Volume 6, Issue 5, May 2016 ISSN: 2277 128X
International Journal of Advanced Research in Computer Science and Software Engineering
Research Paper
Available online at: www.ijarcsse.com

Web Based Student Information Management System using MEAN Stack

Bahubali Akiwate, Ayazahmed Patel, Tasleem Nabiwale, Namita Naik, Suraj Patil
Department of Computer Science and Engineering, K.L.E College of Engineering and Technology, Chikodi, Karnataka, India

Abstract— This Student Information Management System (SIMS) provides a simple interface for maintenance of student Information. It can be used by educational institutes or colleges to maintain the records of students easily. The creation and management of accurate, up-to-date information regarding a students' academic career is critically important in the university as well as colleges. Student information system deals with all kind of student details, faculty details, college details.

Keywords— Student Information Management System, MEAN Stack, JavaScript, HTML, CSS

I. INTRODUCTION

The design and implementation of a comprehensive student information system and user interface is to replace the current paper records[1]. College Staff are able to directly access all aspects of a student's academic progress. The system utilizes user authentication, displaying only information necessary for an individual's duties. The Application is developed using the MEAN stack- a complete open source stack written in JavaScript. The name MEAN is an acronym of the stack components - **M**ongoDB, **E**xpressJS, **A**ngularJS and **N**ode.JS. All data is thoroughly reviewed and validated on the server before actual record alteration occurs.

All data is stored securely on MongoDB servers managed by the college administrator and ensures highest possible level of security. Node.JS is a runtime environment for server-side application and its applications are written in JavaScript. Express.JS is a lightweight Node.JS application framework and it's also written in JavaScript. AngularJS is the front end and client side logic of the stack. Before, the college relied heavily on paper records for this initiative. While paper records are a traditional way of managing student data there are several drawbacks to this method. First, to convey information to the students it should be displayed on the notice board and the student has to visit the notice board to check that information. It takes a very long time to convey the information to the student.

This paper provides a simple interface for the maintenance of student information. It can be used by educational institutes or colleges to maintain the records of students easily. Achieving this objective is difficult using a manual system - as the information is scattered, can be redundant and collecting relevant information may be very time consuming. All these problems are solved using online student information management system. This project focuses on presenting information in an easy and intelligible manner which provides facilities like online registration and profile creation of student's thus reducing paper work and automating the record generation process in an educational-institutions. And also single language that is JavaScript is used on both client side and server side.

II. OVERVIEW OF MEAN STACK

The Web based Student Information Management System is aimed towards recording a considerable number of student records[2]. System should be user-friendly, 'quick to learn' and reliable for the above purpose. Student Information Management System is intended to be a stand-alone product and should not depend on the availability of other website. The system will also have an administrator who has full-fledged rights with regards to performing all actions related to control and management of the website.

The MEAN Stack Means

- **MongoDB:** MongoDB is an open source, non-relational document database that has become very popular over recent years. MongoDB boasts the ability to scale up an application quickly and cost effectively by being able to just add more severs. Unlike relational databases, the data is stored as collections in key-value pairs reminiscent of associative arrays.
- **ExpressJS:** Express.JS is a Node.JS web application server framework, designed for building single-page, multi-page, and hybrid web application. It is the standard framework for Node.JS. Express.JS is a backend part of MEAN stack, together with MongoDB database and AngularJS frontend framework.
- **AngularJS:** Angular is an open source web application framework mainly maintained by Google. It aims to simplify both development and the testing of such application by providing a framework for client-side model-view-controller and model-view-viewmodel architectures. AngularJS is the frontend part of MEAN stack, together with Node.JS runtime and Express.JS as backend framework and MongoDB database.

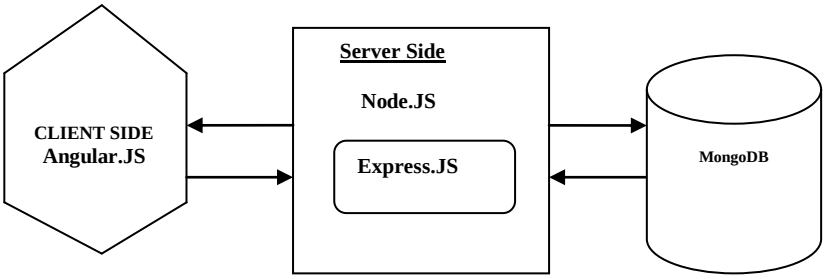

Figure 1: Overview of MEAN stack used in SIMS

- **Node.JS:** Node.JS is an open source, cross-platform runtime environment for developing server side and networking application. Node.JS applications are written in JavaScript, and can be run within the Node.JS runtime on OS X, Microsoft Windows and Linux.

A. Advantages And Disadvantages

- ***Advantages***
  1. The system is user friendly.
  2. It provides "better and efficient" service to the user.
  3. Reduce the work of load of user.
  4. All details will be available on single click.
  5. All the processing part done on the client side hence, the retrieving of the results is fast.

- ***Disadvantage***

  Since MEAN stack being one of the latest technology, it may get a bit difficult to master the required code

III. SYSTEM DESIGN

This deals with data flow diagram, Requirement analysis, and the design process of the front and back end design of the student information management system.

B. Data Flow Diagram

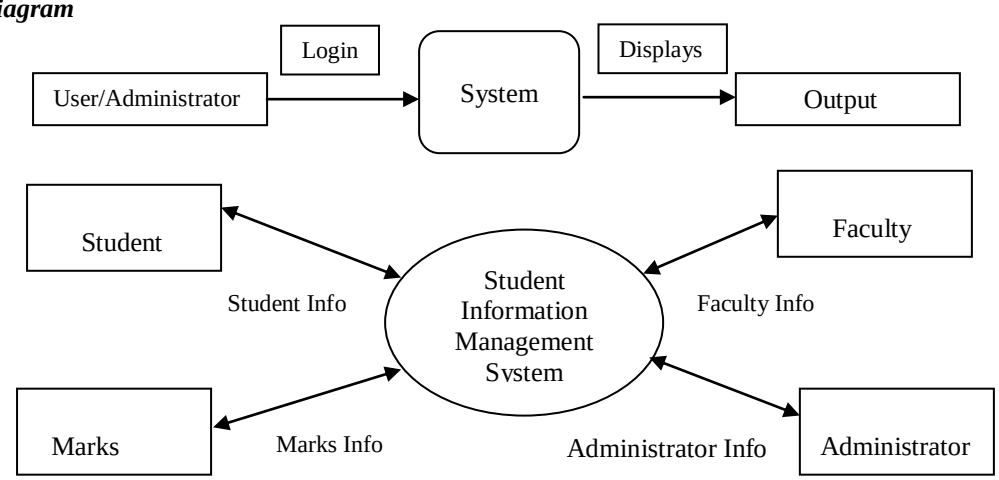

Figure 2: Students Information System and its various modules.

The system is at the center focus having all the modules such as Student, Faculty, Marks and administration. The student can access the information such as its details, marks. The faculty can view the student details and also the faculty has the right to update the details of student. The faculty can also update the Marks module.

The attendance of all the students is being maintained in the attendance module. This module can be accessed by student, faculty or administrator. But it can be updated only by faculty. The administration module has more priority then the other modules. The admin is responsible for managing and updating the student details as well as faculty details. And also the admin updates the Marks.

C. Requirement Analysis

- ***Functional Requirements***

User Interfaces

The set of User Interfaces consists of.

- The Student Information Management system screen displays to log into their respective accounts by users.
- To Add and Modify details, Add fields to a details such as Marks, Attendance and define their respective weightages in the details, save and publish the various data stored in the fields.

- To read the published data, by the student according to the permission of their respective accounts.

Communication Interface

With network Communication will be based on a request-response paradigm, that is request to the server form the client and response to the client from the server.

- ***Non- Functional Requirements***

Performance Requirements

Performance is a key in the design and development of a Application, It is of utmost importance as this requirement will affect the other requirements of the system.The Application is to be designed using the MEAN stack, a complete open source stack written in JavaScript.

Maintainability

The Application is developed using the MEAN (MongoDB, Express.JS, AngularJS and Node.JS) stack, a complete open source stack written in JavaScript that easy to modify and make update.

Hardware interface

a. Server side: 1GB RAM, 24 GB Hard Disk computer with a internet connectivity.

b. Client side: Any Personal computer, which can support any X-window or Windows environment with a mouse support, is acceptable.

Software interface

a. Server side: MongoDB is used as database. Node.JS and ExpressJS is used for validation.

b. Client side: AngularJS is the software which is used to get the input from the user.

D. Database Design

We have used MongoDB which is a No-SQL database. MongoDB is a cross-platform, document oriented database that provides, high performance, high availability, and easy scalability. MongoDB works on concept of collection and document.

Database is a physical container for collections. Each database gets its own set of files on the file system. A single MongoDB server typically has multiple databases.

Collection

Collection is a group of MongoDB documents. It is the equivalent of an RDBMS table. A collection exists within a single database. Collections do not enforce a schema. Documents within a collection can have different fields. Typically, all documents in a collection are of similar or related purpose.

Document

A document is a set of key-value pairs. Documents have dynamic schema. Dynamic schema means that documents in the same collection do not need to have the same set of fields or structure, and common fields in a collection's documents may hold different types of data

{
"Name" : "Simon",
"USN" : "2KD12CS021",
“Email_id” : “simon@gmail.com”,
“Phone No” : “98458900563”,
“10^{th}_marks” : “78.08 %”,
“PUC_avg” : “69.83%”,
“B.E_avg” : “61.69%”
}

IV. SCRIPTING LANGUAGE USED

HTML

HTML is a hypertext markup language which is in reality a backbone of any website. Every website can’t be structured without the knowledge of html. If we make our web page only with the help of html, than we can’t add many of the effective features in a web page, for making a web page more effective we use various platforms such as CSS. So here we are using this language to make our web pages more effective as well as efficient. And to make our web pages dynamic we are using Java script.

CSS

CSS Stands for "Cascading Style Sheet." Cascading style sheets are used to format the layout of Web pages. They can be used to define text styles, table sizes, and other aspects of Web pages that previously could only be defined in a page's HTML. The basic purpose of CSS is to separate the content of a web document (written in any markup language) from its presentation (that is written using Cascading Style Sheets). There are lots of benefits that one can extract through CSS like improved content accessibility, better flexibility and moreover, CSS gives a level of control over various presentation characteristics of the document.

It also helps in reducing the complexity and helps in saving overall presentation time. CSS gives the option of selecting various style schemes and rules according to the requirements and it also allows the same HTML document to be presented in more than one varying style.

JAVA SCRIPT

JavaScript is considered to be one of the most famous scripting languages of all time. JavaScript, by definition, is a Scripting Language of the World Wide Web. The main usage of JavaScript is to add various Web functionalities, Web form validations, browser detections, creation of cookies and so on. JavaScript is used to make web pages more interactive and dynamic. JavaScript is a light weight programming language and it is embedded directly into the HTML code.

JavaScript is used to make web pages more interactive and dynamic. JavaScript is a light weight programming language and it is embedded directly into the HTML code. JavaScript, as the name suggests, was influenced by many languages, especially Java.

V. RESULT

Login Form:

The below figure 3 shows the system which starts with login page where admin logins into the system by entering name and password to be able to access the system.

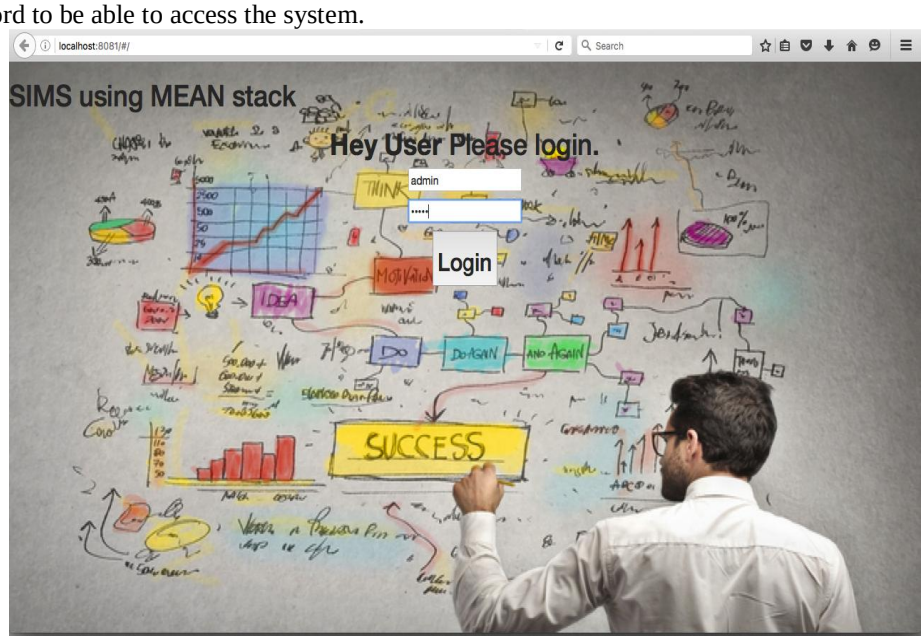

Figure 3: Login Form

Module Form:

After getting login into the system the below figure 4 shows where the admin will get this page. The admin is now entered into the sytem where there will be two modules such as student and faculty. The admin can click on any of this module to access and or to update the details.

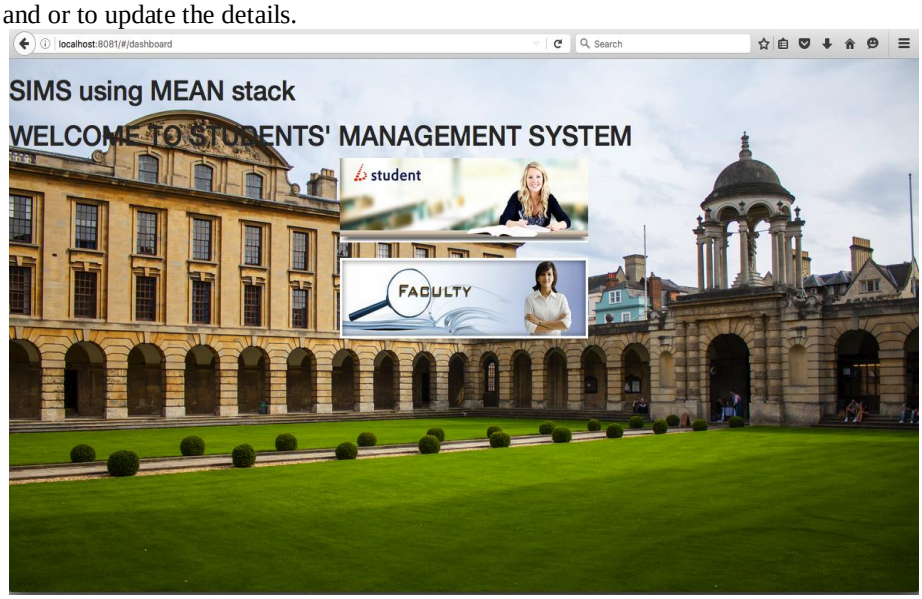

Figure 4: Module Form

Detail Form of Student:

The below figure 5 shows that if the admin wants to access the details of any student then the admin has to click on get information option.

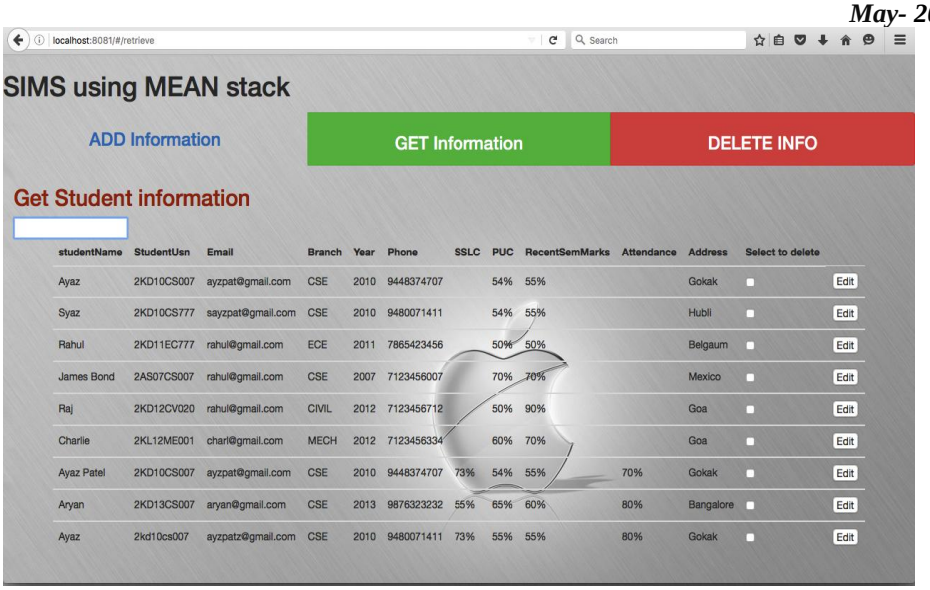

Figure 5: Student Details Form

Detail Form of Faculty:

The information of the faculty is displayed as shown below.

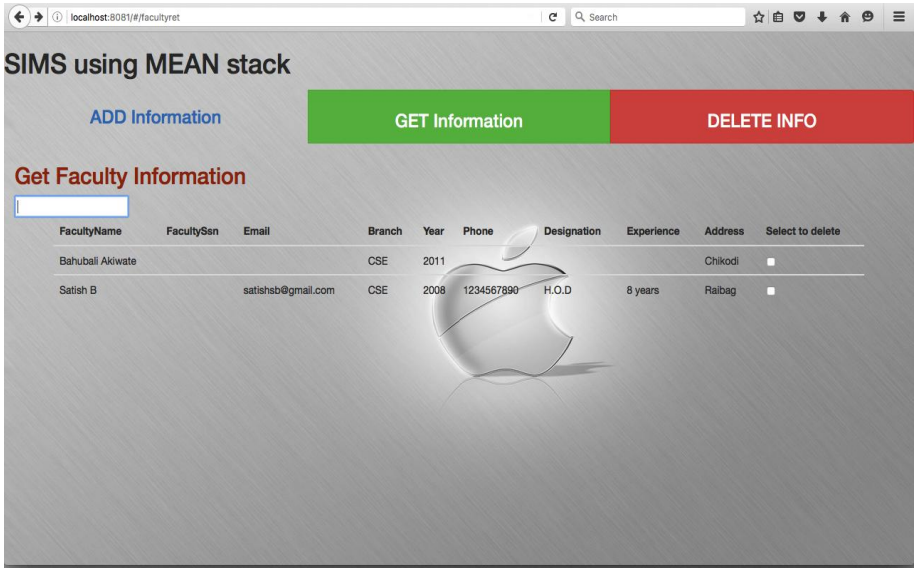

Figure 6: Faculty Details Form

VI. CONCLUSION

This approach represents an efficient Student Information Management System on MEAN Stack technology using JavaScript language at both client and server side. And all the computation done on the client side. Thus the development of college management system, which is helpful for Reduction in manual work so less manpower required.

REFERENCES

[1] S.R.Bharamagoudar1, Geeta R.B.2, S.G.Totad3 "Web Based Student Information Management System" International Journal of Advanced Research in Computer and Communication Engineering Vol. 2, Issue 6, June 2013.

[2] Zhibing Liu, Huixia Wang,Hui Zan "Design and implementation of student information management system." 2010 International symposium on intelligence information processing and trusted computing. 978-0-7695-4196-9/10 IEEE.

[3] Zhi-gang YUE, You-wei JIN, "The development and design of the student management system based on the network environment",2010 International Conference on Multimedia Communications, 978-0-7695-4136-5/10 2010 IEEE.

[4] TANG Yu-fang,ZHANG Yong-sheng,PHD ,"Design and implementation of college student information management system based on the web services". Natural Science Foundation of Shandong Province(Y2008G22), 978-1-4244-3930-0/09 2009 IEEE.

[5] M.A. Norasiah and A. Norhayati. "Intelligent student information system". 4th International conference on telecommunication technology proceedings, Shah Alam, Malaysia, 0-7803-7773 7/03 2003 IEEE.

[6] Jin Mei-shan1 Qiu Chang-li 2 Li Jing 3. "The Designment of student information management system based on B/S architecture". 978-1-4577-1415-3/12 2012 IEEE.

[7] A.C. Polycarpou, , T. Samaras, and J.N. Sahalos. "An RFID-based library management system using smart cabinets: A pilot project". in 8th European Conference on Antennas and Propagation (EuCAP). 2014. The Hague.

[8] A. Shatte, J. Holdsworth, and I. Lee, "Mobile augmented reality based context-aware library management system." Expert Systems with Applications, 2014. **41**(5): p. 2174-2185.

[9] L. Li, "Designing and Implementation of University Library Automatic Management System Based on the Internet of Things.", in Pervasive Computing and the Networked World, M.V.-V.Qiaohong Zu, Bo Hu, Editor. 2014. p. 241-247.

[10] J. Dickey, Write Modern Web Apps with the MEAN Stack: Mongo, Express, AngularJS, and Node.js, 1st edition, Pearson, 2015.

