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Role of Emerging Technology for Building Smart Hospital Information System

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Abstract

For last couple of year emerging technologies had changed our life drastically, specially with advances in smart mobile and faster and cheaper internet. As a result of research & development activities we have various kinds of sensors like Digital Biosensing Surface, ECG (Electrocardiogram) to gather information, smarter equipment like Tablets, any Smart Phone Apps to process and present them; with these we have robust ways of communication to interconnect all these system to provide complete new user experience. Currently various hospitals are using computerized information system known as HIS (Hospital Information System). But with changing technologies there is scope for delivering smarter information system to deliver enhanced administration, superior patient care, and streamlined operations and improve profitability. The study is focus on analyzing current information system, finding key areas for improvement, identifying newer technologies to fit requirement.

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1. Introduction

Now a day's Health Care Organizations of all sizes faces a critical need to manage and integrate clinical, financial and operational information. In the current regulatory and economic environment, hospitals must focus their efforts on performance initiatives that are essential in the short term and that will also remain critical for long-term success. By delivering the right information to the right person at the right time, any enterprise will be able to improve the delivery of the healthcare Services and make processes more efficient. This is what transforming Information into intelligence. To Change Hospital Management system into Smart Hospital Management System needs to take help from various smart devices which are present now and coming in future. These various devices will help Organization with seamless flow of data between disparate systems and business units so that the enterprise at both macroscopic and microscopic levels can deliver better care and enhanced satisfaction to patients, care providers and also the attendants.

2. Objective of study

- Finding key areas for improvement in current information system for hospital in India.
- Identifying cutting edge medical equipments to fit existing and future requirements.
- Finding way for stronger interconnectivity between various terminals at hospital by enabling smarter and automated flow of information

3. Significance Of Study

Enhance operational efficiencies -
By integrating and streamlining your hospital workflow, it allows you to increase patient volumes without increasing staff. Automation of administrative tasks reduces errors and increases productivity at all levels.

Improve costs control -
With more accurate capture and reporting of business data, Smart HIS can be analyzed to avoid duplications, reduce cycle times and maximize the throughput of the hospital supply chain. All this leads to improvements in cost control.

Make better decision -
It helps as a management information system for the hospital authorities to develop comprehensive health care policies.

Improve the quality of care and patient experience -

By providing clinicians with a single, holistic view of a patient's medical information and clinical decision support, it enables informed decision making and improved patient care.

4. Research Methodology

The study is based on comparison between different Hospital Information System, how they are being used currently and thus finding key areas for improvement. With these what are cutting edge technologies available their use in current as well as future scenario. The study is descriptive in nature and most of the data is based on secondary sources of survey data. The study area is very broad and requires source of information to be gather from different fields.

5. Current Scenario

With increasing population demand for hospital management system are increasing. Most of major hospitals in India have adopted computerized hospital management information system. Individual department in hospital have computerized information system but lack of stronger and smarter interconnectivity between them. But still with changing technology there is scope for improvement.

A new generation of feature-rich, easy-to-use advanced devices like digital ECG(electrocardiogram), Ventilator system, wireless temperature counter, smart phones is keeping doctors organized and connected wherever they go and are helping to treat patient timely and precisely. According to a recent study of physicians and healthcare technology, Manhattan Research reported that 87 percent of health user haves smart phones and majority of them are using it for different health care applications.

6. Existing Modules And Scope Of Improvement

Patient Administration/ Front office-

Basic activities for front office includes registration, appointment, admission, billing and discharge.

Currently appointments with doctors are done using their fix schedule at hospitals. But there is always need of flexibility and is always to subject to change as doctors always need to attend emergency patient on priority. There is always need for efficient, time saving means of communication between doctors, hospitals, patient and all other concern persons.

We can enhance this system by building collaborative system comprised of smart phones/tablets, automated scheduling mobile app which will be connected with appointment system at hospital and with all concern persons for particular time schedule so as to send/receive changes in schedule.

We can use system like Adhar Card to make patient's basic entry at the time of emergency. Also information can be directly fetched through Biometrics Machine if system is connected to Portal.

Nursing stations -

The overall nurse station area may include activities including direct patient care with additional support to rooms located adjacent to the desk and charting areas. Medical supply storage, medication prep rooms, and clinical diagnostic areas may also be the responsibility of the nursing staff.

Primary services of the nursing staff are:

Management and distribution of patient care charts and records

Monitoring of patients including administering of tests and treatment

Communication of patient's condition to both physicians and visitors

Tablet computers can be installed in each room to facilitate physician create patient care chart. Nurse can provide treatment specified by physician and update chart. Newer digital lifesaving equipment like ECG, Ventilator System, along digital sensors like wireless temperature counter could be connected to smart application installed on tablet which can be connected with smart phones of nursing personnel. This will facilitate

Physician can monitor weather treatment he specified is provided according in timely manner without being present there.

Depending on reading on life saving equipments emergency alerts can be directly sent on mobile phone.

Physician can change treatment depending on current data from any location at any time.

Doctors Module

As a hospital doctor, doctor should examine, diagnose and treat patients who have been referred to by physician and other health professionals. However, the following responsibilities are likely to be carried out on a daily or weekly basis, regardless of the doctor's specialty. Doctors can enhance their responsibility by using several new techniques:

Surgery

Doctors, specifically surgeons, are the only who can completely perform most surgical procedures. But first assistant nurses may suture, handle and cut tissue. Here, For example, Doctor Can able to send information about some pretest for any surgery to pathology lab directly from tab/pad, so that, patient can only just go and do the suggested test without killing any of time.

Diagnoses

In general, doctors provide the diagnoses in hospital settings, while nurses provide nursing diagnoses, judgments about adjustments to daily patient care. Here, without coming directly contact with the body, Biosensing Surface machines can monitor & diagnose patient.

Treatment

With the exception of surgery, doctors generally prescribe treatment in a hospital setting; Doctors may order therapy, injections and changes of dressing. Here, for some treatments telemedicine's is the best option. The In Touch robots are just one type of technology that enables telemedicine, in which the doctor and patient are in different locations. Telemedicine can help hospitals keep tabs on patients after they're discharged, making sure they follow instructions and avoid the need to be readmitted.

Diagnostics/laboratory

The Laboratory performs various tests under the following disciplines: Biochemistry, Cytology, Haematology, Microbiology, Serology, Neurology and Radiology.

The Laboratory can be automated by enabling doctor to send online investigation request and the process involved in delivering the results to the concerned department/doctor of the hospital can also be automated.

Touch based sensors as an interface can be used to ensure efficient use of time. Smart phones can be used to monitor current state as well as completed report.

Blood bank

Existing module in the Blood Bank Management System is deal with maintaining all information regarding the donors and recipients.

Requirement of blood can be placed for schedule operative. In case of emergency just few click can send blood requirement along with place of requirement by automatically tracking device location(by GPS for distant location or device ID within same premises). In response blood bank can take immediate action based on priority of situation so as to ensure timely blood delivery.

7. Conclusion

With advances in digital medical equipments, wireless sensors it is possible to gather data timely and precisely. It is possible to create centralized system connecting each devices in hospital further this system can be connected with smart phones/tablets thus enabling more monitoring and control of operations even from remote location. Process of automation can be enhance with reduced redundancy with help of centralized interconnected system .

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