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Effective assistance and interaction among e-doctors using cloud computing

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ABSTRACT

In our day-to-day life, the advancements and improvements in the field of medicine are significantly increasing over the years. This typically encourages the people to adopt upcoming trends to enhance the current doctor-patient relationship and take it to the next level. The proposed approach extends the present scenario by providing assistance to doctors around the globe for earlier detection of diseases and their relevant symptoms efficiently. The drawback in existing scenario of using the Healthcare system is often associated only with the user defined keywords. With the competent use of the cloud, it is possible to enhance the scalability issues as large amount of data is subjected to storage and retrieval periodically. This paper highlights in providing an efficient assistance to doctors for detection of possible diseases and its related treatment outfits and also improves interaction among doctors around the globe. This approach mainly aims at providing effective aid to doctors for earlier detection of diseases and not to replace doctors.

KEY WORDS: Cloud, Doctors, Healthcare system.

1. INTRODUCTION

Medicine is one of the most vital necessities to all of us in our day to day life. In India, from ancient time to present era, Medicine itself refined his own evolution from Siddha, Ayurveda, Yoga and Naturopathy, Unani, Sowa Rigpa, Homoeopathy. At present, it is enriched with yet another dimension stating as Medicine applied with Modern Science. Although the advancement in the field of medicine is drastically increased over the years, the doctor-patient relationship still prevails. As far as any disease is concerned, medicine plays the role of savior. That's why it is significant for the doctors and pharmacists to be aware of all the medicines which is prescribed in order to treat the patients. Even some of the prescribed medicines can cause complications, if it is not properly taken care and treated in time. Historically, current medical education is focused only on the diagnostic process. After qualifying the undergraduate course, doctors are expected to transcend their skills. In addition to this, it is also essential to enhance their knowledge and skills with a long term emphasis on the management of patients and their ailments. This is nourished largely in hospital setup but due to the inadequate experience, Doctors are ill-prepared for practicing their knowledge about the consultations of patients in general diagnosis phase. This leads to the need of defining a primary goal for improvising their skills which is more appropriate for general practice. Such skills were neither taught nor learned in medical institutions or hospitals. The development of such general practice as a discipline is witnessed only after the consultation with the physicians for better understanding and also from the guidance of renowned experts. Another major issue to be managed is the complexity and risk in situations that outfits by uncertainty where error can have adverse effects or consequences. This in turn incurs intense and broad practical knowledge based trainings and it is also incumbent on every physician to ensure that he/she is up-to-date in relation to assessment and treatment of diseases, thereby capable of weighing the evidences and individualizing the symptoms and make their judgment with some assumption for treating it. Even though most of the influential studies about the diseases and their symptoms are published in medical journals, many have not yet been proved, the obscure transparency in scientific evidences of the diseases creates a complex problem for the physicians in determining the root cause for the disease which is generally due to be deficient in based on knowledge. This system overcomes the present limitations and aid doctors by providing assistance in diagnosing the diseases which is explained in further sections. The rest of the paper is organized as follows. Section II describes the related works on the basis of the survey. In Section IV describes the proposed architecture of the system. In Section V the modules of the proposed approach is discussed. In section VI provides the details about the results obtained and finally, in Section VI some concluding remarks are drawn with the future enhancements.

Related works: With the regards to the technologies trends, knowledge management can be found as information model such that key performance indicators is used for knowledge analysis within the regional level authorities. This system forms a complete set of metrics for the effective patient's health monitoring in regional health care system. Although the data collection seems to the encapsulate various related data to improve the knowledge sharing among the different health care systems, it lacks to address the scalability issues and meant exclusively for the expert panel group only.

2. MATERIALS AND METHODS

Architecture diagram of the system: The architecture design is of utmost importance because it explains the overall procedural approach of the system in order to understand the series of steps to be followed where specialists from different fields are connected together in a common platform.

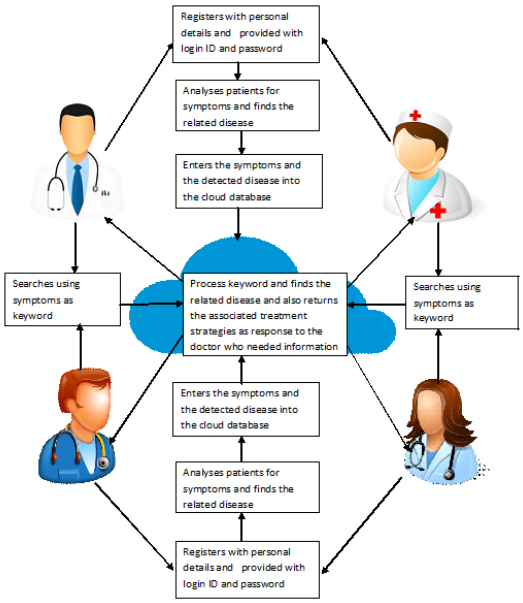

Figure.1. Overall View of the system

Proposed effective assistance for e-doctors: This paper consists of sophisticated effective system which aids the physicians to be aware of the possible disease the patient is suffering from with the known set of symptoms which has been analyzed. The proposed system integrates with cloud services such that it can be accessible from anywhere around the globe. The detailed overview of modules as follows:

Enrollment of Physicians to the registry: During the first phase, Initial set up is framed such that each and every doctor registers himself/herself to the proposed database registry using the unique registration ID(only authorized physicians can hold his id) which is provided during the enrollment in Indian Medical registry of Medical council of India. This process enrolls the name of the concerned physicians and their qualification. In addition to this, it also consists of the registration year and the corresponding council for every doctor. After the registration, all the doctors from various specialization, in the field of medicine is associated to a new profile, wherein it connects all the physicians together in a common platform to communicate and exchange information. Updating of Evidence based knowledgeable reports

In present scenario, physicians find many cases which encounters various problematic situations to decide upon the exact disease. It is also noted that many symptoms seems to be common for certain type of diseases. In such cases without any scientific evident based knowledge, physicians cannot seek the appropriate analysis, for the diseases which causes conflicts in general practice. Hence, while facing such situations and in order to avoid such conflicts physicians can obtain assistance from the group of people who has enrolled in proposed database registry, thereby ensuring their participation by sharing their analysis report about the concerned disease and their possible symptoms after the completion of consultation. These analysis reports generally describes the perception of doctor who handles/handled the similar case with his/her own assumptions in order to treat the disease, by individualizing symptoms by performing a series of tests without any uncertainty of error. The system can also include several evidence based knowledge report provided by many physicians in their own experiences of how to deal with the particular disease. This aids the physicians to weigh the evidences and make their judgment for further treatment.

Efficient Retrieval of Disease using Symptoms as Keyword: In this phase, we code all the data obtained from the physicians to the cloud server such that it can provide ease of storage and information retrieval, it is also subjected to scalability issues since it incorporates thousands of doctors altogether in one platform. Our proposed system involves examining the data provided by various physicians for making comparisons in order to conceptualize the most preferred data sets by indexing the ranking method for prioritization. This structured approach allow doctors to search for the related disease (undetected even after analysis by that concerned physician) using the appropriate symptoms as keyword. After the search query is processed, the most suggested (probabilistic result is chosen) disease is retrieved from a range of inferences. This result can only provide an assistance that the following symptom might have the maximum possibility of occurrence of a certain disease. With this perception, physicians can judge the undetected disease caused by the known symptoms and conclude the dimension of analyzing and proceed to the diagnosing stage. Most likely treatments and prevention is also suggested by every physician for better care.

Add-on functionalities: Diagnosing and treating the disease is also an art in the field of Medicine. Such skills were neither taught nor obtained, it can be learnt only by experience. In case of emergency or critical cases, it is necessary to have specialist or expert in that department (say Neurology) to treat the patients for better care, but this is not possible in every other hospital. For this purpose, our system aids with the special privilege of requesting the specialists for more details in form of reports or videos for effective guidance using the cloud platform. This process is performed after validating the authorization features followed by responding to the request by key exchange mechanism.

3. RESULTS AND DISCUSSION

The proposed approach is carried out on Intel(R) Core(TM) 2 Duo CPU 2.09 GHz processor with 2GB of RAM on Windows XP operating system using Java platform with My SQL 5.0 as back end tool and Apache Tomcat 6.0 web server in Openshit Cloud platform. This system includes various stages as explained in previous sections producing optimized results for assessing and treatment of diseases by weighing the evidences and individualizing the symptoms provided the physicians. Sample results as follows:

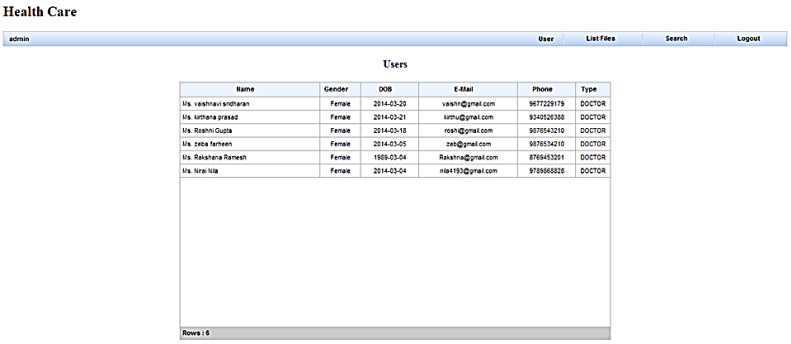

Figure.2. List of physicians enrolled in the registry

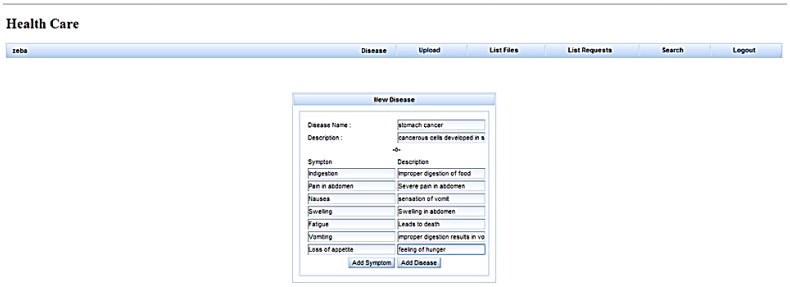

Figure.3. Updating the symptoms related to the diseases

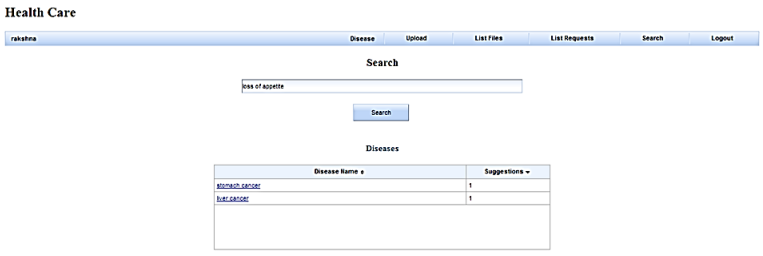

Figure.4. Searching for the related diseases based on symptoms as keyword

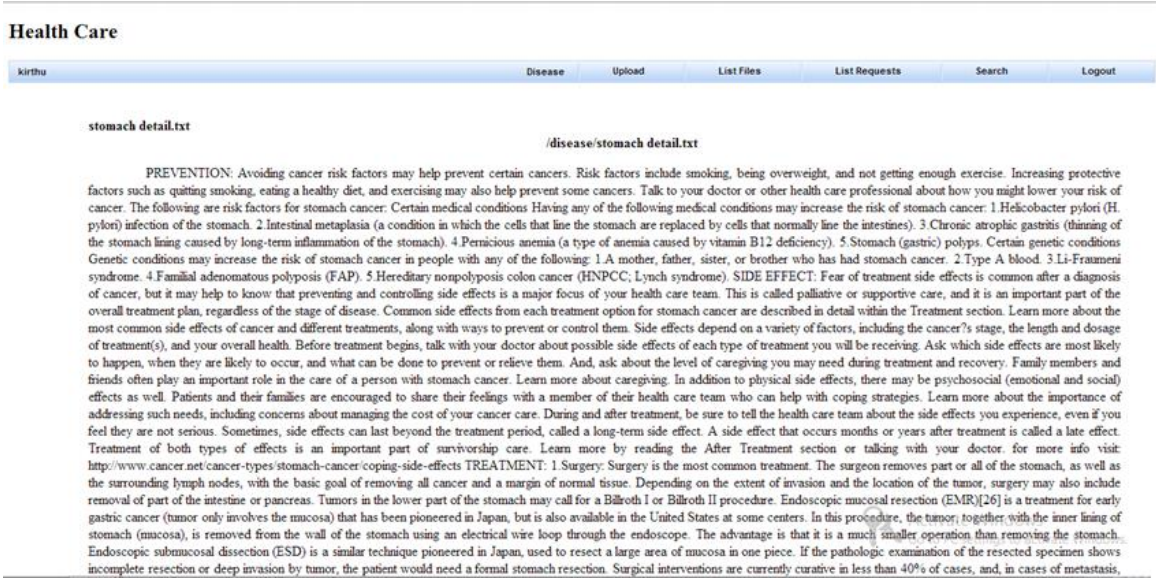

Figure.5. Retrieval of additional reports from experts on requisition

4. CONCLUSION AND FUTURE WORK

Thus a novel approach is presented by providing the effective means of intense care to the patients by aiding doctors to handle critical cases by analyzing the evidences and guidance from the specialist .With the advancements of technology, this system adds to the milestone in the field of healthcare overcoming the possible conflicts in the existing system. Further, the transparency provided by our system encapsulates various scientifically proven evidence based knowledge of what and how the health care system is to be redefined with significant dimensions. Our proposed comprehensive model is mainly designed to aid doctors in critical situations but 'Not as a replacement for doctors'. On future considerations, this approach can reevaluate the scalability constraints of using the cloud as a platform.

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