HEALTH CARE MANAGEMENT SYSTEM WITH DIET AND EXERCISE GUIDELINES

[1]Amruta Bhole, [2]Dr. P.M.Jawandhiya
[1]P.G.Student, [2]Professor
[1]Computer Science and Engineering
[2]Pankaj Laddhad Institute Of Technology And Management Studies, Buldana, India

Abstract: There has been an increase in the number of patients with various diseases every year , hence diet and exercise hold an important place. Treating disease and recommending the diet and exercise is required to efficiently manage health conditions of patients. In this paper, we considered some major diseases and a system has been designed and developed that recommends probable diet and exercise to help people manage their health well. This system analyses the input parameters that are entered by the end user and provides personalized services for users in the form of recommendations for their diet and exercises. The recommendation is done using user interface based on symptoms initially entered by hospital staff given by patient.

The disease prevention plays an important role in improving the public health. It reduces the risk of some of the diseases that may come in the future. The proposed system determines the disease and recommends the suitable diet and exercises. The experimental results show that the performance of our proposed system is efficient in determining the disease and recommending the diet and exercise.

"Healthcare Management System" is a system which uses modeling based on prediction (Predictive modeling) that tries to predict the disease the user may be suffering from on the basis of the symptoms that user provides as an input to the system. The system analyzes the symptoms provided by the user as input and gives the probable disease as an output. Disease Prediction is done by applying the Naïve Bayes Classifier.

Index Terms **– Symptoms, Prediction, Naive Bayes Classifier, Accuracy, Diet, Exercise**

I. INTRODUCTION

At present, when one suffers from particular disease, then the person has to visit to doctor which is time consuming and costly too. Also if the user is out of reach of doctor and hospitals it may be difficult for the user as the disease cannot be identified. So, if the above process can be completed using a automated program which can save time as well as money, it could be easier for the patient which can make the process easier.

Healthcare Management System is a web based application that predicts the disease of the user with respect to the symptoms given by the user. The system has data sets collected from different health related sites. With the help of Healthcare Management System the user will be able to know the probability of the disease with the given symptoms along with diet, exercise and precautions. As the use of internet is growing every day, people are always curious to know different new things. People always try to refer to the internet if any problem arises. People have access to internet than hospitals and doctors. People do not have immediate option when they suffer with particular disease. So, this system can be helpful to the people as they have access to internet 24 hours.

Problem Statement

It's always necessary to make the prevention as per the requirements of health issues and make changes in diet and exercise as per suggested by doctor. But many of us failed in this modern scenario ,so, as to overcome this dietary and exercising issue we need to make a system which will guide us and make aware about the health conditions with due respect to the symptoms.

Previous method was prepared for common diseases and provides limited diet plan to the patient which makes uneasy for patient to follow the guidelines Also it didn't suggested any exercise and precautions to overcome the relief to patient.

Habitual of Regular comprehensive physical examination or daily self-measurement using medical devices, people can clearly understand the vital signs and physiological changes in order to detect the disease and treatment. Even though a number of health management systems which are provided from medical institutions have been developed for recording the daily health measurements, users still have to take the record to medical institutions and ask for self-care guidelines from health care providers. One need to analyze the report of regular comprehensive physical examination to calculate the health risk and provide personalized health care services for users in terms of diet and exercise guideline recommendation. So as to compensate all this features we designed the system which not only take the symptoms of patient but also helps to find out the proper exercise to be done and precautions to be taken. And the way of analyzing the problem will be satisfied with the recommendations done in the project.

II. RESEARCH METHODOLOGY

- To support a regularised diet and exercise pattern
- To make aware about the prediction of disease and referred to the proper diagnosis

1. Proposed Methodology

Following Module that will work in accordance with the topic:

1.1 Patient Registration:

The Patient can register through its own or by the through the reception desk, doctor desk or by admin.

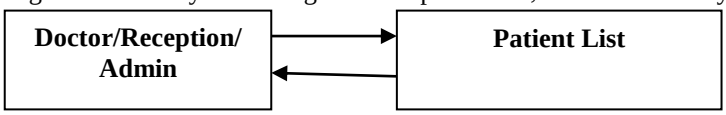

Figure 1: Patient Registration

1.2 Symptoms Valuation

The symptoms listed by patient or Doctor will undergo the checking with Dataset of Symptoms, Disease, Diet and Exercise

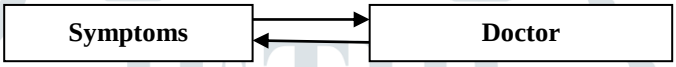

Figure 2: Symptoms Valuation

1.3 Lab Test

If the patient needed some lab test then system will manage the prediction of diet base on its lab tests.

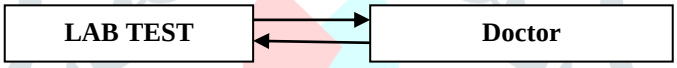

Figure 3: Lab Test

1.4 Suggested Diet and Exercise chart

In Next, the system takes the dataset of patient and compare it with already optimized dataset and Generate the diet and Exercise Prediction.

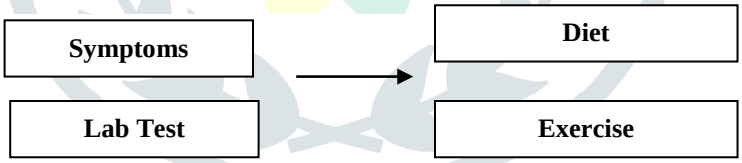

Figure 4: Suggested Diet and Exercise Chart

1.5 Valuation of Patient

Here, The doctor will suggest the prescription and further tests depending on the diagnosis and the History of the Patient.

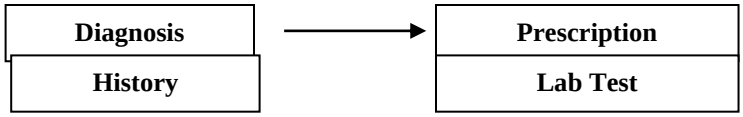

Figure 5: Valuation of Patient

Scope

This project aims to provide a web platform to predict the occurrences of disease on the basis of various symptoms. The user can select various symptoms and can find the diseases with their probabilistic figures

.

2. Theoretical framework

Healthcare Management System has been already implemented using different techniques like Neural Network, decision tree and Naïve Bayes algorithm. Particularly heart related disease is mostly analyzed. From the analysis it was found that Naïve Bayes is more accurate than other techniques. So, Disease Predictor also uses Naïve Bayes for the prediction of different diseases.

Data collection

Data collection has been done from the internet to identify the disease here the real symptoms of the disease are collected i.e. no dummy values are entered. The symptoms of the disease are collected from different health related websites. The Operational Project using the dataset from OPEMML community.(www.openml.org).

The algorithm implemented in this project is Naïve Bayes Classifier. Naïve Bayes classifier depends on Bayes Theorem.

Equation 1:

$$P(Y|X1, \dots\dots\dots\dots, X_n) = \frac{P(Y)P(X1, \dots\dots, X_n|Y)}{P(X1, \dots\dots, X_n)}$$

Where Y is the class variable X_1, X_2, $\dots\dots\dots$, X_n are the dependent features
From equation 1 we get equation 2 as:

Equation 2:

$$P(\text{Disease}|\text{symptom}_1, \text{symptom}_2, \dots\dots\dots, \text{symptom}_n) = \frac{P(\text{Disease})P(\text{symptom}_1, \dots\dots\dots, \text{symptom}_n|\text{Disease})}{P(\text{symptom}_1, \text{symptom}_2, \dots\dots\dots\dots\dots \text{Symptom}_n)}$$

Using the naive independence assumption :

$P(\text{symptom}_1, \dots\dots\dots, \text{symptom}_n|\text{Disease}) = P(\text{Symptom}_i|\text{Disease})$

Where i= 1, 2, ……,n

Equation 3:

$$P(\text{Disease}|\text{symptom}_1, \text{symptom}_2, \dots\dots\dots, \text{symptom}_n)$$

$$= \frac{P(\text{Disease})P(\text{Symptom}_i|\text{Disease})}{P(\text{symptom}_1, \text{symptom}_2, \dots\dots\dots\dots\dots \text{Symptom}_n)}$$

So the relation becomes

Equation 4:

$$P(\text{Disease}|\text{symptom}_1, \text{symptom}_2, \dots\dots\dots, \text{symptom}_n)$$

$$= \frac{P(\text{Disease})\prod_{i=1}^{n} P(\text{Symptom}_i|\text{Disease})}{P(\text{symptom}_1, \text{symptom}_2, \dots\dots\dots\dots\dots \text{Symptom}_n)}$$

Since $P(\text{symptom}_1, \text{symptom}_2, \dots\dots\dots\dots\dots \text{Symptom}_n)$ is constant, we can use the following classification rule:

$$P(Disease|symptom_1, symptom_2, \dots\dots, symptom_n)$$

$$= P(Disease) \prod_{i=1}^{n} P(Symptom_i|Disease)$$

$$P(Disease|symptom_1, symptom_2, \dots\dots, symptom_n) \propto$$

$$P(Disease) \prod_{i=1}^{n} P(symptomi|Disease)$$

$Y = ARG\ MAX\ P(Disease) \prod P(Symptom_i|Disease)$

The value $P(Symptom_i|Disease)$ of can be calculated by using multinomial Naïve Bayes which is given by:

$$P(symptomi|Disease) = N_{yi} + \alpha N_y + \alpha n$$

$$P(Symptom_i|Disease) = \frac{N_{yi} + \alpha}{N_y + \alpha n}$$

Where N_{yi} = Frequency of same disease in the dataset N_y= Total symptoms of the particular disease n= total symptoms in the dataset

α=1, known as Laplace Smoothing

$$P(Disease) = \frac{N + 1}{N(Disease) + 1}$$

given by:

The value of $P(Disease)$ can be calculated by using Laplace Law of Succession which is

Where, N (Disease) = Frequency of the same disease in the dataset N= Total disease in the dataset

III. SCHEMATIC REPRESENTATION:

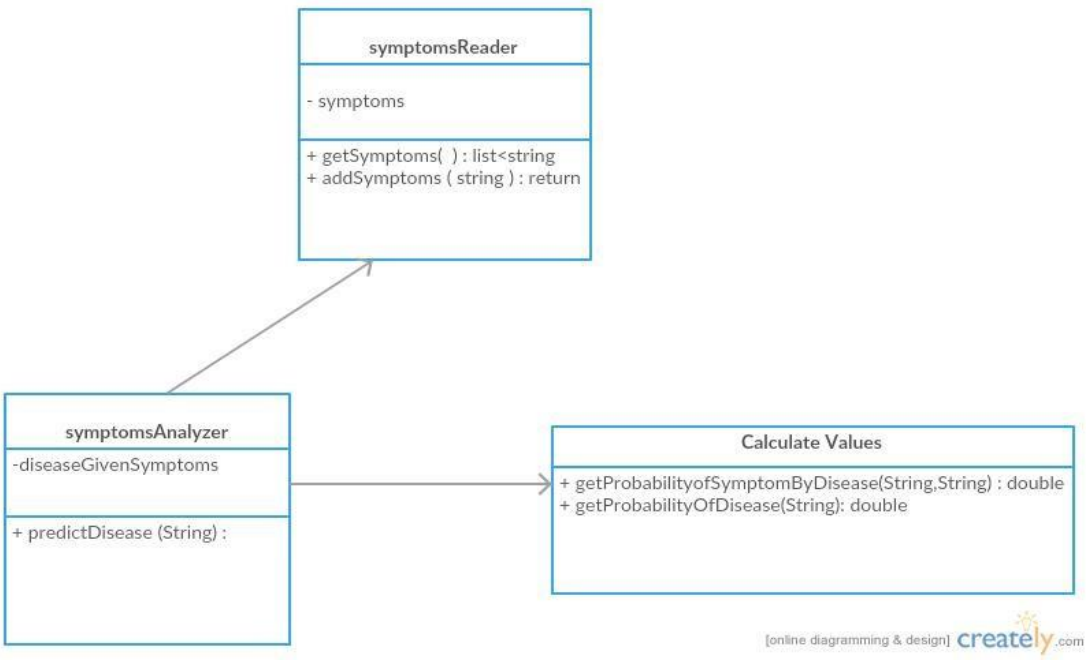

Fig 6. Flow diagram of the process

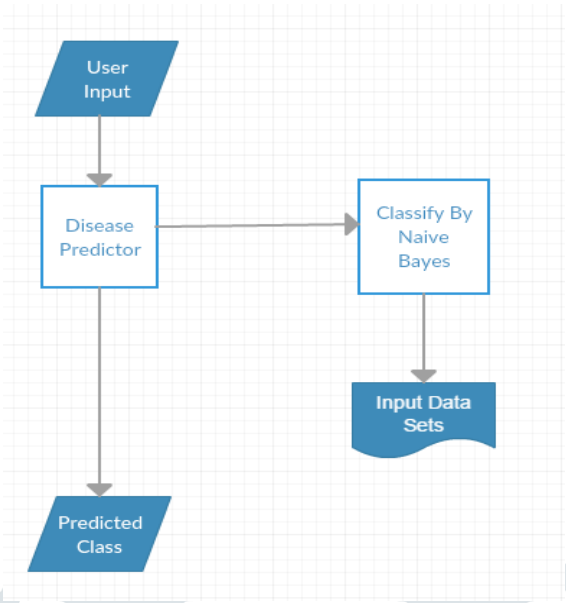

Figure 7: Data Flow Diagram

IV. RESULT

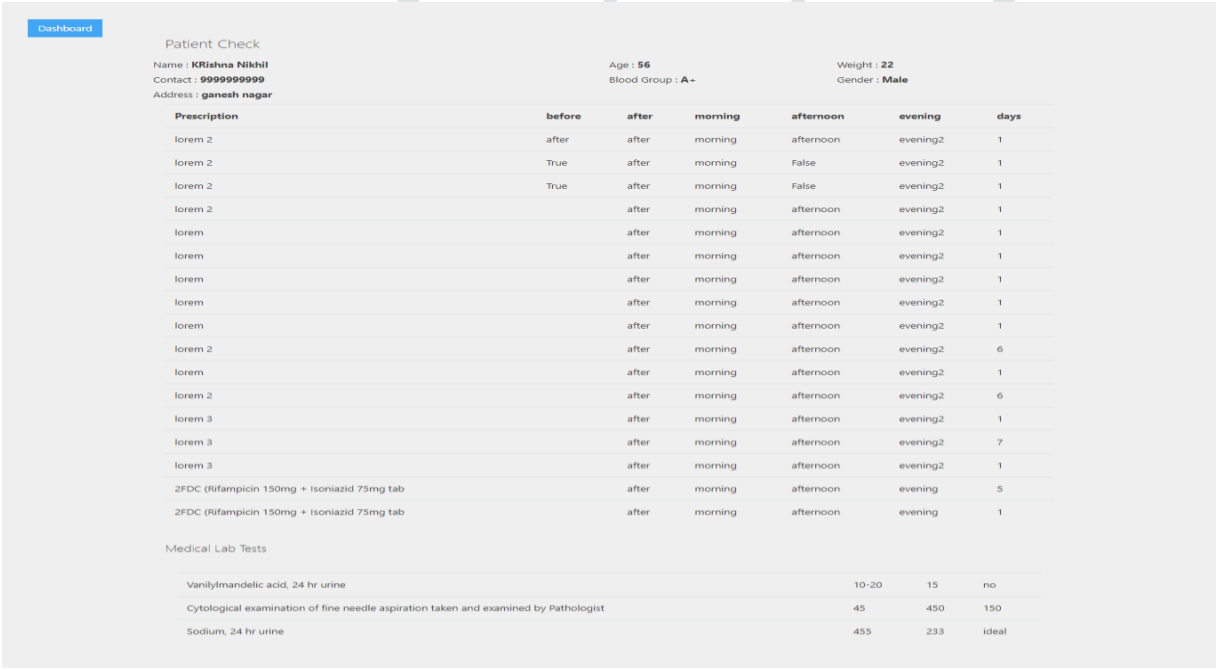

Figure 8: Patient Check Page

V. DISADVANTAGES

1. Disease Predictor does not recommend medications of the disease.
2. Past history of the disease has not been considered

VI. ADVANTAGES

1. Helps to predict the situation
2. Higher accuracy with plenty of datasets
3. Easy GUI to use

REFERENCES:

[1] An Interactive Healthcare System with Personalized Diet and Exercise Guideline Recommendation TAAI2015 Tainan,Taiwan Nov. 20-22, 2015

[2] Health Promotion Administration, Ministry of Health and Welfare. Available online: http://health99.hpa.gov.tw/TXT/HealthyHeadLineZone/HealthyHeadline_Detai.aspx? Topic No=5170 (accessed on 8 August, 2014) 531 TAAI2015 Tainan, Taiwan Nov. 20-22, 2015

[3] Wu, Chun-Hui, Fang, Kwot-Ting, and Chen, Ta-Cheng: Applying data mining for prostate cancer. In: the International Conference on New Trends in Information and Service Sci-ence,pp. 1063-1065, Beijing (2009)

[4] Tsai, Chung-Huang, and Lin, Gau-De: Prevalence of the Metabolic Syndrome in Individ-uals Seeking for Health Examination. Ching Medical Journal, 10-16 (2006)

[5] Lin, Feng-Yu, Hwu, Yueh-Juen, and Chen, Yun-O: Data Mining Technology Applied to Adult Check-Up Data. Journal of Nursing and Healthcare Research, 6(2):117-124 (2010) [6] Lin, Yi-Siang: Apply the Health Examination Data to Construct