A STUDY OF CENTRALISED HEALTH CARE RECOMMENDATION SYSTEM FOR EFFICIENT DIAGNOSIS

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Abstract: The exchange of patient data among hospitals remains a challenge despite advancements in technology. Introducing an automated program or system to securely share patient data through a centralized database concept is pivotal. This approach aims to digitize records, facilitating proper maintenance by doctors and hospitals. The Healthcare Management System (HMS) functions as a web-based application, predicting user diseases based on presented symptoms. Leveraging data from various diagnostic procedures across diverse hospitals enables accurate diagnoses and facilitates doctor referrals for further guidance. The primary goal of this research is to establish a systematic healthcare framework, enhancing patient satisfaction and ensuring doctor availability with adequate resources. The envisioned system aims for widespread accessibility among connected individuals, offering a centralized patient ID database to streamline navigation through diagnosis procedures and treatments. Moreover, it incorporates comprehensive case histories for doctors, simplifying the recommendation of appropriate treatments.

Keywords: HMS,Naive Bayes, Prediction

1. INTRODUCTION

For managing a hospital or any medical office it becomes essential to design a healthcare management system. HMS is the time saving technology which helps medical providers to improve patient care and lowers the rate of medical errors. In this system patients data is stored in centralized server which helps in Appointment & Billing management, maintains lab records and patients history. In the proposed system we focused on its maintenance in terms of security point. HMS replaces manual work with automated task. Using HMS its easy to maintain the priority of records by making and designing of some filters as per requirements. HMS helps the correct data retrieval in least amount of time . [1]

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 will 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. [2]
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 Recommendation System

Once the disease was recommended by the system, it became easy in last phase to recommend the doctor by referring to 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 diagnosis the disease with proper utilization of database resources generated through various patient and doctor management system. 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 become easy for doctor's to get the information of new research and work predicted in various countries which help to manage the resources of doctor at any time and consult for the betterment of patient. 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. [3]
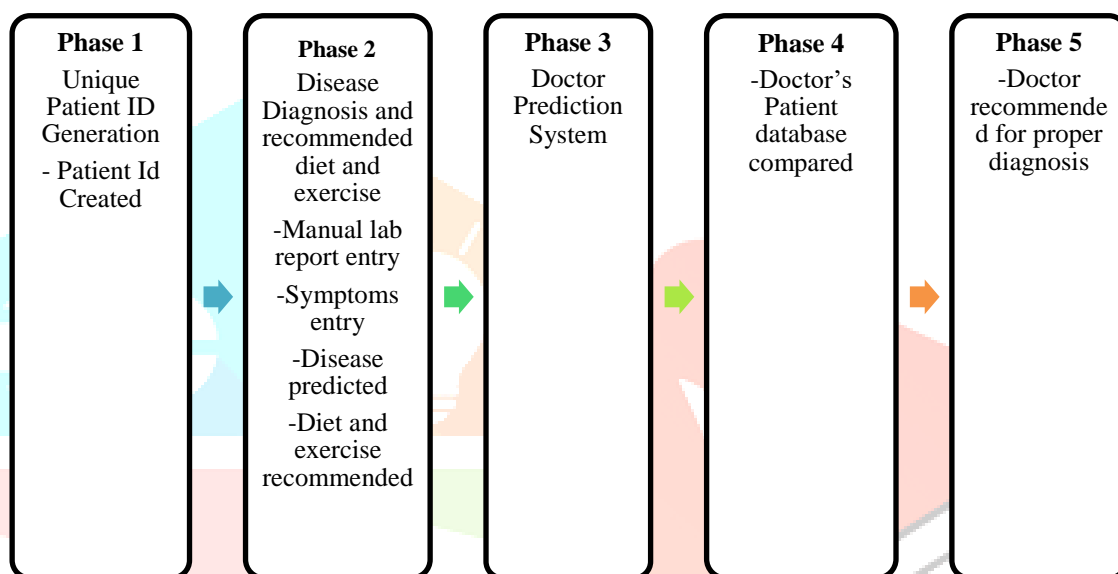
Phase 1 Unique Patient ID Generation - Patient Id Created	Phase 2 Disease Diagnosis and recommended diet and exercise -Manual lab report entry -Symptoms entry -Disease predicted -Diet and exercise recommended	Phase 3 Doctor Prediction System	Phase 4 -Doctor's Patient database compared	Phase 5 -Doctor recommended for proper diagnosis

Fig 1.1: Phases of HMS

2. LITERATURE SURVEY

iHealth365 is one of self-health management systems, which is a platform for medical institutions or companies to manage 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 smart phone 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 feedbacks. The iHealth365 also provides a function for collecting data from the wearable devices. But 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 result 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 of the instantaneity and the interaction for users.[5]

K.M. Al-Aidaroos, A.A. Bakar and Z. Othman have 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)

3. PROBLEM FORMULATION

Diet and exercise are the essential factors to maintain the health issues and follow it as per the doctor's prescription. But as a busy schedule and hectic lifestyle it becomes difficult to maintain it in proper manner. Many people made a resolution to follow the diet and exercise schedule strictly but failed to do so. So make it more importance we proposed a system which makes the health procedure from start to the end. Initially we start it with the registration of patient and then maintaining the database as per the requirements. Then once the patient got registered its complete health records will be maintained in centralized health care system including lab records, diagnostic procedure, doctor recommendation and with virtue of all this a sophisticated diet and exercise will be recommended for proper health recovery. Many diet and exercise was provided to number of patient but the diet and exercise that will be provided will as per the symptoms and diagnostic procedure which help the doctor and patient to show the fast recovery of patient health. [6]

4. PROPOSED METHODOLOGY

Following Module will work in accordance with the HMS.
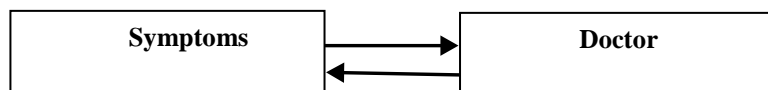
4.1 Patient Registration:

Patient registration through doctor hospital reception or admin panel
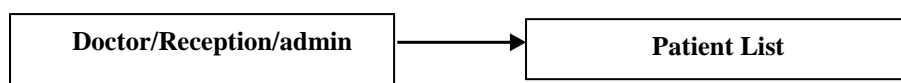
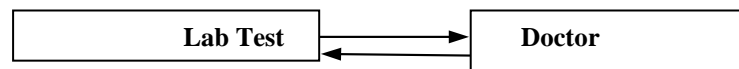**Fig4.1: Patient Registration**

4.2 Symptoms Valuation

Recommendation of diet, exercise and disease diagnose procedure was calculated as per the dataset.
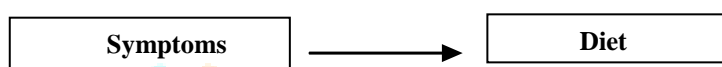

Fig4.2: Symptoms Valuation

4.3 Lab Test

Lab test records was feeded into the system as any reports or in images format

Fig4.3: Lab Test

4.4 Suggested Diet and Exercise Chart

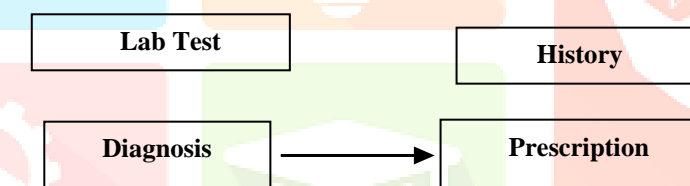Diet and exercise prediction was done as per the the patient diagnostic procedure

Fig4.4: Suggested Diet and Exercise Chart

4.5 Valuation of Patient

Prescription was generated as per the patient symptoms and diet and exercise was properly suggested and main importantly this overall procedure was saved in centralized management system.

Fig4.5: Valuation of Patient

5. CONCLUSION

Daily life of an individual was very important and to maintain it in proper manner a health care conditions need to be properly scheduled. This proposed system not only helps to maintained the diet and exercise as per the patient diagnostic records but also keep the record in centralized manner. 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. [7]

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