Database Model and Applications for Electronic Medical Records (EMRs) System

Lei WANG¹,* and Chang-rui WU²

¹Room 403, Unit 4, Building 6, Tong Zhou District, Beijing, 100149, China
²Institute of Acoustics, Chinese Academy of Sciences, Beijing, 100190, China

*Corresponding author

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Abstract. In order to solve the problem of sharing patient health information among different hospitals and realize the concept of patient autonomous health management, a standard interface SQL Server database model is set up, which can realize seamless connection between different medical equipment. It has the characteristics of strong portability and fast to access and facilitates doctors to understand patients’ medical history more quickly and improves the efficiency of medical treatment, at the same time, it is conducive to patients’ overall management of their health, and realizes the concept of universal medical care. It has proved that, compared with the existing system, the EMRs system based on database proposed in this paper improves work efficiency and medical experience.

Introduction

The production of a large number of medical multimedia and evolution of devices continuously and quickly, the change in the data output of multimedia is also continuous. The participation of multimedia is difficult because of the presence Variables between different hospitals in terms of the quality of the devices [3]. Manufacturers and the complexity of the data is more complex and it became necessary to have as the criteria and bases for the determination of these continuing variables. There is a systematic of the information produced from this how to prepare it to share data with others to maintain the development of a new set of e-health [4].

The current EMRs system in the selected hospital is not designed to be online shared with other hospital networks, so when the registered patient in the selected hospital want to visit another hospital for health check-up, he/she has to printout his previous medical records from the selected hospital and provide the new hospital the paper-based medical report, which happened often when the patient want to visit another hospital with different specialization or another hospital in a different city. This paper-based documentation process will cascade tons of papers in the hospital which considered unsafe information store method and has many limitation, as well as spreading patient’s medical records in many hospitals database systems will produce un-accurate and unmatched patient’s medical reports. There are many problems of paper-based documentation that are currently implemented in Chinese hospitals. Therefore, the paper tried to identify the requirement process in building database model for EMRs system.

My Design

In today's era of rapid development, database plays a decisive role, because according to the speed of database updating, cost determines the speed of enterprise development. On the premise of ensuring the safety and accuracy of medical data, standardized and structured data management is carried out, and assistant decision-making, intelligent inquiry, case retrieval, health guidance and other application services are provided for residents by using artificial intelligence and big data mining technology.
Data acquisition supports large data cloud centers. ETL data extraction system is used to customize complex transformations. Without the development of medical equipment manufacturers, data from multiple data sources can be aggregated, stock and incremental data can be extracted into data centers according to requirements, and medical resource information of each medical institution in the region can be obtained. It matches the health-related information of every resident in the way of time axis. Visual health-care information of every resident intuitively forms the portrait of every resident. It is convenient for clinicians to consult at any time, assist disease diagnosis, medication and treatment, help residents to inquire and manage personal health, and improve medical resources. The utilization rate also improves the efficiency of residents’ treatment.

**Design Process**

With Microsoft visual studio as the developing environment, and asp.net as design pages, and C#, java as programming language, a database model is constructed and a prototype for EMRs system is verified and developed.

Relational database data structure is single. Relations are expressed in terms of both entities and their relationships, which correspond to a two-dimensional data table. The data structure is simple and clear. Relation standardization and establishment on the basis of strict mathematical concepts. The concept is simple and the operation is convenient. Users can operate the database with a simple query language.

![Figure 1. Basic structures of EMRs.](image)

**Set UP Model**

The concept is simple and the operation is convenient. Users can operate the database with a simple query language. Because this system contains the basic medical records, the lack of large system is summarized, and improves the availability to manipulate.

After the conceptual information for the database to be developed, an entity-relationship diagram is produced as diagram below.
Simulation and Application

A new design of requirement model has been developed for new EMRs. The New EMRs system has been successfully designed to be online so that much hospital can share the medical records. A standard system with simple interfaces has been successfully developed to be compatible with critical hospital requirements.

To save the data in EMRs system as example, which it contains many hyper-links to patients’ information tables in the database. The details of each table can be summarized as following:

![User Interface]

Chart 1. User Interface.
Summary

The prototype of the EMRs can help the doctor and patient manage documentation in hospital, the EMRs is basic and standard, the most Value is the foundation of any can be used for a new hospital architecture, because not the size of the hospital is different, have different outpatient service.

According to the system author compiled a simple standard system, the system should be easy to understand, easy to operate, the usability is strong, the system must include the necessary functions of the medical system, the largest value of the system is can be used in any hospital development.

In Future work, the proposed system also can be conducted on developing the system to be an e-health application, so that no need to interview doctors face to face especially for the rural area.

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References


