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Web-Based Management for Distributed Drug Stores

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Abstract: Drug stores are the most common resources of drugs for people because many various types of accidents and disasters are happened at any moment. A good management for these drug centers will help the medical institutions to depend on reliable decision support systems. These corporate judicious decisions give the governments an integrated drug management system for their distributed drug stores. This study introduces a model to manage many distributed and different types of drugs stores by proposing a web-based management system.

Key words: Decision support systems, distributed databases management, web-based databases management, information systems

INTRODUCTION

In the recent dangerous world, the health of any person can vulnerable to risks such as fires, traffic accident, diseases. Because of that any person might need some types of drugs. A drug can be given three possible operational definitions:

- A chemical substance that affects the processes of the body or mind
- Any chemical compound used on or administered to humans as an aid in the diagnosis, treatment or prevention of disease, or other abnormal condition, for the relief of pain or suffering, or to control or improve any physiologic or pathologic state
- A substance used recreationally for its effects on the central nervous system

Such drugs are considered necessary and vital for the health needs of the population; they should be available at all times, in the proper dosage forms and at affordable costs. An essential thing here is how the person can get the necessary drug from such a drug store that has the required drug and the location of this drug store is nearest to him to save the time. It is a conscious attempt to utilize available resources on the most important drugs of benefit to the majority of the population, while recognizing the competition in the public sector (Hibbard *et al*., 2008; Valley, 2008; Lima and Bruera, 2000).

The power point in that field is how can find a good model to help persons for getting their drug by using an easy and efficient way to locate the desired drug store. To satisfy this goal, we must adopt some judicious types of management.

Management is the act or art of being responsible or in charge and conducting or supervising something (e.g., a health centre pharmacy, business, public undertaking) with a degree of skill and address. It is the judicious use of means to accomplish an end (i.e., public health). Despite the availability of numerous tools on the management of drugs, none of these specifically targets the health centre level, particularly the health workers employed at this level that have no formal training in drug management (Hibbard *et al*., 2008; Lima and Bruera, 2000).

Three reasons can be given to explain why drugs need to be managed properly. Firstly, drugs are part of the link between the patient and health services. Consequently, their availability or absence will contribute to the positive or negative impact on health. Secondly, poor drug management, particularly in the public sector of developing countries, is a critical issue, but major improvements are possible that can save money and improve access. Finally, drugs are no longer the responsibility of health workers only. Political, economic, financial and traditional considerations have become so crucial in health care that it has become imperative to look at drugs and health care from these perspectives. All of these factors contribute to appropriate financial expenditure, avoid wastage, increase access and ensure that drugs are properly used (Weaver and Young, 2007; Halevy *et al*., 2003).

In a world characterized by rapid change, the process must be agile so that the stakeholders can access, process and share information rapidly (Huang, 1999; Simon, 2007). The rapid evolution of information technology and tools

for building Decision Support Systems (DSS), since the early 1980s has produced an abundance of methods, models and software to support groups confronted by complex, illstructured problems like strategic decision making (Power *et al*., 2001; Bhargava *et al*., 1997; Ito, 2007). These group Decision Support Systems (GDSS) are interactive computer-based systems that help Decision Makers (DMs) develop a common understanding of the issues, identify alternative solutions, explore what-if questions, identify conflicts and negotiate as they work toward compromise and consensus (Karacapilidis and Pappis, 1997; Ito, 2007).

While, GDSS have the potential to contribute to collaborative decision making, their use has been far below potential (Bhargava *et al*., 1997). In Huang (1999), we observed that it is crucial for solution approaches to quickly support decision making and model analyzing. What is needed a re approaches that allow DMs, who are geographically separated to collaborate regardless of the computer platforms, they are using (Su *et al*., 2001; Kon and Campbell, 2000; Zhong *et al*., 2005; Migliori *et al*., 2006).

In the 1960's and 1970's, information systems were used as tools for data processing, in the 1980's their role evolved to that of systems that supported managers needs and take better decisions. Presently, we see their role change to strategic that is systems that support business goals of organizations and help create competitive advantage. The phenomenon of information systems as agents of organization competitive advantage received a big boost in the second half of the 1990's when Web Information System (WIS) began to become the norm.

WIS basically entails employing the internet technology and the capabilities of a web browser to create systems for enabling enterprise applications. This use of the web-based applications to manage information is a substantial improvement over traditional information systems and conventional use of the web technologies. WIS have certain characteristics that are quite different from the traditional information system that is they have more open architecture, ubiquity and the scalability of the web platform, allows these systems to be highly integrated within an enterprise. WIS also have the potential to cause fundamental change in an organization's business strategy, with accompanying change in it's business processes and that is one of the many reasons why we have seen the huge growth in their popularity in recent years as companies strive to keep competitive edge (Classen and Metzger, 2003; Chiclana *et al*., 2008).

The key in implementing a WIS in an enterprise is to combine the unique promises of the internet technology with traditional information strategies and use them to pursue enterprise objectives.

From a review of the literature, Su *et al*. (2001) inferred one of the earliest arguments for exploiting the opportunities provided by modern information network technologies. They conceptualized the need for a negotiation support system consisting of individual DSS interconnected with an electronic communication channel. Subsequently, Bhargava *et al*. (1997) we can recognized that decision making would become more agile and responsive if users interact and exchange data with the technology over the world wide web (www), but do not have to obtain a copy of the software since execution occurs on the provider's platform. Contemporaneously, Karacapilidis and Pappis (1997) researchers suggested that work on the implementation of GDSS pursue the integration of DSS, such as multi-criteria decision making techniques, with technical developments in electronic computing. They also proposed the use of the www to provide open, platform-independent access to GDSS (Yang and Xue, 2003).

This study propose a model that is employ the www to more fully utilize the potential of the GDSS by exploiting the cooperation produced from many drug stores to introduce a best service to the customer (i.e., to help a patient to get the necessary drug as fast as possible). Furthermore, a powerful connection between the distributed drug stores will cause a good marketing for the drugs and reduce wastage in the drugs, in some drug stores, because reach these drugs to their expired date, while some other drug stores, in other geographical place, lack these type of drugs.

MATERIALS AND METHODS

International Nonproprietary Names (INNs), also known as generic names, are normally used in identifying selected drugs. However, the choice of drugs by generic names requires the existence of an effective drug regulatory authority to ensure the availability of good quality, safe, effective and affordable drugs. At each drug store, it is essential to exist some one who expert in generic names of drugs. This will help to have correct and efficient classification for the drugs in that drug store (Hibbard *et al*., 2008; Lima and Bruera, 2000).

The generic name is used in writing prescriptions as well as in purchasing drugs. The use of the generic name for these purposes has certain advantages:

Table 1: Some examples of generic and brand names

Generic (INN)	Brand names
Acetyl salicylic acid	Asprin®, Aspro®
Ampicillin	Penbritin®
Benzl benzoate	Ascabiol®
Benzylpenicillin	Megacillin®, Specillin®
Cimetidine	Tagamet®
Cloxacillin	Orbenin®
Dexamethasone	Dectancyl®, Dexone®
Diazepam	Valium®
Doxycycline	Doxigram®,Monocline®
Griseofulvin	Fulcine®
Ibuprofen	Brufen®
Propranolol	Inderal®Paracetamol
Panadol®Salbutamol	Ventolin®
Sulfadoxine + pyrimethamine	Fansidar®

- There is easy recognition of the type of drug, especially where many selected drugs exist in that class (e.g., all benzodiazepines have INNs ending with-zepam)
- Drugs can be purchased from multiple sources, thus giving the advantage of buying at a competitive price
- Product substitution is easy where bio-availability presents a clinical problem
- The confusion associated with the use of brand names can be avoided

Some people argue (without evidence) that generic drugs may be of poor quality. The quality of drugs and dosage forms available in a country is dependent on the regulatory measures implemented by the responsible authority. It is important to realize that quality control and naming of drugs are separate issues. Indeed, some manufacturers sell their brand name products under a generic name at a lower price. Table 1 gives some examples of generic and brand names (Hibbard *et al*., 2008; Lima and Bruera, 2000).

RESULTS AND DISCUSSION

The components of the proposed Web-based management for many distributed drug stores systems are shown in Fig. 1.

From the Fig. 1, the architecture of the management system integrates three main parts:

- Web-based management system part (with its centralized database)
- Drug stores part (i.e., databases of distributed drug stores systems)
- Patients part (i.e., customers)

Each of these 3 parts is connected with each other through www (i.e., internet). This connection required a suitable web page for each part. These web pages must

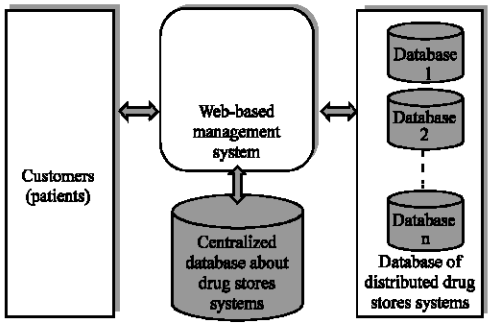

Fig. 1: Framework and architecture of the web-based management for distributed drug stores systems

be easy and have enough information to satisfy the goals of this management system. In the next study, we give a simple description for these web pages. This description just clarified the included information and operations that are required in the web pages for each part of the management system.

In web-based management system part (site) the web pages that are required for this part must have set of operations to manage the 2 other parts. These operations may be placed in many web pages:

Enter/login web page: For entering to the system from of the other 2 parts.

Management web page (for drug stores): To manage the information about drug stores that are participate in this system. These information like drug store ID, dreg store password, geographic description for its location, work hours, etc.

Management web page: To manage the drug information that is stored by each drug store, in the centralized database. These operations like exclude any drug from the central database that is reached to its expired date.

Searching operation for drug: It is the major operation of this management system. That is doing the search operation for any drug, given by any patient, in the centralized database and returns to the patient a list. This list contains the name and location of every drug store that have the required drug and near to the predetermined geographical location of the patient. Also with some information about this drug in these drug stores (like brand and generic name of the drug, price of the drug, type of the drug).

It is necessary to refer here that the web-based management system part must have a full built-in database of 2 types of information:

- Geographical information (city name, street number/name, quarter name) and any other detailed information that are help to describe any location in the country)
- A list of all generic names for any drug that might be referred to it from the patient or drug stores partss

In drug stores part (site), the web pages that are required for this part must enable each drug store system to do the following operations in its segment into the centralized database in the web-based management system part.

- Enter details geographical description information about the location of the drug store and the work hours of this drug store, change its login password. And update these information whenever its change.
- Add a new drug, delete any existing drug, or update the information of any existing drug whenever its change. The information of any drug must contain at least:
  - Brand name and generic name of the drug
  - Product and expired date of the drug
  - Type of the drug (i.e., tablets, capsules, liquid preparations, etc.)
  - Strength (usually in mg)
  - Price of the drug
  - Quantity of the drug

In patient part (site), the web pages that are required for this part must enable each patient to give a drug name (generic and brand) and determine some or all information about his/her geographical location. Also, he/she ask the management system to find a list of drug stores that have this drug and as near as possible to him. To make the use of this management system easy for any patient, wherever he/she wants to use it, it is a powerful point to enable any patient can use the system from any mobile computerized system (Laptop, Mobile telephone, etc.). This is required to provide the patient's web page the ability to display on any micro screen.

The success of the proposed web-based management system for the distributed drug stores is depending mainly on 4 points. First, the persuasion of the drug stores with the goal of good marketing for their drugs and reduce wastage in that drugs. Second, the persuasions of patients that this system will help them to find a list of the nearest drug stores to their location that have the required drug. Certainly, this will save for patients the efforts in searching about these drug stores and also lead to save more time for the patient. Third, the centralized database of the management system must have full and precise geographical description for each location in the city/country and a complete list of information for any drug in each drug store. Forth, an easy and friendly web pages layout for each part of the management system.

We refer here that firstly, we can begin to implement this management system locally for each city in the country and then collect the databases of these local systems to form an exhaustive management system.

CONCLUSION

In this study, we presented a web-based management system to be used in managing distributed drug stores. This system is designed to satisfy 2 main goals. First, this system will help the patients to make a decision in the searching operation for a drug store that has their required drug. This decision will save for patients the searching efforts, the time and the cost. Second, by managing the database of drugs in distributed drug stores the web-based management system seek to satisfy a good marketing of drugs for each drug store and reduce wastage in the drugs wholly. This management system employs the internet as an easy, friendly, available, cheap and familiar way to satisfy these 2 goals. If this web based management system will implement on number of drug stores in a set of small geographic areas as first, certainly this will lead to have an exhaustive management system for the drugs in the next few days. This management for drugs will give the governments an ability to take suitable decisions for good distribution of drugs and success in one of the important field of the health.

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