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Automated Hospital Clinic Maintaining System for Government Hospitals in Sri Lanka

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Abstract: The healthcare system is the most important factor in the development of the country. When considering healthcare hospitals contribution is priceless. So, in Sri Lanka, there are two types of hospitals. Such as government hospitals and private hospitals. Most of the people in this country use government hospitals for their treatment. Treatments to agelong diseases for long-term is one aspect of the treatment. To treat these agelong diseases hospitals, conduct the clinics. That clinics are divides based on the majority of the disease type. This research-based on the difficulties of the existing manual hospital clinic management system and the way it upgraded to the automated computerized system. The methodology used to conduct this research is a qualitative and quantitative-based survey. The online survey circulated through Email and the survey were completed by 300 samples of people covering the western province of Sri Lanka

Keywords: Manual, Automated, Clinics

Introduction

Hospitals play a vital role in Sri Lankan healthcare services. Great healthcare service is necessary for any nation in the world. Because of the efficient healthcare service system hold the key of development of the country. Increased diversity and specialization are the main problems posed in healthcare today. New medical specialties are continually being created: there are many positions in patient care, as well as many public and private organizations. All of these positions are involved in the treatment of a single patient in health care organizations. Hospitals are the backbone of the health service.

In Sri Lanka healthcare service has various aspects. Among all of these aspects' hospitals play a vital role in healthcare service. Also, hospitals are the backbone of the healthcare service. Sri Lankan healthcare service have two types of hospitals. Such as government hospitals and private hospitals. Perspective difference of this partitioning is from the government hospitals patient can get medicine for their diseases free of charge and from the private hospital's patients can get their medicine for their disease's payment basis.

These government hospitals have many aspects for give treatments to patients. Such as hospitals Out-Patient department (OPD), residential patient caring and hospital clinics, etc. When consider about hospital clinic, government hospitals conduct these hospital clinics for cure to patients' long-term for their agelong diseases.

Patients are categories to these clinics, depending on the type of disease. Through these clinics, patients can get treatments to their agelong diseases. That treatments can be day to day, weekly or monthly. It depends on the nature of the diseases. In the current hospital clinic system one hospital have one or more clinics. These clinics divided based on the major aspect of the human diseases. When a patient attends Out Patient Department (OPD) to check for a disease if that patient has a long-term illness, the hospital's OPD submits a latter request to the

Hospital Clinic Department to register that patient to a particular clinic. Hospital clinics have a manual system for registering new clinic patients and recording the daily status of the patient. This information was usually recorded in books. Sometimes after the patient is dead, they keep that record. Because of these record books may reason for so many problems. Sometimes these record books can damage, lost, patient forget to bring or sometime that record books can be misappropriation. Because of these reasons' doctors cannot identify patient real status, sometimes allergic can be occurs, sometime patient privacy in huge problem or patient can be dead because of some reasons. Sometimes one patient can be registered into one or more clinics. In that case, that patient and hospital clinic must maintain one or more separate clinics record books. Because of that kind of incident data redundancy can be occurred.

Literature Review

This research-based on a survey of the difficulties of the existing hospital clinic management system and the way to upgrade the existing system to automated computerized hospital clinic management system.

More and more government agencies, businesses and healthcare organizations are moving nowadays towards electronic records from paper records. Electronic Medical Record (EMR) system is used in healthcare organizations to capture, organize, maintain and retrieve medical records of patients. EMR program is a comprehensive database used to store and manage health care records for patients. For all scientific, regulatory or organizational needs, the EMR has substituted traditional paper medical records as the sole source of information in healthcare services. The paper aims to review the existing Electronic Records Management Systems (ERMS) and evaluate the healthcare industry impact of EMR systems. (Edmund, Ramaiah and Gulla, 2009)

This research introduces an innovative real-time system to enhance clinical research and analysis, which will enable access to medical information and promote care. Many issues remain in the hospital today, such as medical records of lost patients and other critical documents, this paper will address these issues. The system will help replace the manual procedure, and speed up information processing, storage and retrieval, which will greatly assist medical staff in performing their duties. Owing to increased productivity and overall efficiency, hospitals would benefit above all from relentless cost savings. (Ilo, Abraham and C, 2015)

The Hospital Clinic Maintaining System of the Doctor's aspect is concerned with the efforts to keep patient records and monitor their status. For a fact, the doctor's office holds the data of his patients. (Mamra et al., 2017)

Innovative automated hospital clinic maintaining system is based client-server architecture. The client-server architecture is a distributed computing between two types of autonomous and independent entities known as the server and client. Functions such as websites, web-based applications, a centralized computing system, mobile apps, e-commerce applications or even cloud computing are subsidized with the client-server concept in the modern information technology environment. Client-server computing places a crucial role among the majority in the form of remotely stored lactation for data or information access. The client-server system plays an important part in the evolution of IT. The client-server system components divided into two major sections of physical and logical components. Physical components are servers, client devices, input/output devices, networking, and power supply. Logical components are web pages, data, programming scripts, protocols,

e.g., http, https, telnet, IP and API, e.g., ODBC, JDBC. (Mohanty et al., 2019)

Middle-ware systems designed to increase distributed machine efficiency. Residing between the operating system and distributed applications, middle-ware systems provide abstractions that hide from application developers several details inherent to distributed programming. such as network communication primitives, failure handling, heterogeneity, service lookup and synchronization. The most common middle-ware platforms include Java RMI. In such systems, developers use the same syntax of local invocations to invoke methods on remote objects; thus, code for handling distributed communication looks similar to code that handles communication in centralized systems. (Pereira et al., 2004)

For security purposes, bar-coded ID Cards are used. When we use a client-server architecture to enforce this strategy it becomes a simple security version. In theory, barcodes are the encrypted type of data. Information that has to be stored in barcode type depends on the organization. The choices for the encrypted barcode could be rendered by proper software packages. I plan to use the creation of a very compact database kit that handles barcode printing using the NIC number with some encryption keys. (Ahmed, Haider and Nadeem, 2010)

An innovative registry definition which covers both the physician and patient information. It is a kind of database that includes the record keeping of the patient. Its principle avoids record manipulating operation. There are risks that the important data may be destroyed, but we can preserve a backup of each and every data by using this principle. The software is also protected in every way. This will make the data accessible to everyone in a decentralized way. Each person will have their own unique ID and PASSWORD. The registration form of the patient will also be maintained, including his / her name, address, contact number, date of birth, etc. The information will be moved from clinic to clinic and each client will have access to only their own personal data. (Yadav et al., 2016)

In increasingly everyday situations we come across conversational algorithms or chat-bots more and more frequently. For example, purchasing a flight ticket, or clothing from an e-shop. As an advanced and effectively implemented AI, chat-bots have their recognizably history and logical framework for development. (ZEMČÍK, 2019)

There are a variety of treatments available for different diseases. Possibly no person would know all the drugs and the diseases. So, the problem is there is no place where anyone can get the specifics of the diseases or the medicines. The AI can predict the symptom-based diseases and provide a list of treatments available. The system can also give the medicines composition and the uses prescribed for them. (Madhu et al., 2017)

Medical chat-bot using Artificial Intelligence which can diagnose the disease before consulting a doctor. The medical chat-bot is built to reduce the healthcare costs and increase accessibility to medical knowledge. Some chat-bots act as medical reference books that help the patient learn more about their illness and help improve their health. The user can only achieve a chat-bot's real benefit if he can diagnose all sorts of illness and provide the necessary information. A text-to-text diagnostic bot involves patients talking about their medical problems and provides a personalized diagnosis based on their symptoms. People will therefore have an idea of their health, and they will have the right protection. (Divya et al., 2018)

Methodology

The aims of this research area to explore the regression of the existing system for maintaining hospital clinic. The main objectives of this research were to upgrade

existing systems to the automated and computerized hospital clinic maintaining system. We used non-probability sampling methods for this research based on quantitative and qualitative data.

A. Collection of Sample

There are many government clinic users in this research. The population was large. Since this issue, this research was selected as a non-random sampling method for selecting the sample. Because the method of obtaining data was very cheaper and quicker. To increase data accuracy, Sri Lankan citizens have been categorized into a population only for the western province.

B. Collection of Data

In this research, the survey data were collected by a questionnaire. This online survey was performed by e-mail. We have also conducted several interviewees in addition to these questionnaires to improve the quality of the results of this research.

We have attempted to determine several specific facts through this questionnaire. Such as issues when registering for clinics, maintaining the clinic record books, the difficulty of select the next clinic date and medical details misappropriation. And, with a few open-ended questions, this questionnaire contained dichotomous questions, checklist questions.

Results and Discussion

Sri Lanka is a developing country. When considering health care system hospitals done a major thing to help the development of the country. But in government hospitals, most of the aspects work on a manual system. Hospital clinic maintaining system takes apart in that manual system. Because of this existing manual system be a major reason for many problems. This research focusses to find the barriers to the existing system and find a way to upgrade the existing manual system to an automated computerized system.

Questions of chosen specimens

The questionnaire circulated was based on close-ended questions. We gave optional open-ended questions for further evaluation and research assistance.

1) Section 1: Social and Demographic data:

- Gender

Table 1. Gender popularity as a percentage

Particulars	No. of Respondents	Percentage
Male	140	46.7%
Female	160	53.3%
Total	300	100%

Analysis and Interpretation: As shown in Table 1 of the 300 specimens that participated in the research Female was the plurality of 53.3% and Male was 46.7%.

- Age

Table 2. Age popularity as a percentage

Particulars	Percentage
Under 12 years old.	1.2%
12 - 17 years old.	10.3%
18 - 24 years old.	18.6%
25 - 34 years old.	26.7%
35 - 44 years old.	21.6%
45 - 54 years old.	19.6%
55 years old or above.	2.0%

Analysis and Interpretation: Table 2 shows the samples listed by age. The bulk of patients in hospital clinic range from 25-34 years and the minority of patients in hospital clinic range from below 12 years.

- Most used hospital types

Analysis and Interpretation: Table 2 shows the samples listed by the usage of government and private hospitals. Majority of using private hospitals 36% and minor government hospital 36%. 16% used both services. such as government and private hospitals.

Table 3. Hospital using popularity as a percentage

Particulars	Percentage
Web-based	33.3%
Mobile application	83.3%

- Attending of government hospital clinics

Table 4. Hospital clinic using popularity as a percentage

Particulars	Percentage
Yes	43.3%
No	56.7%

Analysis and Interpretation: As shown in Table 4 minority of 43.3% used or currently using hospital clinic and majority of 56.7% never used hospital clinic facility.

2) Section 2: Extant System:

- Current hospital clinic system

Table 5. Current type of hospital clinic system

Particulars	Percentage
Manual	16.7%
Automated	83.3%

Analysis and Interpretation: As shown in Table 5 majority of 83.3% used manual system for hospital clinics and minority of 16.7% using automated hospital clinic maintaining system.

- Satisfaction of existing manual system.

Table 6. Satisfaction of existing manual system

Particulars	Percentage
Strongly satisfy	3.3%
Satisfy	20%
Neutral	26.7%
Dissatisfy	46.7%
Strongly dissatisfy	3.3%
Particulars	Percentage
Easy GUI guiding	43.3%
Self-reset login details	30%
Instant SMS and Email alerts	63.3%
Easy to access previous clinic records	53.3%
Easy to pick a channelling number for next channel date	46.7%

Analysis and Interpretation: Table 5 shows the samples listed by satisfaction of the existing system. The bulk of patients in hospital clinic dissatisfy with the existing manual hospital clinic maintaining system.

- Difficulties

Table 7. Difficulties of the existing hospital clinic system (Multiple Answers)

Particulars	Percentage
Registering for new clinics	60%
Maintaining separate clinic record book for each clinic	50%
Every clinic day bring the clinic record book	46.7%
Forget to bring clinic record book	50%
Damage or lost clinic record book	46.7%
Clinic record book or your medical information misappropriation	36.7%

Analysis and Interpretation: Table 7 show the difficulties of the existing system. Most patients face with the registration problems.

- Platform popularity for Automated hospital clinic maintaining system

Particulars	Percentage
Government	36%
Private	48%
Both	16%

Table 8. Platform usage as a percentage (Multiple Answers)

Analysis and Interpretation: As shown in Table 8 most of clinic patients prefer to use the service through a mobile application and next, they prefer web-based application.

- Features add to the new automated system

Table 9. Features that prefer to add to new automated system as a percentage (Multiple Answers)

Analysis and Interpretation: Table 9 shows hospital clinic patients ' expectations from a new system. They mostly try to avoid the problems identified in Table 7.

Conclusion

As a developing country, we must go forward with technology. Based on that all government sector manual systems must be

computerized and automated. According to that government hospital management system must be automated. This research-based on only one aspect of the government hospital system. So, in this research only focus on to hospital clinic maintenance system. As our research, most of the government hospital clinics in the western province used manual systems for day-to-day works. Usually, one hospital has two or more clinics. Some hospitals have more than 15 clinics. If some patients register to two or more clinics that patient has to maintain clinic record books according to the number of clinics that patients registered. It can be a reason for so many problems because of the manual system. So many people are dissatisfied with the existing manual system according to our research. People really want to upgrade existing system to automated and computerized system. Many people usually receive medication from the private hospital, according to the research. Other than that, the satisfaction of the existing system. Because of some major problems with the existing system most people dissatisfy with the existing system. The upgraded automated system must have automated alerts for the next clinic session, simple-to-understand GUI, use Sinhalese as the default language and it must be easy to use for elderly people who do not have IT skills, usually a lot of time is wasted due to lack of proper management, hence, it must be assigned to a proper time management system to be successful, usually a lot of time is wasted due to lack of proper management.

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