Automated Information Retrieval System for Hospital Records Management

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Article Info

ABSTRACT

This Research work in its present form is a result of poor management of retrieval patient's information in hospitals. As a result of that, papers are wasted to stock data of patients in the hospital, time consuming to search for patient information and also handwriting of some administrators are not very clear. The idea is to develop a java program application software for the management and ease retrieval of patients' information in hospitals, and this led to the development of automated information retrieval system for hospital record management. It commences by first reviewing existing system, compare similar systems, review relevant concepts/technologies related to the system, review system development methodologies and propose waterfall model for the development of the new system. Fact –findings/ information gathering was done, analysis of the requirements, designed the database and inter-face, code the system using java program and programming language, evaluate the system and finally a test plan was carried out. After conducting the test plan, the system was confirmed to meet its requirements, working effectively/ accurately in line with the scope, an administrator control page for administrator to add/update/retrieve patient information, computerized database system to store patient information which is easy to maintain and retrieve. Government at all levels and private hospitals should adopt and implement this automated system in their facilities to ensure effective service delivery.

1. Introduction

Considering from a terminological standpoint, the idea of an Information Retrieval System (IRS)—a "system which retrieves information"—is rather self-explanatory. Two primary areas are of interest to IRS: (i) Ways to save data, and (ii) Ways to get data back. An easy way to describe this kind of system is as one that can store and retrieve data. There is an interdependent system of parts that make up IRS, and each part is there to do a certain job. In order to do anything, all of these parts work together. Information Retrieval (IR) is founded on the idea that some pieces of data have been structured in a way that makes them easy to find again. The goal of an information retrieval system is to find the specific pieces of data that a user needs once they have analyzed, processed, and stored the relevant data. Bibliographic materials or the precise text matching a user's search parameters can be retrieved from a stored database of documents using modern information retrieval systems. Since IRS was first working with textual documents, they meant text retrieval systems. Multimedia information, which includes text, music, pictures, and video, is also handled by modern information retrieval systems. Therefore, contemporary information retrieval systems handle the archiving, cataloguing, and retrieval of textual and multimedia information resources (Beel & Joran, 2009). Therefore, an IR system may be defined as a collection of protocols for carrying out any or all of the following tasks: a) Indexing means building representations of documents; b) Search formulation means building representations of information needs; c) Searching means matching representations of documents against representations of needs; and d) Index language construction means generation of rules of representation In a nutshell, information retrieval is the "science of search" that entails a variety of techniques for finding specific pieces of recorded and/or indexed data inside large data sets.

A method of adding documents to a database, making changes to those documents, and then searching for those documents to show to a user must exist. People who are actively trying to get information, such when they search the Internet, are the target audience for information retrieval systems. Searches for information in databases usually presuppose that the databases themselves are static or at least somewhat static. By deploying "spiders" to crawl the Internet and index the sites they come across, search engine businesses build these databases. With data mining, a formidable technique that can unearth buried predictive information in massive databases, businesses will be able to zero in on the most crucial data stored in their warehouses. Businesses can take the initiative to make informed decisions based on data mining technologies' predictions of future trends and behaviors. Data mining goes beyond the traditional decision support systems' retrospective tools by providing automated, prospective analysis of future occurrences. Material mining and information retrieval have grown in importance as a means for users to discover, access, and comprehend pertinent material in any format or language. When it comes to information retrieval, there is a particular

definition of language that applies when dealing with document collections that are multilingual; nonetheless, queries in one language can still be used to search collections of documents in one or more languages. Improving retrieval efficacy is the primary goal of the current study, which focuses on query expansion, translation candidates, disambiguation of numerous requests, and query translation with diverse combinations (Chang & Chen ;2006).

The main objective here is to change the data in such a way that sensitive data points can't be directly mined. The overall amount of data suggests that this data adjustment will not have a major effect on the primary conclusions. - In order to provide privacy, data distortion—also called data perturbation or data randomization—modifies individual data in some way. Even while the distortion changes the values of the individual records, it probably won't have much of an effect on finding and quantifying the primary correlations. - Techniques using cryptography. Here, several cryptographic methods are taken into account in order to conceal the original data when data mining. In safe multiparty computation, cryptographic methods are frequently employed to enable several participants to work together in join computing without gaining any knowledge beyond the aggregate outcome of their efforts. While cryptographic approaches may seem appealing at first glance, it's important to note that they incur significant communication and computing overhead, which may be expensive, particularly when working with big datasets (Billerbeck & Zobel ;2006) . Even if privacy restrictions prevent direct access to numerical data, all potential interactions might be fulfilled through interactions at the higher level of abstraction provided by information granules. Two crucial aspects of data granulation are communicated via (a) partition matrices and (b) prototypes in objective function based fuzzy clustering. Partition matrices are essentially collections of fuzzy sets that capture the characteristics of the data but do not expose precise numerical details. Partition matrices might be shared in this way without disclosing specifics about individual data points, so there is no invasion of privacy. The same holds true for prototypes; they summarize data and mirror its structure. Precise numerical data is concealed beneath prototypes and cannot be restored to its original format. No hard numbers are divulged in any instance.

A tremendous quantity of data is being generated globally as a result of the increasing reliance on information technology in our everyday lives. Due to the explosion of information and the ease with which it can be shared online, the pace and quantity of this growth have been increased. We require innovative methods to sift through this mountain of irrelevant data and extract the insights that will satisfy the needs of each user. By combining data mining with information retrieval and user reaction technologies, active mining aims to efficiently uncover relevant knowledge for users (Desikan et al;2011) The research details a method for retrieving information across languages, with an emphasis on techniques for processing the query in a source language before and after it is input. Users will have a better understanding of the papers' contents to the described

mechanism for showing the findings. The method is effective; it runs alongside the current search engine and aids in further refining the search. Through the integration of data mining and information retrieval approaches, we presented the found rule fettering and outlined the procedures to construct an automated information retrieval system for hospitals, with a special focus on.

2. Methodology

Waterfall Model also called as classic life cycle model was used. In the design process, progress is seen as flowing steadily downwards through the phases; investigation/planning, analysis, design, implementation, maintenance and evaluation with each phase completed before the next phase can begin and there is no overlapping in the phases.

A. Software Analysis of the System

The system is a web-database (automated) hospital management system that captures the records of patients and health personnel/ doctors official assignments. The new system is ICT based. It is an automated information retrieval system that processes the storing of data and information in a database that will be easy to retrieve at any given time. This is achieved by using some keywords to query the database and the requested information will be displayed for the user.

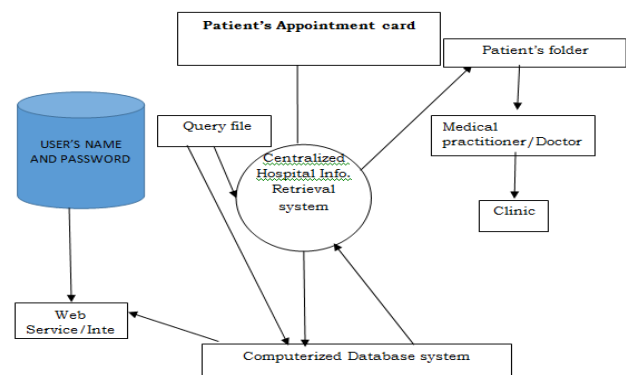### B. Software Architecture of the Hospital Retrieval Information System

Fig 1. Software Architecture

Analysis of Software Architectural Design for Hospital Information Retrieval System

The architecture of the proposed Hospital Information Retrieval System provides the structural frame work on how it would be module. Database files/folders would be created for both patients and medical practitioners where all their information would be stored and can be retrieved any given point in time. Graphical user interface (GUI) would be designed, this describes the part of the database that is relevant to particular users which in turn identify entities relationship and the associate attributes and also secure the centralized database so the entire hospital. Entity relationship (ER) model would be used to show the relationship between entities and to facilitate communication about the information requirements of the new system for the hospital management to retrieve any information that may be needed and the computerized database would be connected to the internet for efficiency, prompt and safety of the hospital information, this

new proposed system would be accessible from any part of country where by managers of the system.

Input / Output Design and Specification

The software will require some input for it to function or perform its task. It will also produce specified output based on the input.

The required input is listed below.

- Reg No:
- Last Name
- First Name
- Middle Name
- Sex: (Male, Female)
- Address:
- State of Origin:
- LGA
- Phone Number
- The output will include
- Extracted data from database
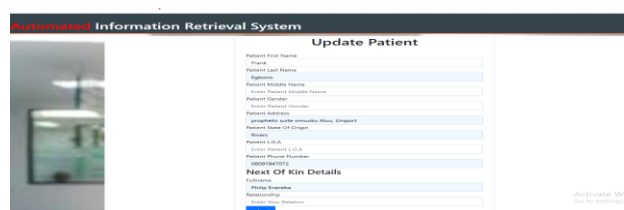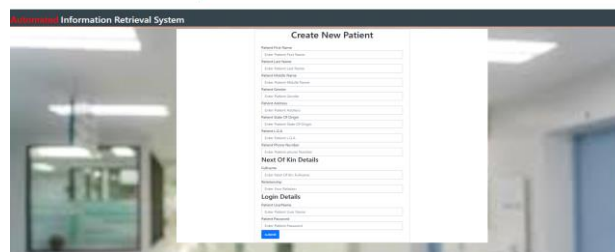- Suggestions: Alpha numeric (String)
- Report generation

3. Result of Findings

The result displayed a total compliance of the intend and purpose of the automated information retrieval application software system for hospital management, it's a computer software program for management of hospital records due to the numerous problems always encountered in the current manual method in use. Over 14 people were registered in database, these included some patients and staff (both medical and non-medical), booking of appointment for patients, retrieval, etc were done. The automated retrieval information system software designed for the hospital management was able to display transparency, storage, accessibility, fastness, accountability and irretrievability of patients and staff, even in the internet. Therefore, the problems associated with the manual method of handling information of patient and staff were solved at ease without any complication or crisis of any sort which even make the management of the hospital effective, productive and accessible in any part of the world.

S/N	EXISTING (OLD) SYSTEM	NEW SYSTEM
1	No Database Management system of both patients and health personnel/ doctors on duty but goes to the centralized medical records department where his/her folder is traced/ retrieved for use and is sent to the particular clinic he/she would be attended to by a medical practitioner/ doctor.	Has a Database management system that capture the records of patients and health personnel/ doctors official duty.
2	A manual method where patient's appointment are booked physically and folder taken straight to the centralized medical records department for continues storage on shelves and retrieval done physically.	The new system is an automated ICT/wed based. It is an automated information retrieval system that processes the storing of data where patient's appointments are booked on-line (via internet) and
		information in the database is easy to retrieve at any given time

Software Program

Table 1. All Patients Appointments

ID	User ID	Complaint	Doctor	Clinic	Date	Actions
1	1	Surgery	philip	Male Surgical ward	1/12/2024	Appoint Delete
2	6	Headache	Dr Chinko	Out patient cinic	30th of November 2023	Appoint Delete
4	12	Diabeties melatus	Dr.Frank	Out patient clinic	18th of November	Appoint Delete
3	1	Malaria	Dr Gift	Emergency	17th Nov.2023	Appoint Delete
5	5	Headache	Dr Gift	Emergency	30th of November 2023	Appoint Delete

4. Discussion of Finding

The automated information retrieval system for hospital records management used java program software targeted at having a computerized information system that records, analyse, process, store and retrieve at ease via data mining technique for patients and health personnel and the hospital administrators. This designed automated information

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retrieval system for the hospital management covers the gap presently existing in hospital and health sector such as lack of a well-designed storing and retrieving of records, database for handling records of patients, operational software program for monitoring events and official processes of both staff and patients (Desikan et al;2011).

The system provided an automated information retrieval system that will help the hospital management to create a centralized, transparent, accessible, accurate and safe patients and staff files/records enabling storing and retrieving large number of data and reduce manual method of putting them on shelves or archives as it is currently happening. The 14 people that were registered in the database were able to perform booking for appointments, receive treatments, retrieve folders at any given time needed at fast speed, at ease, transparently etc and with the software system on the web, it was simple to perform any of the pre-clinical processes elsewhere before finally moving to the hospital or health center for the doctor's attention and subsequent treatment if the need be (Bollegala, 2011). The research also details a method for retrieving information across languages, with an emphasis on techniques for processing the query in a source language before and after it is input. Users will have a better understanding of the papers' contents thanks to the described mechanism for showing the findings. The method is effective; it runs alongside the current search engine and aids in further refining the search. Through the integration of data mining and information retrieval approaches, we presented the found rule fettering and outlined the procedures to construct an automated information retrieval system for hospitals, with a special focus on.

5. Conclusion

This Research work has been able to proffer solution to much stress associated with manual processes of storage and retrieving of patient's folders where papers are wasted to stock data of patients in the hospital, time consuming to search for patient information and also handwriting of some administrators are not very clear. The idea is to develop a computer software application to management and ease retrieval of patient information in hospitals and this led to the development of Automated Information Retrieval System Using Data Mining Techniques For Hospital Record Management by first reviewing existing system, compare similar systems, review relevant concepts/technologies related to the system, review system development methodologies and propose waterfall model for the development of the new system. It's also create page for administrator to add/update/retrieve patient information, computerized database system to store patient information which is easy to maintain and retrieve making the health sector to experience current procedures obtainable in modern societies.

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