The Next Generation of the Medical Doctor

Abdurazzag Ali Aburas

Ittihad University
College of Computer Engineering and Sciences
Ras Al Khaimah,
P.O. Box 2286, UAE
Phone: 00971 50 680 3201
Fax: 00971 7 2362121
Email: abdulrrazaq01@hotmail.com

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Abstract

*The development of different software packages, which are, becomes more efficient and has increased its functionality to accomplish complex topics at one time. This paper introduces and describes the architecture of the **E**lectronic **M**edical **D**octor **S**ystem - **EMDS**. The EMDS based on an interactive learning environment of the Internet or on an independent of Personal Computer platform using **M**edical **D**octor Expert Database System. With members registered as physicians and learner (**MD** practice/patient). The EMDS provides clinical information and educational tools that are the most objective, credible and relevant to the members, their patients and their practice. The achieved system rests on three-tier architectures the practice/patient, the practice medical doctor and the database/application server, where learner can communicate via a very high quality interface using **D**istance **T**eaching and **L**earning – **DLT** strategy. The EMDS content the web's most robust and integrated medical information (medicine) and educational tools including online the market-leading medicine company. The EMDS provides a range of information, transaction and technology solutions that help learner such as consumer, physicians and complexity of the diagnoses prescription.*

1. Introduction

The EMDS was first used as a source to find the best list, directories of information in the medicine. Hence, the name EMDS comes from Electronic Medical Doctor System, which providing links to high quality diagnoses interface (web pages) is an important part for the MD learner and/or the patient (purchaser) to produce a very good quality diagnosis prescription as well.

In the E-learning context [1][2][3][4][5][6][7][8], the pedagogical triangle must take into account two elements that, in this case, take a particular importance the group and the mediation context (Figure 1).

The group is an instituted set of learners and Medical Doctor practices which shows some common objectives [10]. The mediation context constitutes the material (Medical Manager Database) or virtual interface environment in which occurs the interactions between the learner and the EMDS. Several works [11][12][13][15], have showed that in a learning environment, the social and the culture interaction and the cooperative work such as Medical Doctor in a community of learner has influence on the intern structure of the learner cognitive form [5][12]. Our software system is based on the principle that learner enriched also itself through the data exchanges, the confrontations, the competition and the interactions between both the learner and the EMDS.

Figure 1: The pedagogical

In this present work, we introduce and describe the EMDS as an interactive learning environment in the distant diagnosis context using either Internet or independent machine platforms. The achieved system is a software framework of **E**lectronic **D**ata **I**nterchange-**EDI** dedicated to the relational Medical Manager database integrated with a special hardware interface for laboratory medical examination. For the communication between the learner we used web's must robust and integrated medical information and education tools including electronic mailing system (Email), advanced health notices and printed completed instructed prescription.

In the following section, we describe the EMDS software architecture, in section 2., we demonstrate the Medical Manager over the medicine database, section 3., and we define and introduce the DTL policy [16]. In the section 4., we give a complete description of the advantage of using the EMDS, section 6., and section 7., we describe the diagnose
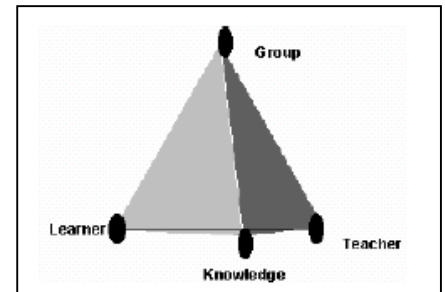
process and producing the prescription system, respectively, then we conclude our work with comments and future work in the diagnoses procedures.

2. The EMDS Software architectures

E-commerce refers to the process of baying or selling a product or service over an electronic network. The most popular medium in which e-commerce is conducted is the Internet. Medical doctor system is programmed to create commercial web sites using Active Server Pages contain scripts written in other scripting languages such as (Visual basic Scripting) and (Java Scripting). The NMDS allows healthcare providers and payer to process transactions more quickly and accurately, reduce administrative costs and speed healthcare reimbursements, also it is offers clinical transaction services such as electronic prescribing and ordering, reporting of lab tests requesting and patient billing.

The system has been conceived according to the three levels Customer/Server architecture (Architecture Three-tier): a customer/patient level, a data and applications server level and a web server level

2.1. Customer Level

It represents the different services asked by a customer, learner or doctors.

2.2. Web server level

It constitutes the interface between the customer and the data server while transmitting the customer's request toward the data server, and the achieved service by this last toward the *customer*.

2.3. Data and applications level

It represents the different services of data management offered to the customers (doctors, learners). In our data server, we distinguish two main actors that achieve these services according to the customer's request: the system actor and the tutor actor. These two actors use a whole of Medical databases for managing their services:

- A learner's base that contains the personal information about the learners.
- A practice's base that contains information concerning the practices.
- A diagnosis base whose structure is hypertextual that contains the whole of the medicines structured in levels.
- A connected learners base that contains the list of all health-problems on-line on the system.

3. The Medical Database Manager

The database is the heart of any information system. It is the centralized master file of basic information that is available to any authorized person within the firm. A database should provide for rapid retrieval of accurate and relevant information. Also it is a set of logically connected files that have a common method of access between them. Design the database was very sensitive step in our system and even it will be like that in any other system. The information provided must be accurate because the whole system is dependent on the Medical database Manager.

There are several types of database management systems. They can be classified according to the way they structure records. Early database management systems organized records in hierarchies or networks implemented with indexes and linked lists. Today, most successful database management systems are based on relation technology. Relational databases implement data in a series of two-dimensional tables that are "related" to one another via foreign keys. Each table (sometimes called a *relation*) consists of named columns (which are fields or attributes) and any number of unnamed rows (which correspond to records).
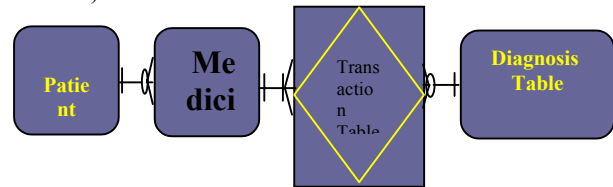

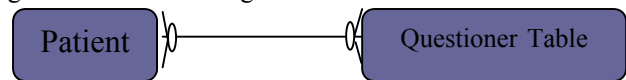Figure 2. Illustrates a logical data model for MD database.

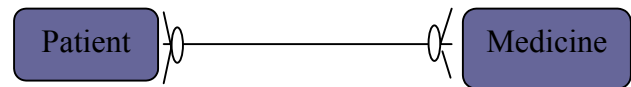Figure 3. *A Relationship (Many-to-Many*

Figure 4. *A Relationship (Many-to-One)*

Some entities of this system don't have relation with other entities, such as: Instructor. The main entities that this system depends on them are: Patient, Questioner Table (figure 3.), Transaction Table, Diagnosis Table, Medicines Table (Figure 4.) and the other entities are just to complete the system and to make the whole entities integrated with each other.

4. The DTL strategy

Distance Teaching and Learning (DTL) is a comprehensive staff development academy that will train interested educators to appropriately use the state wide software capabilities that are being placed in school districts and are scheduled to come online in the Internet. As with other Technology for Teaching and Learning academies, DTL's major emphasis will be on the creation of high quality, interactive curricular content by participating educators. This content will form a starting base for the instructional use of the state wide interactive interface capacity and will provide a platform for further

development of capacity and skill in using distance teaching and learning technologies.

The purpose of the DTL strategy is to establish a growing cadre of educators who will create, implement and deliver high-quality instruction interface program.

5. The advantage of using EMDS

Although a doctor and laboratory work may be essential to confirm a diagnosis, the EMDS does offer certain advantages over the human doctor – table 1.

The EMDS	A Doctor
Has the combined knowledge of many doctors and researchers	Has the knowledge of one doctor
Has no time limit	Has a few minutes per patient
Does not suffer from forgetfulness or imprecise recall	Is human
Operates at the same high standards every day	Has good days and bad days
Offers complete anonymity (if desired)	Knows exactly who you are
Is available 24x7x365 from where you are now	Is available by appointment only
Shows you the full reasoning behind its findings	Tells you "Trust me, I'm a doctor"
Looks at your health from many perspectives	Tends to think within his or her specialty
Provides you with a comprehensive, prioritized report	Keeps a few notes that you generally can not see
Has no interest in selling you treatments	May profit from the sale of treatments
Views your body as a highly interconnected system	Deals with obvious symptoms and with what you *say* is wrong
Highlights risk factors and discusses your overall 'system status'	Is generally unaware of this information
Presents the latest research, organized and cross-referenced	Will answer specific questions according to recollection, if time permits
Views each case objectively	May be biased by preconceptions, stereotyping, emotions or personal interests

Table 1. The advantages of the EMDS

6. The Diagnose process

The evaluation is a process that consists in either determining or to assign a level to the patient/learner in a diagnosis session. For the learner evaluation, we defined two categories of Multiple Choices Questioners (MCQ). The first category includes simple questions for simple diagnosis and the two or more questions with proof (yes/no addition question) for complex diagnosis.

For the simple questions, the learner must select the right answer. For questions with proof, the learner must answer by *yes* or by *no*, and the diagnosis must be justified by a proof.

7. Implementation: Producing Prescription

In order to fear the working and the global dynamic of the system, and more particularly, the interactions between the different actors (patient and doctor), we present a user's friendly Human Computer Interface -HCI of the application for a learner user, a doctor user and for an administrator (system) user. Figure 5.

Figure 5. Main EMDS Page

7.1 Sign In for EMDS member

The learner, the doctor or the administrator types the username and the password that have been assigned to him at their account (medical history) creation time (Figure 6.). After verification of the identity

Figure 6. Login In Page

by the system actor, the interface of the corresponding user (Learner, doctor or Administrator) is displayed

7.2 Leader-Medicine Company – Administrator

The leading medicine company will keep truck of the Medicine database upgraded Adding / Deleting / Modifying its product of medicine all time (Figure 7.).

Fig. 7 Leading Medicine

7.3 The Diagnosis System

The tutor is informed about his health problem, via the system HCI selection actor (Figure 8.), that goes to re-actualize the advancement state with taking into account the profiles base, then, the EMDS

Fig. 8 HCI Diagnosis Page

present to the patient/learner as possible of diagnosis procedure (Figure 9.).

After this, the EMDS diagnosis health problems of the learner; then the EMDS request a payment procedure before producing either in form of email message or printed prescription.

Fig. 9. Selection of the Diagnosis

According to the kind of prescription, the completed usage of the medicines is provided.

8. Conclusion

We described an interactive Medical Doctor System under the relational Medical Manager databases on Internet. The EMD system uses the DTL learning strategy, in its new version implies a community of learners and human. The system adopts a three-tier customer/server architecture (Web server, data and applications server and customer), where human and software actors can communicate through the Internet network.

The system adopts a collaborative pedagogical method that permits a constant solicitation of the learner, a permanent evaluation, a multiplication of paths, and multimedia tools that encourages using a maximum of learning channels implying a community of human and machine interactions. The ambition of the present project is to offer a collaborative Medical Doctor environment on Internet. Gaits are undertaken currently to shelter the system on the university and the market-leading medicine company website in order to be able to experiment it with students of the final year of the Medic/Pharmacology student.

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