Development of an Artificially Intelligent Advising System for Saudi Medical Transcription

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ABSTRACT

In this world of IT related services and computer science, various new technologies are emerging. This technology is focused mainly on the ease of human being and their survival amid Covid 19. Medical Transcription is one of the highly professional IT related services. It involves highly skilled data processing job for medical field. The common system which prevails around the world nowadays is to visit the hospital and get the cure. However, once a patient which is a hospital and gets the medicine which is diagnosed by a doctor. He comes back to his house and take the medicine to get well. But in this complete process there is no guarantee of responding to a medicine in such a manner such that the problem, which had arisen will not happen in the future. Thus, it becomes very obvious that we don't have a solution in which the healthcare benefits can be obtained from using IT and services. As per the old system. The records of the patient's health are maintained in a file normally for a good hospital. The system maintains the medical records for each patient, however medical record helps in avoiding chances of omission of some of the important findings in the records. But in this scenario of globalization across the world, mobility of human being had been a very important part of its daily lifestyle. Thus, we can very well say that the system which prevails around the world nowadays is not very easy. Since the files that are written in the hospital for the medical health care services is not approachable at a very convenient rate. It is also not at all very sure that the disease that had been cured by the doctor shall never revert back again. When the disease comes back again, the patient needs a date to visit the doctor. This type of free visit to the doctor is required at every instance whenever a man feel some sick-ness. The sickness that has been encountered by the human being is not at all mortal. It can return back whenever it is required and there are certain symptoms in which the disease can be observed. This is a loss of time and effort. It is a very strong understanding method and the use of artificial intelligence can be done in order to observe the routine of the person and its healthcare. A system could be designed in which depending on the past histories of the medical ailments and the treatment of a person can be utilized in order to predict the nature of its human anatomy. A system which is artificially so intelligent that it can be able to give prediction for what might happen in the future for a particular man. Thus, this artificial intelligence system will be helpful enough to give warning to a human being at various times whenever he is happy, so that he will be saved from the problems that might arise in the future.

Keywords: Intelligent systems, Design and development, Web services, System analysis, Artificial intelligence, Medical transcription.

1. Introduction

If we consider the present system of medication and the system of human healthcare, which is followed by various hospitals across the globe it can be well identified that the system which prevails is not sufficient enough for maintaining all the records of the human health for an individual. As we have seen in the past history about various different systems that have evolved because of this tendency [1]. The most commonly used of all the systems is the routine inspection and the availability of information around the vicinity of the hospital only in the form of papers and files [2]. Several other observation symptoms and features that are possible by a human being healthcare system can be:

• Since Internet had become an integral part of the human life and contains more information, as compared to the books on social media if someone wants a medical advice he will search in the internet.

• The society itself is one of the best teachers who can serve to find out various in-formation regarding to a particular disease and its ailments by consultation of human beings within them.

• The most recognized and world famous method that can be used for finding out any solution of the healthcare problems is to visit a particular doctors specialize in a specific field.

• Finally he can review his mind for some basic advices from his past experiences. The stories that were heard from the seniors of the family or the society can be very helpful to find out the solution of various problems and their results as far as healthcare is concerned.

If you talk about the healthcare facilities that are provided by Ministry of health in Saudi Arabia, the best practice that has been observed by this particular healthcare facility is provided by the country for the people of the kingdom. In order to keep the health of the citizens up to a remarkable level, the ministry is trying hard to provide solutions of the problems by providing good healthcare facilities better hospitals and skillful labor and doctors. However, pay visiting a doctor is a big problem for the patient. And more important is the maintenance of the record of the patient in the hospital in the form of letters and files. However, it can be also observed that the hospitals are saving the information, not for a very long archival time. Since as the time grows up more of the information needs to be identified and managed by the hospital premises and the authorities.

This becomes a very big problem as compared to all the other things that can be done at the hospital level. The problem still becomes more intensified when the Doctor who is concerning a particular patient is changed or is removed from the existing location. The past health history of the patient remains aloof from the new Doctor who is going to take care of the patient from now. Thus, it becomes practically big problem in which the particular information which is required by the doctor to handle the treatment of the patient is found missing at a very considerable amount. It can be well identified that the information of the medical history of a particular patient is of immense importance as compared to other things whenever treating a person from a particular ailment is taken into consideration. The type of practices that are followed in the hospitals in the current scenario are not sufficient enough to meet this requirements. Also, it can be identified that the hospital will not process any information regarding to the global scenario and the information of the healthcare of a particular person is not noted down and available all across the globe. The non-association of all the doctors of the world is still more big critical issue whenever it comes to the sys-tem on handling the data of the individual human being.

There is a need of a procedure or an application that can be made with the help of IT services and computer trained systems to process the information of a particular human being. An artificial intelligent application that is self-sufficient enough to guide a particular human person to avoid all the dangers and the situations that may arise. Looking at his past history from the database that is available global, the artificial intelligent application must be able to support certain heuristics which are capable enough to predict the future of a particular person, depending on his past health history and the present medical outlook. Keeping in mind the points that are stated above and the problem that have been noted down this project targets to achieve certain objectives:

• The first and the foremost objective is the maintenance of the information in a particular order, so that it serves the history of the medical human under consideration [3].

• An artificial intelligence system that will be helpful enough to protect the future of the human being. Depending on his past history of the medical science using sophisticated heuristic. Methodology to solve the problem of healthcare and what might be faced by the person in the near future is the main task that is required to be done with the help of this project.

• Since the present era is of human computer interaction systems, it can be well identified that with the help of certain systems that will be able to record observations of a human being at a very specific order, the prediction of the ailment that he might face in his future can be done with least effort using sophisticated heuristic methods [4].

• The main idea behind this paper is to avoid the problem of the doctor interaction with the human being when the recursive process changes the doctor and the prediction of the ailment of the human becomes a very big critical problem. The Doctor Who had prescribed something in the past tense is not able to guide the new doctor for the ailment of the human being and thus it becomes sincere problem for the new doctor to identify what the past history of the patient was.

The system aims to develop web-based artificial intelligent application which have the power of predicting the ailment of the patient that will be beneficial for the patient, doctor and hospital in achieving its goals as follow:

• Hospital can enter the details of patient.

• Patient can log in the system and register himself.

• Doctor can view patient details.

• System will maintain records for the patient.

• Doctor will enter the details of sickness.

• System will maintain the information and generate the report.

• Artificial intelligence of the system will predict the user problems and probable solutions.

As a general observation, it can be identified and said that the application should be sufficient enough to maintain the records of a patient, so as to find out his past history that can be useful enough for the doctor who is taking care of its healthcare at present. It can be also identified that the solution which is proposed in this particular project will be artificially intelligent enough to predict what might come in the future if the person does not follow certain healthcare tips that will be given by the system itself [5]. The system is taking care of finding out all the possibilities to reduce the danger of the any sickness that can come in the near future. The medical transcription system (MTS) can be very helpful to provide various benefits to the users of the system along with the doctors and the hospital. If we consider a situation in which there are information about a person available in the hospital and they cannot reach another hospital for further treatment. We can very well identified that the level of problem is very high. This particular problem is resolved with the help of various techniques that can arise as a result of the artificial intelligence that can be given to the system that under consideration.

A very genetic mechanism, can be adapted by this particular application in which all the hospitals can be connected together with the help of a single system. All the users that will be making use of this particular system will be having a global approachability and availability of the data and information for any specific healthcare unit. Thus, it can be identified that this particular system of immense importance for the hospitals also. Even the doctors while treating a particular patient may find it very difficult from the past history is to be identified, what the patient have suffered in the past life. This artificial intelligent application is making records for all the consideration for the doctors will be taking care of the patients under consideration. Thus we can say that this application is a win-win situation for all the people who are taking this application into consideration like the doctor the user and the hospital. Finally, the project scope can be summarized to a very higher-level in which the guidance from the system

can be given to the particular person, which will be of various importance for this particular person to avoid any kind of sickness that can arise in the future [6].

2. Related work and Background

Artificial intelligence in medicine may be characterized as the scientific discipline pertaining to research studies, projects, and applications that aim at supporting decision-based medical tasks through knowledge- and/or data-intensive computer-based solutions that ultimately support and improve the performance of a human care provider. Various systems were taken into consideration and after listening to all the systems and their information, some of the systems were considered for the information gathering and the comparison of the features that are available. One of the most popular systems that are available in the medical transcription phases is run by EMDAT [7] (A). The system is a platform independent system which is very integrated with high quality of clinical notes that are required in various clinical documentations. The most highlighting feature of this particular system can be summarized below:

• Abbreviation Expansion: all the abbreviations that the doctors use can be used for the expansion of the system very easily and effectively. While reading the con-tents of the system identifies the abbreviation and use them.

• Archiving & Retention: one of the best features of the system is the archival and the retention of the information that is available for the records of all the patience from ancient history. This becomes very necessary and important ingredient of the system that is required to be produced with artificial intelligence logic of datasets.

• Audio File Management: yet another powerful feature of the system is the audiophile management system in which the recording of the audiophiles can also be done as far as the conversation between a medical doctor and patient is considered. This gives us the power to find out various conversations at various different levels of the history of the patient treatment at different clinics and hospitals.

• Audio Transmission: the transmission of audio files can be done from one point to the one, which gives the power to the doctor or the patient to find out the information at any instance from the existing system.

• Customizable Macros: the macros that are available in the programmable environment can be customized to be used by the user at very different stages. These macros are highly customizable in which a drag-and-drop sequence can be obtain for the utilization of them.

• Transcription Reporting: the reporting of the transcriptional system is yet another important feature that is offered by this particular system in which the transcription can be sent from one place to another, depending on the requirement of the doctor at a particular hospital or clinic. Finally, looking at the transcriptional system. The system can give and generate a report for the patient's history of the clinical treatment.

• Voice Capture: the capturing of the voice of the patient or the doctor along with the results that are opting from various different laboratories is also an important feature that is available in this particular documentation system.

• Voice Recognition: the recognition of the voice of a particular user is very important from the point of view of the medical treatment as well as for Security parameter is a biometric presentation unit.

It is very user friendly and it gives complete information about the voice file and helps to store templates in a proper way and checks the grammar and spellings. It even gives the character count and the line count. You can even make macros for frequently used text and keep a short cut. Yet another powerful system [8] (B) that is available in the field of medical transcription with intelligent medical software. As compared to the system that is shown above in the example, some more advanced features are available in this particular system [9]. These features can be explained as below:

• Adjustor Management: one of the salient feature of the system is that adjustor Management in which the Management can be adjusted with respect to the requirement of the user at the hospital is well.

• Case Management: various cases can be managed in this particular system. De-pending on the number of cases available for the user in the doctor concerned. Various cases can be filed against a particular identity of a user. These cases can give rise to a big number of database in which it can be managed and obtained their respective information required.

• Claim Resolution Tracking: at various instance. Many patients tried to tame for some particular medical transcriptions file. These medical transcription files can be claimed for various resolutions and the tracking can be done at par. Under certain circumstances of law and enforcement. There can be a requirement of the medical history of a particular person and the claim can be set the government level.

• Co-Pay & Deductible Tracking: yet another powerful feature for the payment in a dual mode and the reduction of the tracking system can be done for the 12 people is also clear in this particular system which is on the absent in the system above.

• Compliance Management: all the compliance reporting can be done in order to find out a comprehensive result and history of the patient. In the form of a report with the help of this particular system. Thus, it could be very useful in cases where the long-term history of the patient is required for the treatment of a particular ailment.

• Customer Management: the management of the customer can be done, when various modes and this prize a proper for the system to manage the system consumers.

• Electronic Claims: large number of information can be claimed by the user from his house in order to get the information various claims can be made. These claims that were requested by the user in form of a electronic system can be done with the help of electronic claims over Internet media.

• Forms Management: since a large number of documentation is required at the level of the hospital. Various forms that are available in a particular hospital can be made done with the help of the system easy. The filling of these forms and the retrieval of information from the data stored can be done with the help of the system effectively.

• Paper-Based Claims: a large number of paper-based claims can be asked by different levels and different places by different people. The system is capable enough in order to process this information that is required with respect to the pa-per-based claims.

• Payer Management: the management of the payer who is paying for the bills of the particular system can be handled with the system. Thus, it gives the power to understand who is paying and at what level.

• Policy Administration: finally the administration of a medical policy that is avail-able for various patients can be done with the help of the system without any problem.

Table 1. Comparison of the two existing system with the proposed model.

Features	Proposed System	A	B
Medical History	Y	Y	Y
Doctor History	Y	N	Y
Hospital History	Y	Y	Y
AI Based Advising (Problem Based)	Y	N	N
Health Guidance (Absolute)	Y	N	N
Health Tips (General)	Y	N	N
Transcription	Y	Y	Y

3. System Design
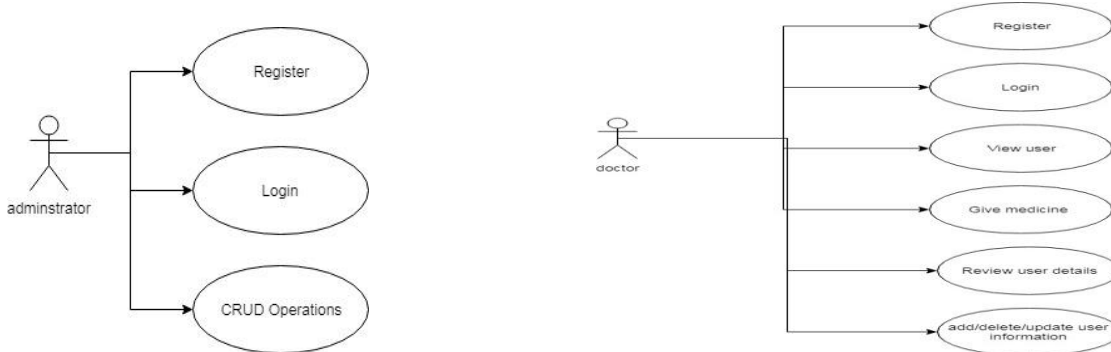
Fig.1. Use Case Diagrams (Admin and Hospital)
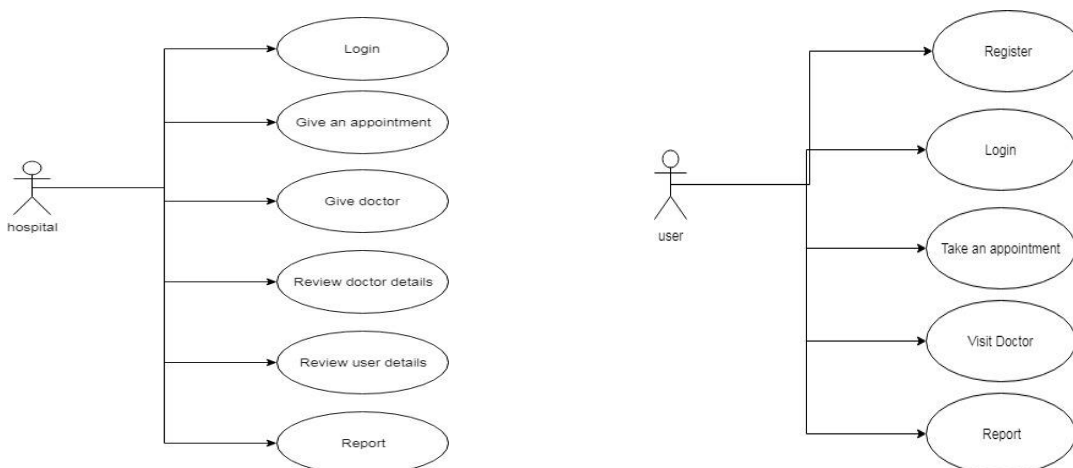
Fig.2. Use case Diagrams (Doctor and Patient)
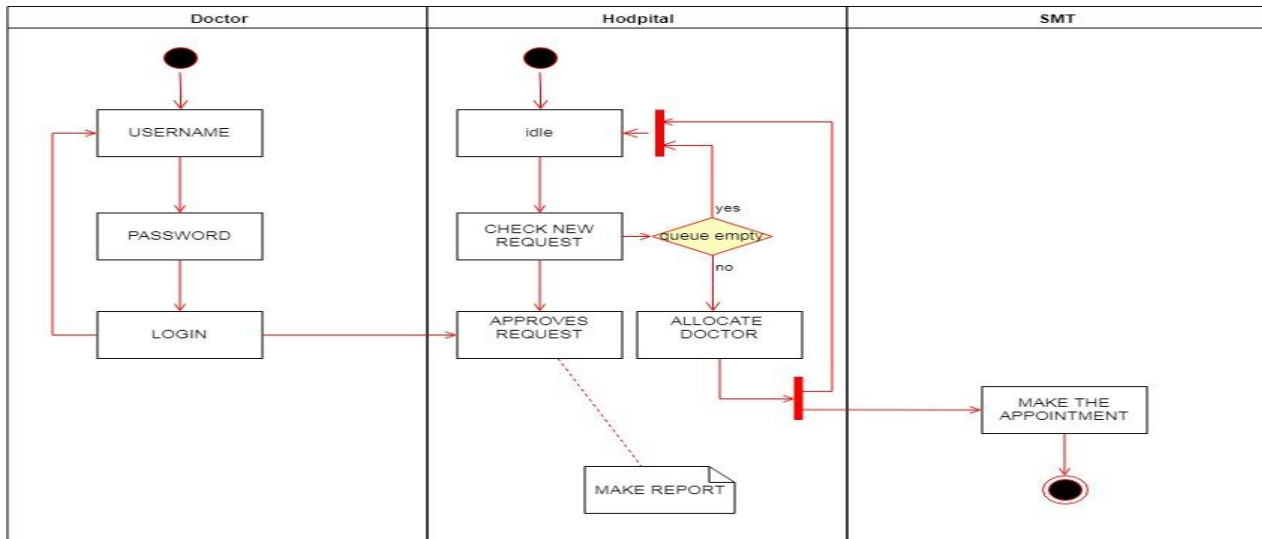
Fig.3. Activity Diagram (Doctor)
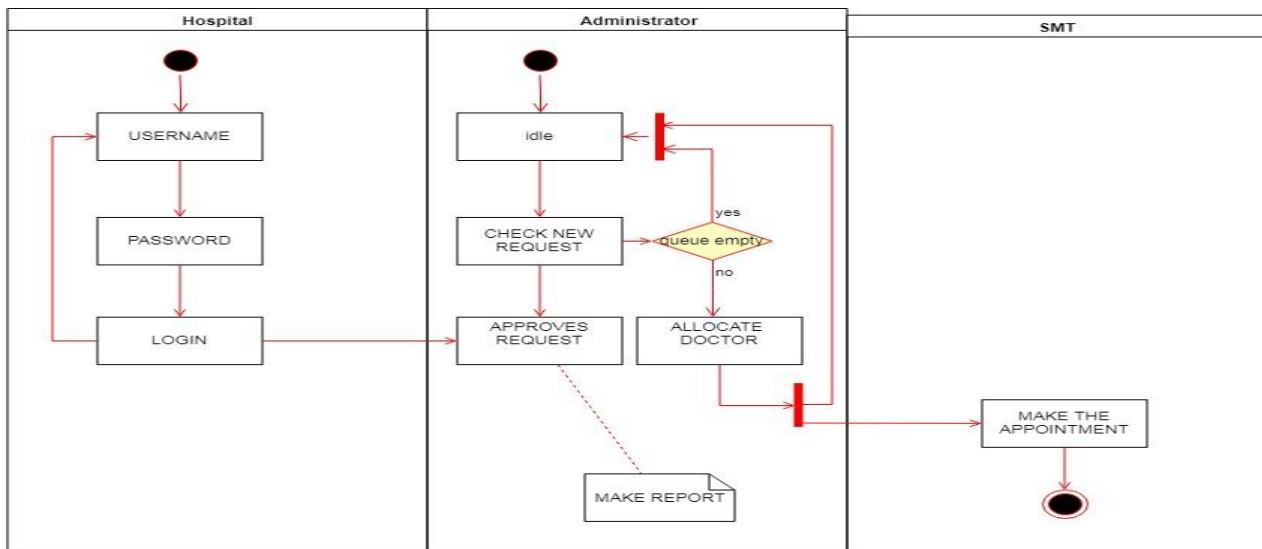
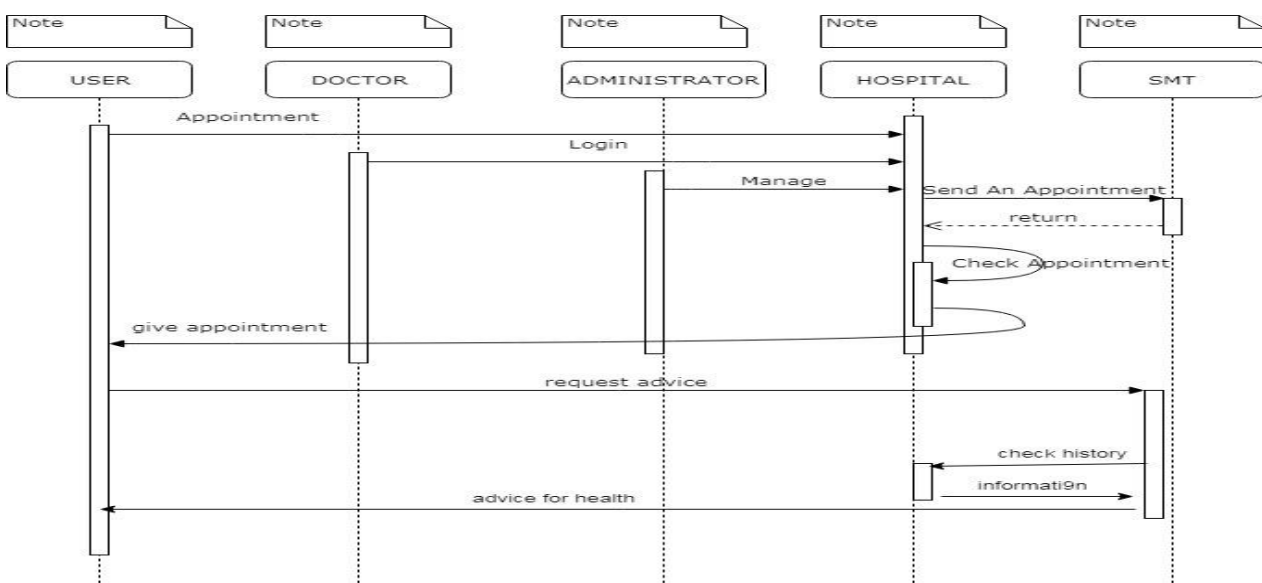**Fig.4.** Activity Diagram (Hospital)

Fig.5. Sequence Diagram for System Proposed
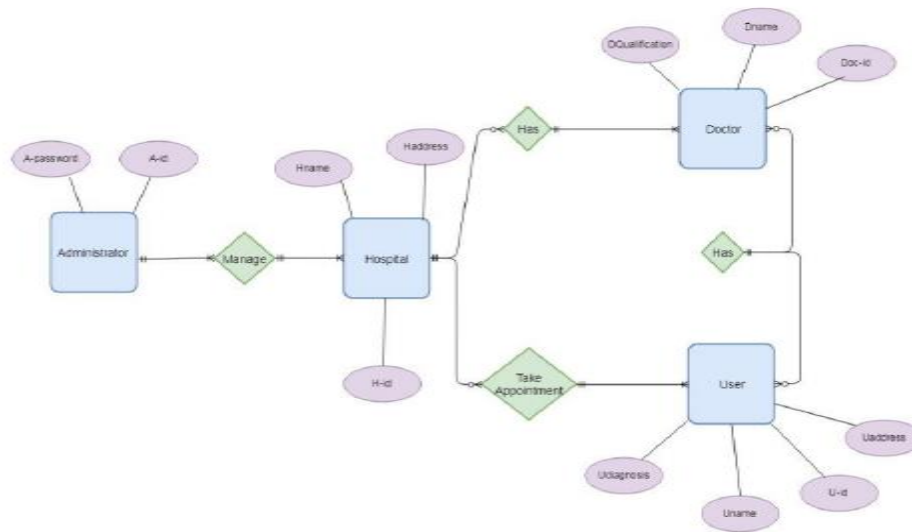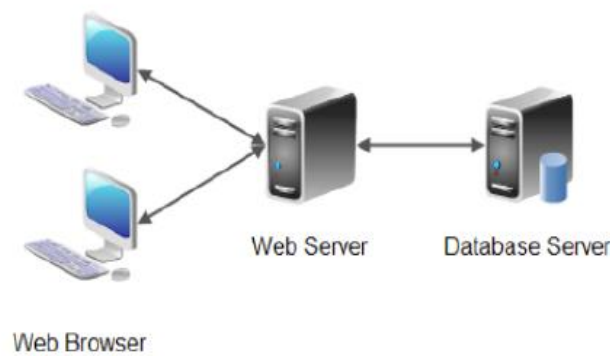
Fig.6. ER Diagram for the Proposed System

Fig.7. Architectural Diagram for Proposed System

4. Conclusions

A comparison of two system, which are existing is done in this research. Based on the findings and observations of the previously available system, a new prototype is designed in this paper to provide the power of artificial intelligence. The UML model is presented in this paper, in order to understand the system properly. A strong under-standing and background of the requirement is done. Based on the information and inputs the anomalies of the existing system, is calculated and design of a future generation based the system is presented. There are various other software driven approaches in order to provide medical transcription facilities. However, all of them lack the prediction power of artificial intelligence. The system which is designed in this research article, comprises of various factors that will be helpful enough to provide a strong system. The deployment of system is under pilot test at local level. The future enhancements for the system will be an artificial intelligent Mobile based application. However, the research for such an application is still under process as an extension of this part. The system is very useful to handle situation in various countries that have frequent movements of health care professionals across the medical realms. The availability of quick and respondent transcription will be helpful for the patient, doc-tor and the hospital facility as well. The use of heuristics to provide the power of Artificial Intelligence can be very helpful for prediction of the symptoms and proposing the medicine. Overall the proposed model is really helpful.

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