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A COMPREHENSIVE STUDY OF HEALTH CARE RECOMMENDATION SYSTEM

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Abstract: This study investigates the implementation and impact of an integrated health care system designed to streamline processes and improve overall healthcare delivery. The system integrates electronic health records, telemedicine solutions, and data analytics to facilitate efficient communication among healthcare professionals, enhance patient care, and optimize resource allocation. The research evaluates the system's effectiveness in reducing medical errors, improving patient outcomes, and increasing operational efficiency within healthcare institutions. Insights gained from this study contribute to the ongoing efforts to harness technology for advancing healthcare systems and ultimately enhancing the overall quality of patient care. the imperative to improve diagnostic precision is underscored by its pivotal role in patient outcomes and resource optimization. this review aims to provide a nuanced understanding of their potential impact on diagnostic improvement. The synthesis of existing literature and emerging trends serves as a guide for healthcare practitioners, policymakers, and researchers navigating the evolving terrain of diagnostic enhancement within healthcare systems.

Keywords: Medical Imaging, Diagnostic Accuracy, HMS, Naive Bayes, Prediction

1. INTRODUCTION

In the dynamic realm of healthcare, a thorough examination of diagnostic processes becomes imperative, prompting an insightful review of the existing health care system and its potential enhancements. This exploration is motivated by the transformative impact of technology, data integration, and artificial intelligence on diagnostic capabilities. Through an in-depth analysis of diagnostic accuracy, healthcare technology, and the influence of electronic health records, this review aims to uncover the evolving landscape of diagnostic practices. The intersection of interdisciplinary collaboration, clinical decision support systems, and the integration of telemedicine adds nuance to our understanding, emphasizing the intricate layers involved in diagnostic improvements. This exploration seeks to illuminate not only the efficiency of diagnostic workflows but also the broader implications for patient outcomes and the overall quality of healthcare delivery.

1.1 Five phases of HMS

1.1.1 Phase 1- Unique Patient ID Generation

In this phase when a patient is going to visit any hospital its unique id was generated which includes its complete diagnosis reports and its treatment parameter also it includes all the details of its lab reports, X-Ray, MRI and many other details. The ID can be searched on the basis of patient name, mobile number and its Id itself. The only necessity is that the hospital needs to connect to centralized database

1.1.2 Phase 2 – Disease Diagnosis and recommended diet and exercise

Once the patient ID is generated and all lab reports manuals entry and symptoms of patients was done along everything was stored in the system and depend upon that database only, the disease was predicted and proper diet and exercise is recommended

1.1.3 Phase 3 –Doctor Prediction System

Once the disease was predicted by the system, it became easy in the last phase to recommend the doctor by referring to the individual doctor's patient history, the doctor can be predicted for proper diagnoses which definitely save the patient time and money.

1.1.4 Phase 4 – Effective diagnosis system

It helps to diagnose the disease with proper utilization of database resources generated through various patient and doctor management systems. When a patient need to cure it helps to diagnose the patient with effective medication and treatments with proper history of the patients

1.1.5 Phase 5 – Doctor referencing

With this model it becomes easy for doctors to get the information of new research and work predicted in various countries which help to manage the resources of doctors at any time and consult for the betterment of patients. In this pandemic situation if the doctors understand the diagnosis information then it might get easily understandable by others doctors and researcher which also helps to reduce the spread.

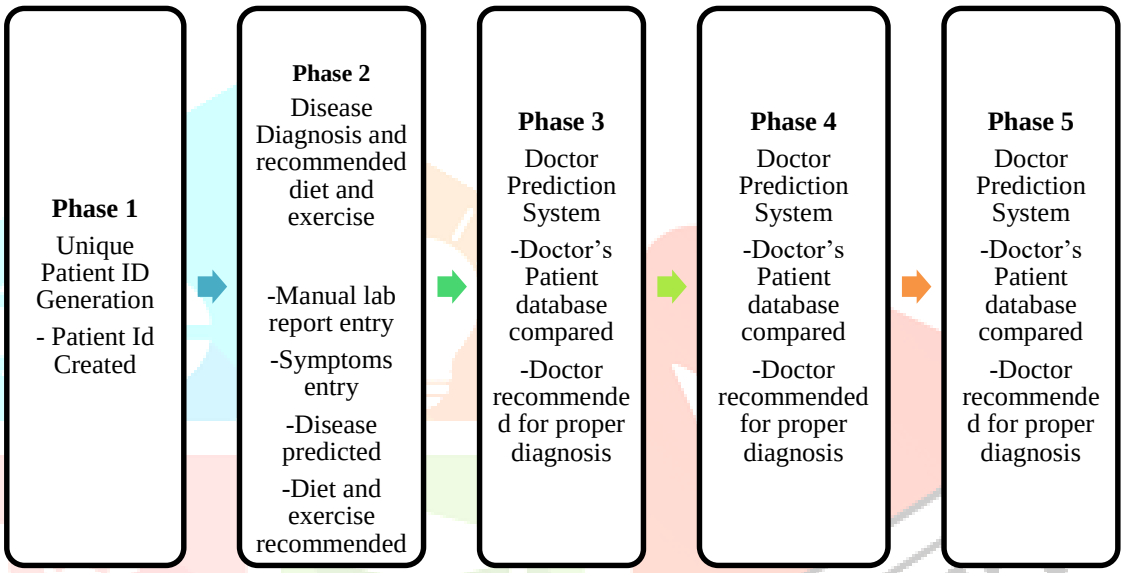

Fig 1.1: Flow of the process

2. LITERATURE SURVEY

Many people have busy and high pressure modern life, so; they cannot keep a healthy lifestyle and tend to lack exercise with eating disorders. Consequently, there are not enough medical resources to meet the medical needs of all people and chronic illnesses are getting increased and are more popular among the younger generation. Many companies co-working with medical institutions designed remote monitoring systems to help medical experts efficiently maintain their patients or avoid the elderly people in danger, and they also proposed self-health management systems in preventing chronic illness.

iHealth365 is one of self-health management systems, which is a platform for medical institutions or companies to manage the health of customers or employees. iHealth365 can allow users to upload their report of regular comprehensive physical examination and analyze the vital signs of the report, and it also provides not only the assessment of health risk but also the health data visualization and reminds system to supervise the users. Furthermore, the smartphone app of the iHealth365 for the users can get an improvement plan to maintain their health. The experts also can use this system to help their patients in real time when the patients give the feedback. The iHealth365 also provides a function for collecting data from the wearable devices. But the iHealth365 system does not automatically provide personal diet and exercise guidelines, and it still needs medical experts to analyze the report to suggest the personal guidelines.

In addition, Lin et al. proposed VASP (Virtual Assistant System for Personal health management), a virtual assistant system for personal health management, which can analyze the report of regular comprehensive physical examination results to evaluate the health risk and provide personalized healthcare services for users in terms of diet and exercise guideline recommendations. Furthermore, the system also can supervise and remind users to meet the recommended plans of personalized diet and exercise guidelines. Although the designed system provides automatic recommendations of personalized diet and

exercise guidelines according to the analysis of the individual report of regular comprehensive physical examination, it lacks the instantaneity and the interaction for users.

K.M. Al-Aidaroos, A.A. Bakar and Z. Othman has conducted the research for the best medical diagnosis mining technique. For this authors compared Naïve Bayes with five other classifiers i.e. Logistic Regression (LR), KStar (K*), Decision Tree (DT), Neural Network (NN) and a simple rule-based algorithm (ZeroR). For this, 15 real-world medical problems from the UCI machine learning repository (Asuncion and Newman, 2007) were selected for evaluating the performance of all algorithms. In the experiment it was found that NB outperforms the other algorithms in 8 out of 15 data sets so it was concluded that the predictive accuracy results in Naïve Baeyes is better than other techniques.

Darcy A. Davis, Nitesh V. Chawla, Nicholas Blumm, Nicholas Christakis, Albert-Laszlo Barabasi have found that global treatment of chronic disease is neither time or cost efficient. So the authors conducted this research to predict future disease risk. For this CARE was used (which relies only on a patient's medical history using ICD- 9-CM codes in order to predict future diseases risks). CARE combines collaborative filtering methods with clustering to predict each patient's greatest disease risks based on their own medical history and that of similar patients. Authors have also described an Iterative version, ICARE, which incorporates ensemble concepts for improved performance. These novel systems require no specialized information and provide predictions for medical conditions of all kinds in a single run. The impressive future disease coverage of ICARE represents more accurate early warnings for thousands of diseases, some even years in advance. Applied to full potential, the CARE framework can be used explore a broader disease histories, suggest previously unconsidered concerns, and facilitating discussion about early testing and prevention.
(A.Davis, V.Chawla, Blumm, Christakis, &Barbasi, 2008)

JyotiSoni, Ujma Ansari, Dipesh Sharma and SunitaSoni have done the research paper into provide a survey of current techniques of knowledge discovery in databases using data mining techniques that are in use in today's medical research particularly in Heart Disease Prediction. Number of experiment has been conducted to compare the performance of predictive data mining technique on the same dataset and the outcome reveals that Decision Tree outperforms and sometime Bayesian classification is having similar accuracy as of decision tree but other predictive methods like KNN, Neural Networks, Classification based on clustering is not performing well. The second conclusion is that the accuracy of the Decision Tree and Bayesian Classification further improves after applying genetic algorithm to reduce the actual data size to get the optimal subset of attribute sufficient for heart disease prediction.
(JyotiSoni, Ansari, Sharma, &Soni, 2011)

Intelligent Heart Disease Prediction System (IHDPS) using data mining techniques, namely, Decision Trees, Naïve Bayes and Neural Network. is implemented in using .NET platform . IHDPS is Web-based, user- friendly, scalable, reliable and expandable system. It can also answer complex "what if" queries which traditional decision support systems cannot. Using medical profiles such as age, sex, blood pressure and blood sugar it can predict the likelihood of patients getting a heart disease. It enables significant knowledge, e.g. patterns, relationships between medical factors related to heart disease. As a Data source a total of 909 records with 15 medical attributes (factors) were obtained from the Cleveland Heart Disease database. Figure 1 lists the attributes. The records were split equally into two datasets: training dataset (455 records) and testing dataset (454 records) Table 2 summarizes the results of all three models. Naïve Bayes appears to be most effective as it has the highest percentage of correct predictions (86.53%) for patients with heart disease, followed by Neural Network (with a difference of less than 1%) and Decision Trees. Decision Trees, however, appears to be most effective for predicting patients with no heart disease (89%) compared to the other two models.

3. PROBLEM FORMULATION

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 it provides limited diet plan to the patient which makes uneasy for patient to follow the guidelines Also it didn't suggested any exercise 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 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 the way of analyzing the problem will be satisfied with the recommendations done in the project. Although there are some earlier health care management systems, they do not automatically provide personal diet and exercise guidelines or lacks of the instantaneity and the interaction for users. Also, the systems do not give precautions or suggest tests for the diseases.

4. PROPOSED METHODOLOGY

Following Module will work in accordance with the HMS.

4.1 Patient Registration:

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

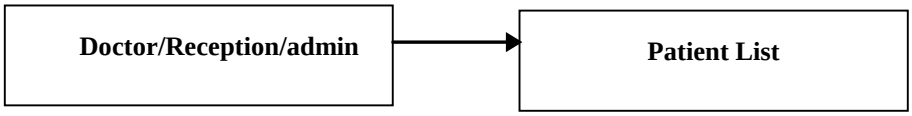

Fig4.1: Patient Registration

4.2 Symptoms Valuation

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

Fig4.2: Symptoms Valuation

4.3 Lab Test

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

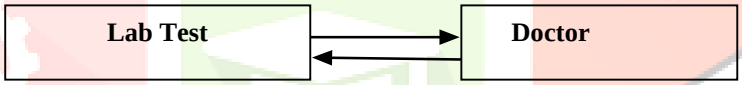

Fig4.3: Lab Test

4.4 Suggested Diet and Exercise Chart

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

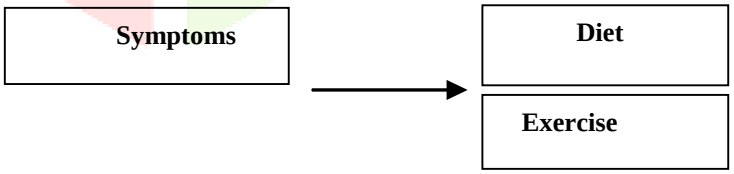

Fig4.4: Suggested Diet and Exercise Chart

4.5 Valuation of Patient

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

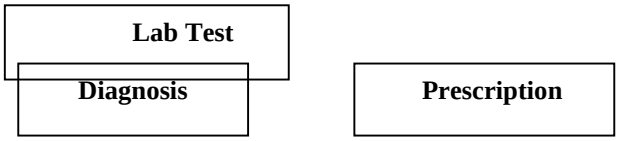

Fig4.5: Valuation of Patient

5. CONCLUSION

This paper aims to predict the disease on the basis of the symptoms. The system is designed in such a way that it takes symptoms from the user as input and produces output i.e. predict disease and consequently provide a guideline for diet, precautions and exercise for the probable predicted disease. Health Management System is successfully implemented using django framework. This is a robust system, which allows user based permission on modules, pages and even controls inside pages. The system is easy to use, user friendly and is readily available to the end users. Thus, we can say that this system can help people to control the disease and live a healthy lifestyle. Thus our HealthCare System provides diet, exercises along with precautions and suggested tests depending on the symptoms given and hence it helps in better patient care. It promotes better coordination among different departments and provides top management a single point of control. The system reduces paper work to a great extent and avoids the missing of any data along with easy updating facility.

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