PATIENT HEALTHCARE SYSTEM

Lakshmi Priya.S,
Student,
Department of computer science,
Velammal Institute of Technology,
Thiruvallur,india.

Priya.K,
Student,
Department of computer science,
Velammal Institute of Technology,
Thiruvallur,india.

Subathra.S ,
Student,
Department of Computer Science,
Velammal Institute of Technology,
Thiruvallur,india .

Vanmathi.R,
Student,
Department of Computer Science,
Velammal Institute of Technology,
Thiruvallur,india.

Indumathi.G,
Assistant Professor,
Department of Computer Science,
Velammal Institute of Technology,
Thiruvallur,India.

Abstract: In this paper, we present a system wherein we monitor a patient's health records to help in accessing information on previous health history of that patient. Various services like Body Mass Index, Glucose reading, Diabetes risk calculation and complete body blood count are provided. This helps the patient to gain knowledge on their health conditions and take adequate medications when needed. We use frameworks like Spring MVC and Hibernate for developing this web application. Security is provided by providing individual credentials. Before a patient is given treatment, this could help us in diagnosis of the problem the patient has.

Keywords: Diabetes, Electronic health records, Healthcare, Hibernate, PHS, spring MVC

I.INTRODUCTION

A Patient Healthcare System (PHS) is a health record where health data and information related to the care of a patient is maintained by the patient.This system stands in contrast to the more widely used electronic medical record, which is operated by institutions and contains data entered by clinicians or billing data to support insurance claims. The intention of a patient healthcare system is to provide a complete and accurate summary of an individual's medical history which is accessible online.The Patient healthcare system (PHS) is an Internet-based set of tools that allows people to access and coordinate their lifelong health information and make appropriate parts of it available to those who need it. PHS offer an integrated and comprehensive view of health information, including information people generate themselves such as symptoms and medication use, information from doctors such as diagnoses and test results, and information from their pharmacies.It is important to note that Patient healthcare system are not the same as electronic health records (EHRs) or electronic medical records (EMRs), which are software systems designed for use by health care providers.Like the data recorded in paper-based medical records, the data in EHRs are legally mandated notes on the care provided by clinicians to patients. There is no legal mandate that compels a consumer or patient to store her personal health information in a PHS.

II.LITERATURE SURVEY

Patient web portals (PWPs), defined as the integration of electronic medical records and patient health records, have been related to enhanced patient outcomes. A literature review was conducted to characterize the design and evaluation of PWPs to improve health care processes and outcomes in diabetes. A summary of 26 articles revealed the positive impact PWPs have on patient outcomes, patient-provider communication, disease management, and access to and patient satisfaction with health care. Assessing the impact of PWPs on mediators of health behaviors, such as patient distress, identification of barriers to use, and patient willingness to pay for access. Future research should focus on relevant processes that mediate patient and provider use, impact on health care utilization, and a patient-centered approach to the design and integration of educational opportunities afforded through PWPs.[2] Patient Portals can offer important benefits to patient and provider. These technologies, particularly when integrated with an electronic health record have the potential to improve both quality and access to care. It is intended to inform the work of health care providers particularly safety net organizations as they plan and implement patient portals and develop measurement strategies for assessing their impact on patient care.[3]

III.EXISTING SYSTEM

The existing system which is difficult to keep proper records of the daily activities of hospitals, patient information, maintenance schedule of equipments in the hospital, and how funds are being allocated and used. This resulted in waste of money, time and manpower. The one of the existing system which is used by doctors and other health professionals is the electronic health records. This is one of the most easiest and convenient types that greatly helps in managing patients' records. This is very efficient to some healthcare institutions like hospitals and many others specifically if there are immense numbers of patients to accommodate. Although there are several advantages that this electronic health records

provide, still there are some points where using this would also be disadvantageous.[1]Disadvantages includes financial issues, including adoption and implementation costs, ongoing maintenance costs, loss of revenue associated with temporary loss of productivity, and declines in revenue, present a disincentive for hospitals and physicians to adopt and implement an EHR. EHR adoption and implementation costs include purchasing and installing hardware and software, converting paper charts to electronic ones, and training end-users. Many studies have documented these costs in both the inpatient and outpatient settings.[4,5]

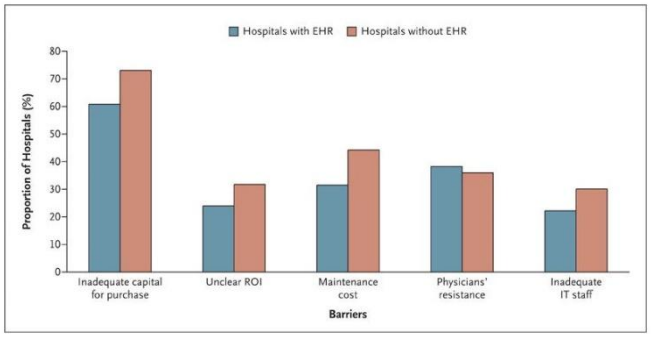

Figure 1: Major Perceived Barriers to Adoption of Electronic Health Records

In fact, physicians frequently cite upfront costs and ongoing maintenance costs as the largest barriers to adoption and implementation of an EHR[6].Another disadvantage of an EHR is disruption of workflows for medical staff and providers, which result in temporary losses in productivity. Another potential drawback of EHRs is the risk of patient privacy violations, which is an increasing concern for patients due to the increasing amount of health information exchanged electronically.[7,8]

IV.PROPOSED SYSTEM

The proposed system is a web based application where the patient can add and maintain their medical records for future use. This system will be assisting patients in health self-management and this system is not a physician-oriented.

The scope of the system is explained through its modules as follows

Creating an Account for the user to access the portal – deals with creating an account for the user in order to access the application.

Patient profile creation - deals with creating a profile and updating the profile for the patients upon logging in to the portal.

Patient Body Mass Index calculator - deals with calculation of BMI by giving the patient's height and weight as input parameters.

Patient Complete Blood Count - deals with diagnosing the patient based on his Complete Blood Count.

Diabetes risk calculator - deals with calculation of the risk percentage in getting diabetes based on several parameters.

Patient healthcare system helps in saving and retrieving information about the patient's health progress. The user can be add or maintain the patient medical records for future use. This system will also act as a self-assistant thus claims to improve their physical system.

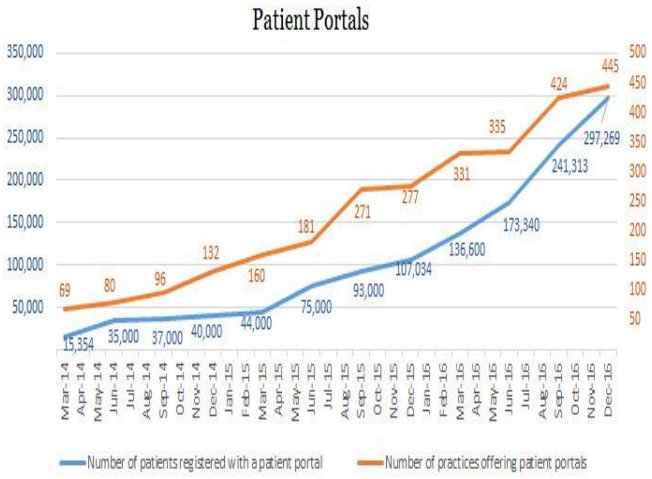

Figure 2: Usage of patient portals

Challenges:

- Only administrator can access the application.
- None of the application features can be accessed without login.
- Application should have single login feature. Login functionality should be the welcome feature for the application
- All screens and services must be protected with authentication.

V.SYSTEM ARCHITECTURE DIAGRAM

A physical architecture is an arrangement of physical elements, (system elements and physical interfaces) that provides the designed solution for a product, service, or enterprise. It is intended to satisfy logical architecture elements and system requirements. Medicare Claim follows a three layered architecture namely presentation layer, business logic layer and data access layer.

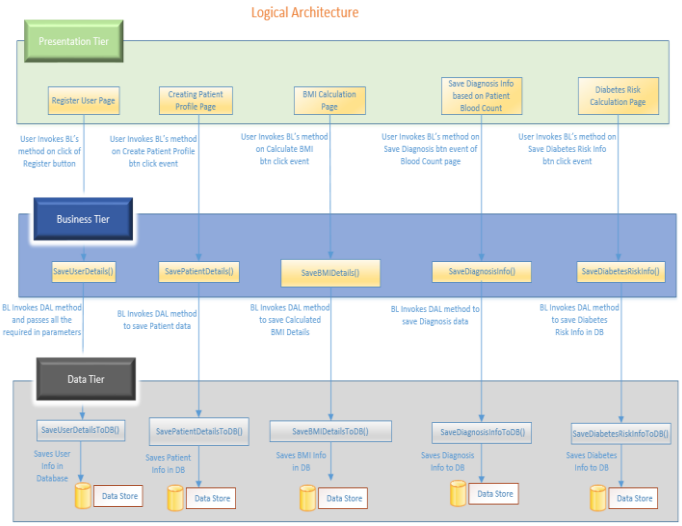

Figure 3: Logical architecture

VI. TECHNOLOGIES USED

We use Spring MVC and Hibernate framework for developing this application.

SPRING MVC FRAMEWORK

The Spring Web MVC framework provides Model-View-Controller (MVC) architecture and ready components that can be used to develop flexible and loosely coupled web applications. The MVC pattern results in separating the different aspects of the application (input logic, business logic, and UI logic), while providing a loose coupling between these elements.[9]

- The Model encapsulates the application data and in general they will consist of POJO.
- The View is responsible for rendering the model data and in general it generates HTML output that the client's browser can interpret.
- The Controller is responsible for processing user requests and building an appropriate model and passes it to the view for rendering.

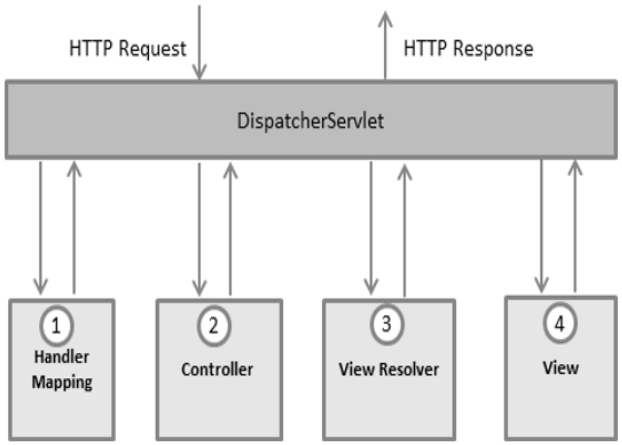

Figure 4: Spring MVC Dispatcher Servlet

Following is the sequence of events corresponding to an incoming HTTP request to Dispatcher Servlet −

- After receiving an HTTP request, Dispatcher Servlet consults the HandlerMapping to call the appropriate Controller.
- The Controller takes the request and calls the appropriate service methods based on used GET or POST method. The service method will set model data based on defined business logic and returns view name to the DispatcherServlet.
- The DispatcherServlet will take help from View Resolver to pickup the defined view for the request.
- Once view is finalized, The DispatcherServlet passes the model data to the view which is finally rendered on the browser.

All the above-mentioned components, i.e. HandlerMapping, Controller, and ViewResolver are parts of WebApplicationContext which is an extension of the plain ApplicationContext with some extra features necessary for web applications.

HIBERNATE FRAMEWORK

This hibernate tutorial provides in-depth concepts of Hibernate Framework with simplified examples. It was started in 2001 by Gavin King as an alternative to EJB2 style entity bean. The stable release of Hibernate till July 16, 2014, is hibernate 4.3.6. It is helpful for beginners and experienced persons. Hibernate framework simplifies the development of java application to interact with the database. Hibernate is an open source, lightweight, ORM (Object Relational Mapping) tool. An ORM tool simplifies the data creation, data manipulation and data access. It is a programming technique that maps the object to the data stored in the database.The ORM tool internally uses the JDBC API to interact with the database.[9]

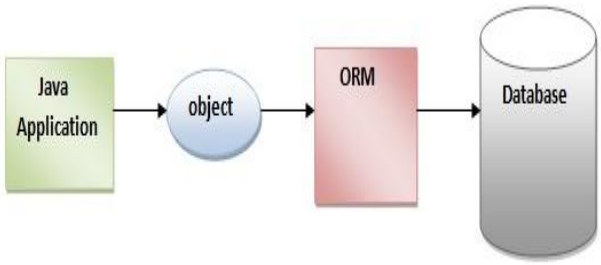

Figure 5: JDBC API

There are many advantages of Hibernate Framework. They are as follows:

- **Opensource and Lightweight:** Hibernate framework is opensource under the LGPL license and lightweight.
- **Fast performance:** The performance of hibernate framework is fast because cache is internally used in hibernate framework. There are two types of cache in hibernate framework first level cache and second level cache. First level cache is enabled by default.
- **Database Independent query:** HQL (Hibernate Query Language) is the object-oriented version of SQL. It generates the database independent queries. So you don't need to write database specific queries. Before Hibernate, If database is changed for the project, we need to change the SQL query as well that leads to the maintenance problem.
- **Automatic table creation:** Hibernate framework provides the facility to create the tables of the database automatically. So there is no need to create tables in the database manually.
- **Simplifies complex join:** To fetch data form multiple tables is easy in hibernate framework.
- **Provides query statistics and database status:** Hibernate supports Query cache and provide statistics about query and database status.

VII. MODULES DESCRIPTION

This application helps in Creating an Account for the user to access the portal deals with creating an account for the user in order to access the application. Patient Profile can be created and can update the profile for the patients upon logging in to the portal.

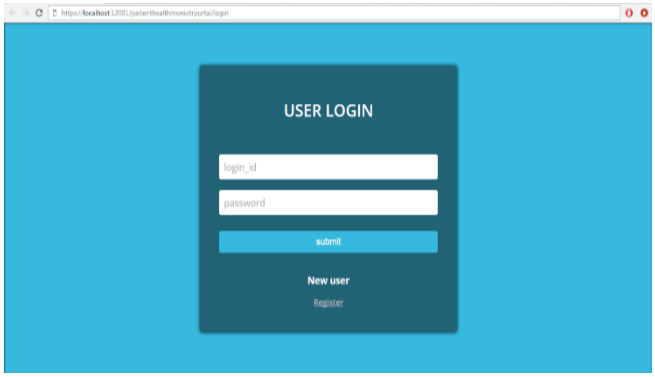

Figure 6: Login page

On successful profile creation, generate profile id and save the profile id along with the patient's profile details in the database. After the user logs in, user will be able to update the profile for the patient.

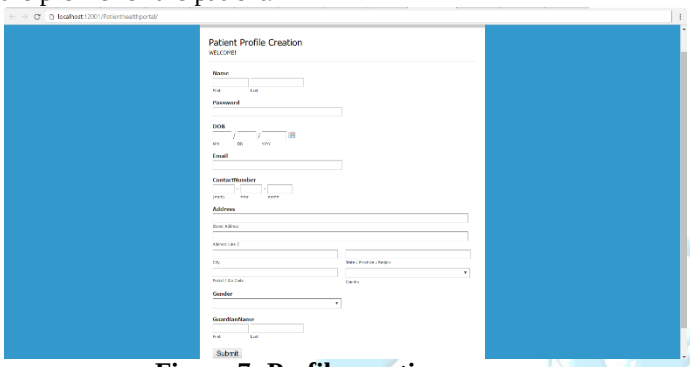

Figure 7: Profile creation page

Patient monitor portal has modules for BMI calculation, Blood count and glucose level. The calculation of BMI by giving the patient's height and weight as input parameters.The bmi value is stored in database along with the current date and based on the bmi value ,suggestion will be given to patient regarding their health condition.

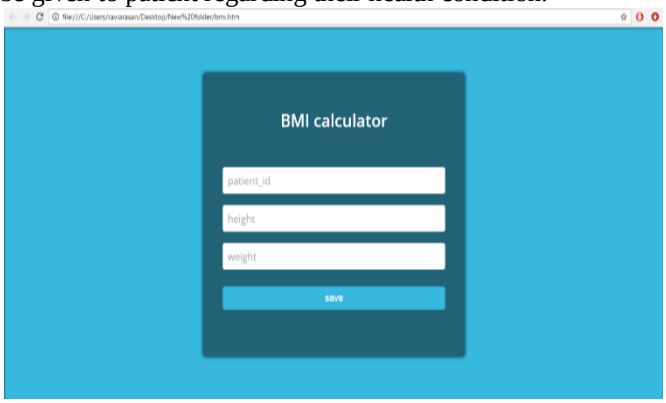

Figure 8: snapshot of BMI calculation page

The list of previously calculated BMI'S for the patient should be displayed in the screen. when a new BMI is calculated this list should be updated with new BMI values. Glucose Level page deals with adding and saving blood glucose levels during different times of the day. Upon successful validation, the values get saved in the Database and the updated list should be displayed. Along with the list, the suggestion for the patient regarding glucose content in blood will be displayed.Blood count module deals with diagnosing the patient based on patient Complete Blood Count.Then last module is Diabetes risk calculation module deals with calculation of the risk percentage in getting diabetes based on several parameters, the values will be saved to the Diabetes table in the DB. The diabetes risk calculation takes bmi value, BP Systolic Value, BP Diastolic Value ,Fasting Glucose Reading ,HDL Cholesterol Reading, Serum Triglycerides.The suggestion will be given to patient based on the calculated value.so that the patient can able to realize their health condition.

Figure 9: snapshot of glucose reading page

Figure 10: snapshot of blood count page

Figure 11: snapshot of diabetes risk table

VIII. CONCLUSION

The process of the system is to monitor the health of the patient using hi-tech system. It maintains a database stores all the details about the patient. It also helps the patient to check up their health periodically. The records stored in this portal will be very secured. Also helps the user to keep track of his own family member's records in an efficient manner. In an unexpected situation the doctors can decide what kind of treatment to be carried out in a first step.

IX. REFERENCES

[1] Nir Menachemi, Taleah H Collum "Benefits and drawbacks of electronic health record systems" in Riskmanagement and healthcare policy,2011.

[2] Chandra Y. Osborn, Lindsay Satterwhite Mayberry, Shelagh A. Mulvaney, and Rachel Hess "Patient Web Portals to Improve Diabetes Outcomes: A Systematic Review",2011.

[3] Seth Emont "Measuring the impact of patient health portals",2011

[4] Schmitt KF, Wofford DA. Financial analysis projects clear returns from electronic medical records. Health Finance Manage. 2002;56(1): 52–57.

[5] Agrawal A. Return on investment analysis for a computer-based patient record in the outpatient clinic setting. J Assoc Acad Minor Phys. 2002; 13(3):61–65.

[6] Menachemi N. Barriers to ambulatory EHR: who are 'imminent adopters' and how do they differ from other physicians? Inform Prim Care. 2006;14(2):101–108.

[7] Zurita L, Nohr C. Patient opinion: EHR assessment from the users perspective. Stud Health Technol Inform. 2004;107(2):1333–1336.

[8] Westin AF. Public attitudes toward electronic health records. Privacy and American Business. 2005;12(2):1–6

[9] Dr. Tejinder Singh "Java web design frameworks : review of java frameworks for web applications",2015.

