DESIGN AND DEVELOPMENT OF ONLINE HOSPITAL MANAGEMENT

INFORMATION SYSTEM

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ABSTRACT

Computers are finding their way into every business, industry and research activity today. The use of computers is diverse such as entertainment, education, problem solving, research, personal management, etc. In hospitals, the process of maintaining the record of patients and employees working in the hospital, calculating bills, etc., requires processing and record keeping in different departments. Keeping in view a strong need for managing the above information fast and efficiently, Online Hospital MIS has been designed and developed. It is user friendly and provides simple and efficient way for managing the working of hospitals. It has been developed using .NET Framework. The database has been secured as only authorized personnel can modify the data. The database has been designed using Microsoft SQL Server 2000 as the back-end and the application has been developed using ASP.NET 2.0 as front-end. SQL Client data provider has been used to provide database connectivity. The software provides better speed and performance than the traditional hospital management system.

KEYWORDS: MIS (Management Information System), .NET Framework, SQL Server, SQL Client, ASP.NET

INTRODUCTION

Computers have improved the accuracy, speed and reliability of many of the administrative and technical tasks traditionally involved in patient care besides improving the service offered to patients. This has changed the workload of health professionals, allowing them to spend more time on the human aspects of patient care. Management Information Systems (MIS) are information systems, typically computer based, that are used within an organization. An information system is comprised of all the components that collect, manipulate and disseminate data or information. It usually includes hardware, software, people, communication systems such as telephone lines and the data itself. The activities involved include inputting data, processing of data into information, storage of data and information and the production of outputs such as management reports.

The introduction of computerized systems in hospitals has changed the working practices. Patient data is stored on computer systems, which can then be used to manage patient lists, appointment bookings and issuing of prescriptions. This is usually faster, more reliable and more accurate than performing these tasks manually. Therefore, computerized systems are money saving and reduce the workload of clerical staff. This project has been developed using Microsoft .NET Framework and Microsoft SQL Server 2000. The Microsoft .NET Framework is a component of the Microsoft Windows operating system. It provides a large body of pre-coded solutions to common program requirements and manages the execution of programs written specifically for the framework. The pre-coded solutions form the framework's class library. The functions of the class library are used by programmers who combine them with their own code to produce applications. Programs written for the .NET framework execute in a software environment that manages the program's runtime requirements. This runtime environment is known as the Common Language Runtime. Microsoft SQL Server
2000 is a product of Microsoft Corporation supporting web connectivity and better security than traditional database management systems.

Objectives of the Research

Online Hospital Management System automates and manages the working of hospitals. This is faster and more impressive than the traditional hospital system. The whole project is divided into different modules. The proposed system not only overcomes the loopholes in the existing system but also provides additional features, which will help in better management and also make the work of users easier. The specific objectives of the research are:

- To maintain the record of indoor and outdoor patients.
- To computerize the records of employees working in the hospital, including their financial aspects.
- Automation of billing of patients.
- Management of Hospital Stock Inventory.

The patient record touches, in some way, virtually everyone associated with providing, receiving or reimbursing health care services. This wide range of applications and use has led to efforts to automate the collection, storage and management of the data that constitute these records. But in spite of more than 30 years of exploratory work and millions of dollars in research and implementation of computer systems in health care provider institutions, patient records today are still predominantly paper records. This evident lack of diffusion of information management technologies in the health care sector has limited the tools available for effective decision-making. Given the importance of patient data to the activities of all portions of the health care spectrum, an effort was made to improve patient records, acting in response to expanding demands for information and for increased functional capacity of patient record systems, as well as the considerable recent technological advances that bring the benefits of computer-based patient records within reach.

A patient’s medical record has always been a dispersed entity. It can be defined as the accumulation of medical information concerning the patient. Ideally, this information is bundled in a single folder with the patient’s identification data on the cover. Much of the information in the records is obsolete, redundant, duplicated or indecipherable to the extent that it does not benefit the patient at the point of care. Ownership of the data is also a limiting issue. Many hospitals consider the records in their systems to be their property, whereas many patients argue that their medical information is their own. Consequently, a distinction is made between ownership of the physical record and the right to access (or duplicate) data that are stored in it. It is typically agreed that patients have the right to be informed of the general content of their medical record and that patients’ care providers must be allowed access to any information that is relevant to a patient’s treatment. They said that using the Internet to transmit medical information could allow providers, access to medical information at the point of care, but it might violate patient confidentiality. Obstacles that have prevented such implementation include patient and provider identification, security requirements, content issues, format and language. A patient controlled, “granularly secured” and cross sectional medical record that is accessible via the World Wide Web may be simple enough to implement and practical enough to show benefit.

Electronic medical record systems improve the quality of patient care and decrease medical errors, but their financial effects have not been as well documented. If we estimate the net financial benefit and cost of implementing electronic medical record systems in primary care and perform a cost-benefit study to analyze the financial effects of electronic medical record systems in ambulatory primary care settings from the perspective of the health care organization, benefits accrue primarily from savings in drug expenditures, improved utilization of radiology tests, better capture of
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charges and decreased billing errors. Implementation of an electronic medical record system in primary care can result in a positive financial return on investment to the health care organization and the magnitude of the return is sensitive to several key factors. Automation results in an improvement in response time and greater efficiency in diagnostic procedures. Electronic health records (EHRs) have a great impact on documentation time of physicians and nurses. The use of bedside terminals and central station desktops caused reduction in documentation time.

MATERIAL AND METHODS

System Analysis

A detailed study of various operations performed by a system and their relationships within and outside of the system was done. Data was collected from the available files, decision points and transactions handled by the present system.

Present System

The existing system, which is managed manually, faces many problems, such as difficulty in data storage and retrieval, data inconsistency, data insecurity, risk of data loss, wastage of time in maintaining paper work and many more. All the information about the patient’s treatment is maintained on the patient’s card. When the patient visits the hospital for treatment, he is given a card indicating the date of visit, name of the doctor giving the treatment, check-ups done, name of the disease and proper prescription. Thus the card contains complete history of the patient. When the patient visits the hospital he has to carry all the reports and card with him. Disadvantage of this manual system is that the patient needs to carry his card with him every time. It may be the case that the patient gets ill on the way, when he is out of city and may not carry the card with him. In that case he may have to undergo all the tests again. Thus the treatment may be delayed. Hence the traditional hospital management systems are not efficient.

The requirement analysis discovered necessity of having automation and computerization of the entire working of the system that would result in reduction of paper work, faster access to the entire contents, easy and durable storage, ease in the process of handling accounts like bill payments and receipts, capability of the software to maintain patient details, etc. To prevail over all these drawbacks, the Online Hospital Management Information System has been developed.

Proposed System

This software automates and manages the working of hospitals. The database system keeps track of data required for various departments in a hospital. The whole project is divided into following modules:

- **Patient Details (IPD/OPD):** This module keeps record of the indoor patients admitted, new outdoor patients, old outdoor patients revisiting the hospital for check-up, patients discharged, employees working in the hospital, details of the rooms issued to the patients, charges of various rooms, room transfers of the patients within the hospital, receipts for advance and bill payments, etc.

- **Billing:** This module is used for managing the billing of patients including all kinds of charges such as room charges, doctor charges and other miscellaneous charges deducting the net advance paid, if any and discount provided, if any.

- **Login:** This module deals with the security matters, user logons and authentications. It is used to create new users, who can login to the software of hospital and change password, if a user finds some security problems. Proper authorization will be done to take care of who is accessing the database – Administrator, CMO, doctor, operator or patient.
E-Card: In the proposed system, the patient’s card gets computerized. Therefore it is know as an ELECTRONIC CARD. The patient’s details are now maintained through the computer system. It is just like the normal card that the patient gets when he visits for treatment. The benefit is that the patient or doctor can access the electronic card anywhere across the world through INTERNET by just entering Patient Card No. Thus, the doctor can get complete information about the patient’s treatment history. The patient now doesn’t need to carry all the reports with him.

This system presents following benefits over the existing arduous and ineffective system of manual operations:

- Reduction of Paper Work: No need of voluminous files.
- Speed: The machine can retrieve and modify data far faster than a human can.
- Redundancy: Redundancy of data entry can be eradicated.
- Cost Saving: Money spent on papers and files can be saved.
- Easy and Durable Storage
- Ease in the process of handling accounts like bill payments and receipts
- Proper Authorization and Security
- Online Access

Following figure shows the block diagram of the project:

![Block Diagram of the Project](image-url)
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Figure 2: Design of Login Screen

Figure 3: Design of Module form

Design and Development of Database

SQL Server 2000 was used for database support. Fig. 4 represents the entity relationship diagram that is designed to view the required entities & their relationships within the Hospital MIS.
**RESULTS AND DISCUSSIONS**

Online Hospital MIS provides more security and better performance as compared to manual hospital management. Paper work is reduced to a large extent. Several tasks like registration of patients on the registers of hospital, bill calculation of patients, maintenance of records of employees, etc., which consumed hours previously are now jobs of just a few button clicks. E-Card allows for the storage of vital patient information and electronic access to health care provider's database.

The flexibility of E-Card allows affiliated hospitals and clinics to retrieve patient information. E-Card is a challenging area, where one needs expertise in domain as well as technical understanding, with hold on language used to implement the application. E-card is being used in western countries but it is yet to be implemented in India. In the coming times, this facility will be available across whole of the country. The interface with user is through forms that are totally graphics oriented and user friendly. Even a layman can handle the whole work after a short-term training.

The database is kept on a central server, which contains the database tables. The forms are kept on individual workstations in different departments and are able to access data from the server. Various departments can access their corresponding modules after proper authentication. Finally, we can say that the software is ready for implementation and it is sure to provide better and in-time healthcare services to patients.

**CONCLUSIONS**

The objective of research was to automate and computerize whole working of hospitals. Objective has been achieved successfully. The user first adds information into the database regarding various departments, designations, states, districts, patient categories, bed categories, etc., using master forms. Then details of various employees working in the hospital can be added. After that patients can be registered, transferred and discharged. Finally their bills are calculated, including bed charges, doctor charges and other charges. When a patient visits a hospital, he is assigned a card no., which is used to manage his visits to the hospital.

E-card relieves the patients from carrying their details with them by providing online access. It may happen that the patient faces some problem when he is out of city and has no treatment reports with him. In that case, if he has the card no., he can visit any doctor in that city and show his treatment history by accessing the online card by just entering his card no. and password. He is thus saved from undergoing all the tests again and can have immediate treatment. Online access to the software allows the doctors to view reports and visit details of patients even by sitting at home. Thus the E-card system can be beneficial for both the patients and doctors.

The system is secure as a user can modify the information only after proper authentication. It provides a big leap forward over the existing laborious and inefficient system of hospital management. Chances of errors are also eliminated to a large extent. Computerization and automation of the whole system helps in easy and fast access to the required information. The system is highly user friendly as appropriate messages are provided to guide the user logged in.

Although the project is complete in itself but as there is always a future scope for improvement; the same applies to this software. The provision for getting appointment from the doctor through Internet, i.e., Online Appointment facility can be added. The doctor could view the requests from several patients and accordingly give the appointment if possible. Further, Mobile Application can be implemented to allow the patients to view their previous visit details and get appointment from doctors through mobiles. Posting of employees from one hospital to another can also be managed. Further, doctors can be given the provision to post their articles on the website of hospital.
REFERENCES


