

# Online Medical Record Billing System

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**Abstract** - To eliminate the problem associated with the traditional manual billing system in a typical hospital, an online medical billing system is being developed to enhance proper billing task thereby bringing about profitability and efficiency in an hospital medical billing system. Therefore, the proposed hospital billing system is designed to help the billing system in hospitals required services for users at the medical billing point of the clinic. This research is a web based application designed to be deployed over the internet in order to allow easy access to the systems functionalities globally. The system models the complex means of the hospital records and billing System. However, the web based program designed is broken down into program modules using top down approach by identifying the relationship that exists between them including solution statements and coding to meet the set objectives of the research.

**Keywords** - *Billing, Hospital, IT, Manual, Medical, Online*

## 1. Introduction

Hospital is a health care institution that provides patient treatment with specialized medical and nursing staff with medical equipment. From the inception of the hospital, billing has been manually processed but it is imperative for healthcare providers to do their job in an efficient and effective manner by using an information technology for significant impact on the healthcare sector thereby saving countless lives and improved quality of life even more [2]. Therefore employees have to manage and integrate clinical, financial and operational information that grows with the practice. Digital records can then be much easier to handle and improve the workflow efficiency by integrating various tasks; overcoming ineffectiveness in the old cumbersome paper medical records and delivery system.

The manual system now becomes inefficient due to the voluminous number of drugs users, record of patients etc. which serve as information for preparing managerial decisions which are very difficult to locate manually. Therefore because of the problem and error arising from such a system, the computer-based billing system becomes very invaluable. In general, adoption of Information Technology (IT) will affect the productivity and profitability of a hospital [3]. For the improvement of the manual system, the proposed system will have features

found on the billing form with a built-in formula for mathematical computation. The computation phase will be integrated to the system to eliminate errors in the manual computation involving the use of hands and calculator. Unlike the manual system where the billing staff writes the price of the patient's treatment on the billing form, now the staff just have to enter the patient's fee on the proposed software based application and it will automatically compute the total amount to be paid. The system doesn't need to recheck the bill computation for several times for accuracy. Romano states that automated billing system conserves more time and no errors will be generated [7]. The billing staff just enters the name/id of the patient on the system and the system automatically checks the record on the database for access to patient's record and financial status among others at every point in time.

### 1.1 Research Focus

This research is primarily to address irregularities being encountered in an Hospital management billing system for:

- Faster means of billing a patient.
- Reducing redundancies of files.
- Generation of monthly billing transaction information.
- Increasing billing efficiency.
- A faster means of calculating revenue.

## 2. Study Background

The introduction of information technology approach to human endeavours is to bring about improvement to the traditional approach of getting things done and to meet the needs of organizations more efficiently. This concept defines basis on how to incorporate or integrate the use of computer in the production of invoice/bills to charge subscribers for the goods they purchase and services rendered. This however creates awareness of the limitless potentialities of computer to every field of human endeavour.

The manual method of bill preparation is prone to errors and it's also time consuming leading to late generation of customers' bill as at when due. To eliminate all these problems associated with the manual billing system and enhance proper billing, the use of computer is the best alternative to be adopted. The billing system (procedure) in virtually commercial organizations involves manipulation of data like calculations, measurement, assessment among other, in order to get the required information [1]. The billing system cut across the three (3) computing processes/phases - The input phase, the execution phase and the output phase. These three steps are also the basic steps taken in bill preparation.

## 3. Billing System

A billing system is a combination of software and hardware that receives call details and services usage information, groups this information for specific accounts or customers, produces invoices, creates reports for management, and records (posts) payments made to customer accounts. Most time, billing software applications also create billing cycle reports to display information such as hours worked, expenses incurred, how much to bill clients, and which clients owe money for specific projects. The popular time and billing software tools includes: Sage Time slips, Intuit QuickBooks Time, Billing Manager and Billing Tracker.

## 4. System Design Flow

System analysis and design is the process of investigating a system, identifying problems and using the information to recommend improvements to the system using software and developmental activities. It is an important stage in the system development lifecycle. It involves identification and specification of both functional and non-functional requirements of the system [6] using systematic approach.

The main menu specification involves the corresponding controls and attributes of the new system with specific functionalities. This cut across input, processing and output procedures of the entire system (Fig. 1). The new system indirectly models the complex means of Hospital records and Billing System for efficiencies.

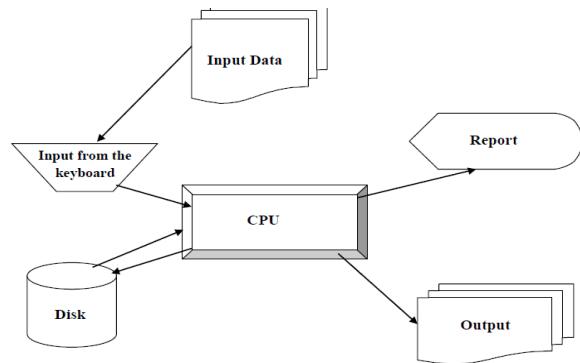


Fig. 1 System Flowchart

## 5. System Design

The program designed identifies all the software modules and the relationship that exists between them including solution statements and coding. This is broken into a program modules using top-down design approach (Fig. 2). Each sub-program sub-divided the system into smaller units that are independently testable which can be integrated to accomplish the overall program objectives (Fig. 3).

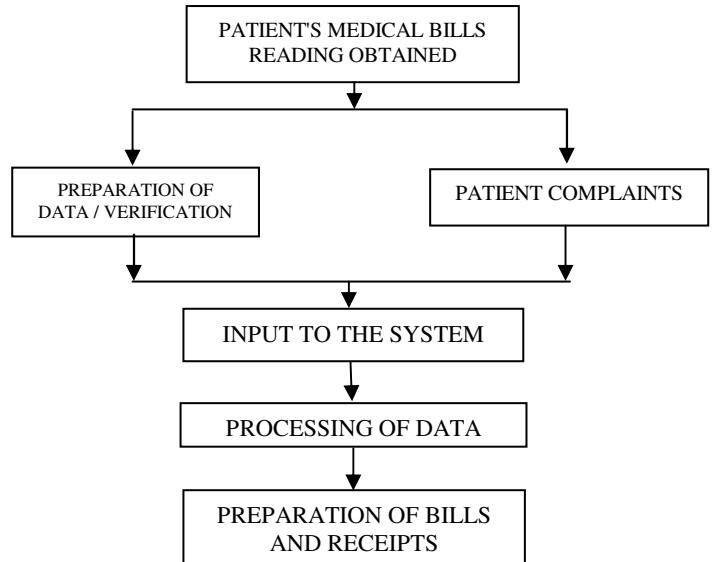


Fig. 2 Activity Chart

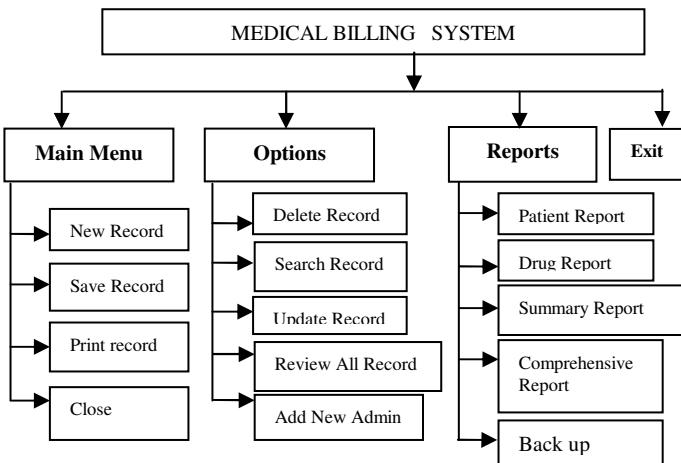


Fig. 3 Procedural Flowchart

## 6. Programming Tools

The designed billing system runs on Microsoft windows; PHPmyadmin as Database Management System application with PHP, HTML, CSS and Java as programming language.

Mysql was used to implement the rule engine of the multi-criteria based hospital billing system web app as an open source web application that provides personalized recommendations using web services which is integrated into a web enabled applications; and its robustness nature to accommodate large amount of data easily integrated with Java. Employing PhP in the implementation phase enables Mysql database have access to the database to provide personalized recommendations due to its easy to use platform [5] making the research area (hospital billing system) a web-based application.

## 7. Program Modular Interface

### 7.1 Registration Page

This is the user's first point of contact with the system. It displays the registration page for the user to register their username and password to access the hospital billing system (Fig. 4)

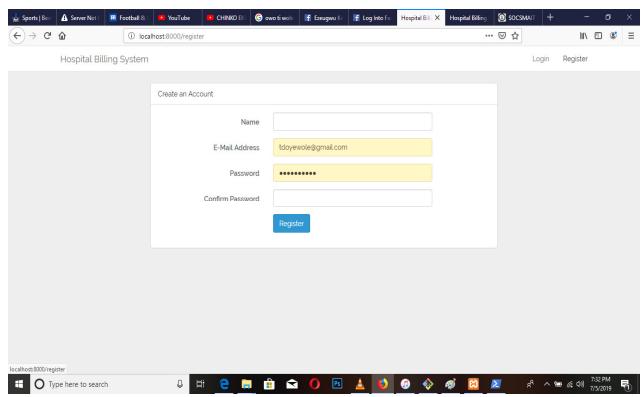


Fig. 4 Registration Page

### 7.2 Login Page

This is the user's second point of contact with the system. It displays the login page for the user to input their valid username and password to access the hospital billing system (Fig. 5).

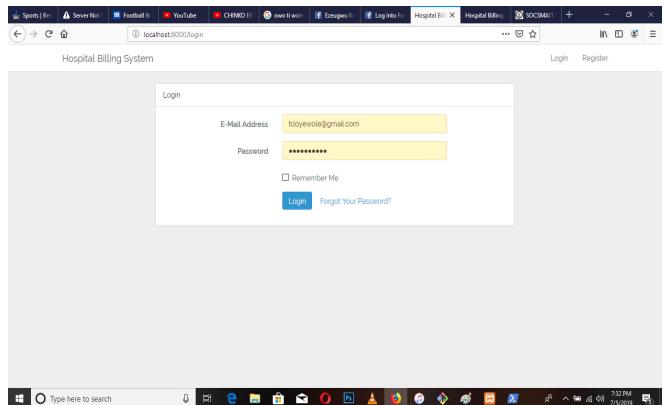


Fig. 5 Login Page

### 7.3 Dashboard

From the login page, the user is directed to the dashboard which contains important information needed in a way that is easy to read and navigate (Fig. 6).

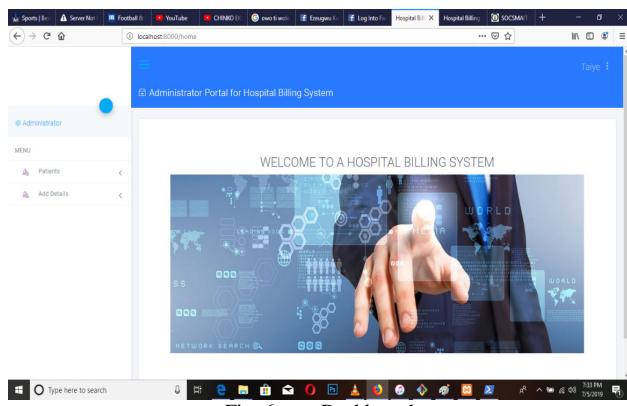


Fig. 6 Dashboard

#### 7.4 Patient Information

This page is used by the user to fill in the required information needed for creating a profile on the hospital billing system (Fig. 7).

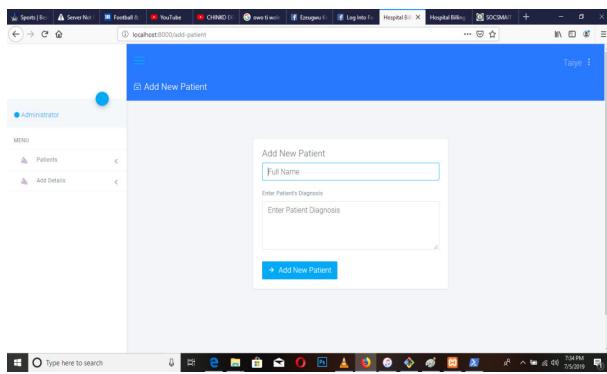


Fig. 7 Patient Information

#### 7.5 List of Patient Bills

This page is used to view the bills of all the registered patients on the hospital billing system (Fig. 8) platform.

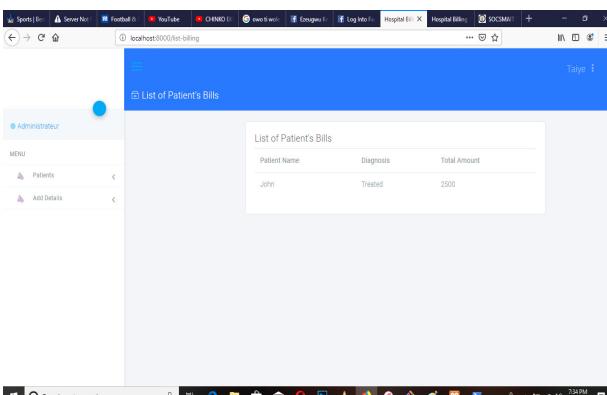


Fig. 8 Patient Bills

#### 7.6 Add New Bill

On this page, the administrator is able to add a new bill assigned to a registered patient on the hospital billing system (Fig. 9).

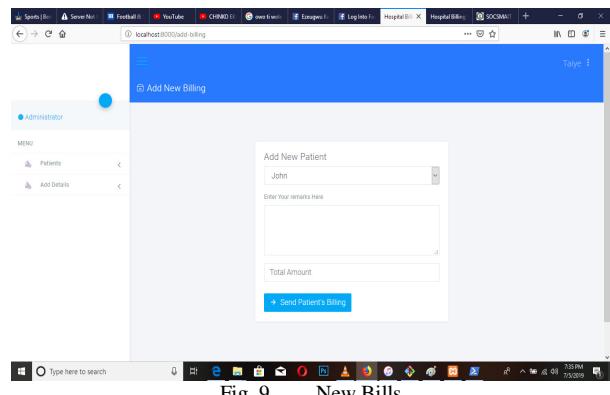


Fig. 9 New Bills

### 8. Scope for Further Work

This project has been deployed as a web application to allow easy access to users. However with the increased growth in the use of mobile devices, it would be profitable for such platforms to be exploited. This would bring about greater portability and access to a wider range of persons.

### 9. Conclusion

The application of technology in an hospital billing system is constantly increasing and unending. However the use of approaches such as personalized recommendations in an online services meet every user's need as a product which must be customized to meet specific users requirements thereby providing a platform for such without violating constraints and rules on how each activities is carried out. The result is user satisfaction and improved quality of hospital billing system.

### References

- [1] Aluko, A.O (1991), "Personnel Management theory and Practice"
- [2] Banova, B (2018, April 24), "The Impact of Technology on Healthcare"
- [3] Brynjolfsson (1996), "Productivity, Business Profitability, and Consumer Surplus: Three Different Measures of Information Technology Value"
- [4] Feigenbaum, L & McCorduck, S (1983), "Understanding Possible Futures by Acknowledging the Past and the Present"

- [5] Funk, E.C (1980), "Data models, Database Language and Database Management Systems"
- [6] McNab (2004),"Expert System Development for Use in Theoretical Simulations"
- [7] Romano, C (2013, February 19), "Advantages of invoicing using spreadsheets"