people.
➢ The system also gives necessary precautions and suggested lab tests along with diet and exercise.

Disadvantages

- There are security measures that are taken to protect information, but there is always the possibility of hackers breaking into the system and stealing the data.
- Also, companies could misuse the information that they are given access to. This is a common mishap that occurs within companies all the time. Just recently Google got caught using information that was supposed to be private.
- The system does not recommend medications to the system.

Conclusion

In this project, we carried out a study to find the predictive performance of different classifiers. We select four popular classifiers considering their qualitative performance for the experiment. We also choose one dataset from heart available at UCI machine learning repository. Naïve base classifier is the best in performance. In an attempt to compare the classification performance of four machine learning algorithms, classifiers are applied on same data and results are compared on the basis of misclassification and correct classification rate and according to experimental results, it can be concluded that Naïve base classifier is the best as compared to Support Vector Machine, Decision Tree and K-Nearest Neighbor. After analyzing the quantitative data generated from the computer simulations,

Moreover, their performance is closely competitive showing slight difference. So, more experiments on several other datasets need to be considered to draw a more general conclusion on the comparative performance of the classifiers. This research makes an individual under consideration for those who will give proper time and effort in completing the entries successfully

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