

# A SYSTEM FOR COMPLETE HEALTHCARE MANAGEMENT: ASK-US-HEALTH (A second opinion provider using Learning Pneumatic algorithm and Data mining)

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**Abstract** - Having an avenue to health related information is the key to better health and has numerous benefits for patients and their entire family. Proposed system backs disease management and reduces patient's anxiety by encouraging them to more energetically participate in care, building better informed medical decisions and have more appropriate acknowledgement of medical advices and services. Health related crucial data processing may lead to improvement in healthy lifestyle. Data mining algorithm applied on stored individual data can be used to derive a decision regarding diseases. Recent research has demonstrated capabilities which may improve doctor's opinion and manage specialists appointments, etc. In this paper we propose integration of proposed Learning Pneumatic algorithm and data mining approach on health data and demonstrating efficiency in data management system including announcing probable diseases, doctor appointments and medicine delivery from nearby pharmacy stores. We have also proposed real life application for the developed system.

**Key Words:** patients, doctors, diseases, prescriptions, pharmacy, symptoms, medicine, specializations.

## 1. INTRODUCTION

Before modern medicament came into the picture, life was quite fading for the humans. The surrounding atmosphere was satiated with invisible threats in the form of diseases and medical circumstances. Later, a methodized profession evolved from this medical practice serving humans a more desirable quality of life. Being encouraged by the latest innovations in medical science, the radius of medical technology stretched out to extraordinary limits. Nevertheless, the position of doctors in our society hasn't abated at all; doctors remain fundamental, despite of these technological innovations.

People nowadays in India are facing a lot of health issues. It is not convenient for all to always visit another doctor for a second opinion, as some doctors charge a lot of high fees or some are remotely located. In such a scenario, our web application acts as a second opinion provider. The patients need to enter their symptoms which they are

facing and our web application will accordingly mention the probable disease as the output. Hereby, the patients can have a rough idea about the disease they might be facing. Not only that, we will also provide them with a list of relevant doctors with whom they can book their appointments. Our database will store all the prescriptions and medical history of the patients. Information pertaining of the nearby chemists store will also be provided to the patients.

We have challenges of providing health care services to the people, delivering medical services on time and supervising patients for progress and real-time data collection for research and development. There is a great need to deploy technologies like web applications in the health zone that will favor patients with real-time management of illnesses, reactions or side effects to prescribed medication, update patients on scheduled doctor patient appointments and make prescription reminders and facilitate access diagnosis from a physician and general medical assistance. The entire process of the doctor prescribing the medicines to the patients and advising him lab tests and then the patient returning back to the doctor with the results of the tests is a time consuming process. However this entire process can be done in a shorter span of time if digitized reports are maintained. So in this paper we propose digitized reports of the patients that can be viewed by experts and chemists limitedly for faster working of the process. Rest of the paper is organized in the following sections. Section two represents the related work. In section three we describe the proposed system. Section four presents the proposed Learning Pneumatic algorithm. In section five we discuss the applications of the proposed system and finally we conclude in section six.

## 2. RELATED WORK

Huge amount of literature exists on processing of medical data. Evolution of computerized applications for supporting physicians is an old but still alive quest. Various systems have emerged for assisting medical decisions by supplying an array of services from the information retrieved and communicated for worthwhile,

error prevention, safety, security and betterment of healthcare attributes. This web portal was designed for relative diagnose and adequate patient care for primary care clinicians.

There are many ways through which health care solutions can be provided to the people. We have studied and listed few papers over the same issue, as follows:

(i) **Mobile Health Application in Indonesia:** Most Indonesians do not have an easy access to Healthcare facilities. A survey from 2011 stated that 94.1 % of Indonesian households were located more than 5 kilometers away from the nearest healthcare centres. These drew them significant amount for travelling all the way to these healthcare centres that delayed their healthcare services. This sort of reciprocal action needed satisfactory concord between the requesting and consulting physicians who were responsible for making a decision to give appropriate analysis to the patients. By adopting these applications, doctors could have information about the patient's health such as clinical locations, doctor tutorial, etc. Doctors always wanted to ask about supplementary information such as videos, tutorial and tips. They also scheduled appointments for patients planning their health care.[1]

(ii) **Web application for Health Semantics :** In this system, the server database held the patient healthcare record which was used for reference purpose. The system was made to analyze the health related information of the patient stored in their records in order to convey basic medicines to the patient on time. Home monitoring programs helped in reducing travelling costs and high cost of hospital centre visits for patients in remote areas. Results determined that the proposed real time system's medical data was transmitted with a high accuracy. This accelerated individual and the whole population with good health outcomes, bolstered up patient care and strongly growing clinician-patient relationship.

(iii) **E-Health Web Application for Patient Management :**

Objective of this system was to develop and implement an application that would expedite real-time management of long ailments, harmful reactions or side effects of prescribed medication, notify patients on their appointments with the doctors and make prescription reminders, use the data collected from surveys for medical research purposes and also have privilege to use diagnosis reports from the physicians and common medical facilitation using a combination of a web services speech recognition, IVR (Interactive voice response) and SMS. The application will be hosted and looked after by Medical service providers. This application can be accessed by the patients through their web browsers or mobile phones with great user satisfaction on different viewports. Collaboration with the medical service providers, study of existing technologies, surveys and reviewing of personal

experiences helped in gathering the requirements. The application is sustained by MySQL Database and web services. [3]

(iv) **An Intelligent Decision support system for M-Health application:** The Idea of the Decision support system presented in this paper[4] has been broadly recognized in healthcare sector. It is an arduous task to develop a decision support system that can be used for detecting almost all major types of diseases, this system aims to develop a system that is capable of detecting any type of disease. In this research paper, they have proposed a decision support system that can detect some of the major types of cardiac diseases. This system is basically a software designed to directly help in making health related decisions in which attributes or traits of individual patients are processed for the purpose of generating patient's distinct detailed reports that are then conferred to clinicians for examination.

### 3. PROPOSED SYSTEM

The purpose of the system is to collect and analyze all assorted ideas that have come up to define the system, its requirements with respect to patients. Aim of this section is to provide a complete description of all of the features that are planned to implement to system and define the expectations from the ASK-US-HEALTH system. It also describes how the system operates and how users interact with the application.

This proposed system is a Web technology based application integrated with data mining which includes user interaction. This system will provide communication environment for users (Patient Doctors and pharmacies). Every user has their own profiles and the Doctors, Pharmacies as well as the patients can have better secure access with given logins to the system. The patients can enter their symptoms and the system will provide them with a list of probable diseases. They will also be provided with a list of nearby pharmacy shops as well as relevant Doctors and few tips and tricks to maintain a healthy lifestyle.

**Supervised Learning:** A supervised Learning Pneumatic algorithm is used, where the doctor acts as a teacher and provides inputs to the system. The algorithm iteratively makes predictions on the training data and is corrected by the teacher.

**Intended Audience:** System development team members, patients, chemists and Doctors.

This system will be independent and self-contained. It will work in the following manner: The System will ask the patients to register first by providing their personal credentials in order to create a login id. All the patients can login into the system by using their own login id and password. They can enter their symptoms and the system

will display a list of most possible diseases using the Learning Pneumatic algorithm. We intend to provide accurate results for the users which will be helpful for further diagnosis. The system shall allow user to create profile and set his **credential**. The system shall authenticate user credentials to view the profile. Doctors will be asked to login into the system by registering with their details and uploading a photocopy of their medical degree certificate. The admin will have his own id and password to login into the system.

**Design and Implementation:** The System is restricted to evaluate English Language only. The basic constraint of the system is to keep the data of the patient confidential to the System and Doctors only. Also, the maintenance of the patient's medical prescriptions are to be considered. In addition to these, since the user information is stored in a database and this database can be hacked and user information will be no longer private to the user. An Internet connection is must for the web application to operate. To sum up, this system has constraints in terms of regulatory, reliability, safety and security but these constraints can be manageable.

**System Model:** The Software Architecture of the proposed system as shown in figure No.1 displays the workflow of the system. It describes how the user is guided while using the system.

In the system, actors are Doctors, Patient, Chemist and Admin.

System will take inputs from the Patients in the form of symptoms.

Patients can view the outcome of the system in the form of probable list of diseases.

The Patients can contact the nearby list of chemist shops provided to them

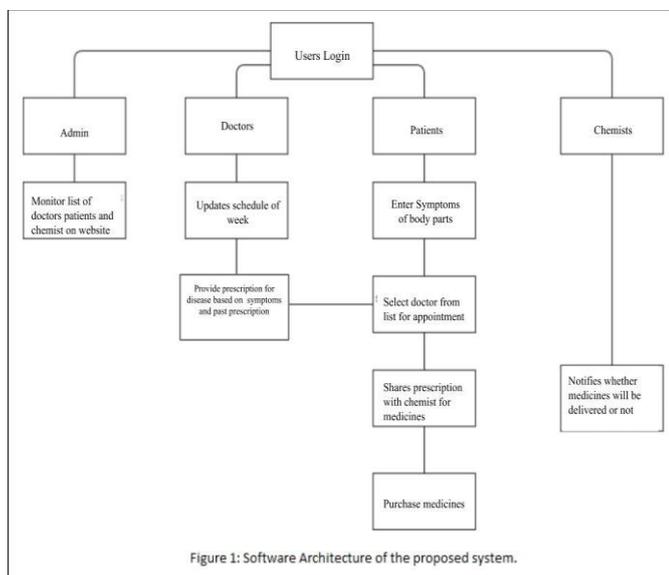


Figure 1: Software Architecture of the proposed system.

#### 4. PROPOSED ALGORITHM

In this section we present the proposed novel Learning Pneumatic algorithm which works as per explained in the previous section, by taking the inputs from the patients in the form of symptoms and displaying the output to them in the form of list of most probable diseases and connecting them with the specialists concerned.

##### Learning Pneumatic Algorithm

1. Accept the list of symptoms provided by the user
2. For each symptom
  - a. Find the list of disease associated with the symptoms
    - i. For each disease check
    - ii. Whether that disease exist in an array
    - iii. If it does not exist create its key and assign the value as 1
  - b. Else increase key value by 1
3. Sort the above array based on value.
4. If a batch of disease has the same number of match\_count then sort them based on total number of symptoms matched.
5. For each diseases, compute weight of all associated symptoms that are provided by the user and store in Key-Value pairs.
6. Sort the above pairs in descending order based on value.

The next proposed novel algorithm deals with the inputs received from the doctor's side in the form of accepting that the disease predicted by our system is correct and we thereby increase the weightage of those symptoms in order to give better user experience to the next users using our system.

##### Doctor Input Phase

Doctor will be provided with an option to review the disease predicted by our System.

1. If disease predicted by our system is verified by the doctor
  - a. Increase weight of the user provided symptoms that are associated with that disease by '0.1'.
2. If disease predicted by our system is incorrect the doctor provides the correct disease name
  - a. If disease exist in database, for each symptoms
    - i. If symptom is associated with that disease
      1. Increase weight of that symptom by '0.1'.

- ii. Else if symptom is not associated with the disease
  1. Create relation of that symptom with that disease and body parts provided by doctor for that symptom.
- b. Else enter the disease in database and enter all the corresponding symptoms with the respective body part.

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## 5. APPLICATIONS OF THE PROPOSED SYSTEM

The diverse advantages of the Internet, such as easy accessibility, availability, collaboration with various services and intermutual communication, has made diffusing healthcare information very basic and easy, moving towards an era of information revolution. The proposed developed system can be utilised by doctors, patients, pharmacies, Healthcare Mobile Applications, police, ambulances, etc which will help to save the life of an individual and also help them to connect with the needful services on time.

## 6. CONCLUSIONS

This paper presented, a system for complete healthcare Management, deals with health data. We have also listed the various applications which can use the proposed system. The proposed system developed using integration of various features on single web application using data mining, is able to deliver effective and efficient second opinion of diseases, scheduling specialists appointments and receiving medicines at his/her convenience.

Proposed system was tested on MySQL as backend and developed using HTML/CSS and Laravel on frontend. Initial

experimental results are highly encouraging. In future, the proposed system can be integrated with ambulances, smart wearable devices, hospitals, etc for delivering highest level of user satisfaction.

## 7. REFERENCES

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