# Web Based Student Information Management System using MEAN

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*Abstract: 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. Student information system deals with student details, faculty details, faculty appraisal detail, auto time table generator and other resource related details too. It tracks all the details of a student and faculty which can be used for all reporting purpose, progress in the course, managing time table and all these will be available through a secure, online interface embedded in the college's website. It also provides an overview of online student feedback system. It describes how data from SIMS is used to observe the quality of teaching between experience and inexperience lecturer. It also introduces a practical timetabling algorithm capable of taking care of both strong and weak constraints effectively, used in an automated timetabling system. 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 - MongoDB, ExpressJS, AngularJS and Node.JS.*

## 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 detail through a secure, online interface embedded in the college's website.

The system utilizes user authentication, displaying only information necessary for an individual's duties.

Additionally, each sub-system has authentication allowing authorized users to create or update information in that sub-system. All data is thoroughly reviewed and validated on the server before actual record alteration occurs. In addition to a staff user interface, the system plans for student user interface, allowing users to access information and submit requests online thus reducing processing time. All data is stored securely on MongoDB servers managed by the college administrator and ensures highest possible level of security. The system features a complex logging system to track all users access and ensure conformity to data access guidelines and is expected to increase the efficiency of the college's

record management thereby decreasing the work hours needed to access and deliver student records to users.

Previously, 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.

This system 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. The paper focuses on presenting information in an easy and intelligible manner which provides facilities like online registration and profile creation of student's and faculty's thus reducing paper work and automating the record generation process in an educational institution.

The MEAN stack means:

**1.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.

**2.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.

**3.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-model architectures. AngularJS is the frontend part of MEAN stack, together with Node.JS runtime and Express.JS as backend framework and MongoDB database.

**4.Node.JS:** Node.JS is an open source, cross-platform runtime environment for developing server side and networking application.

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## II. SYSTEM DESIGN

This deals with data flow diagram, detailed flow graph, requirement analysis, and the design process of the front and

back end design of the student information management system.

### A. DATA FLOW DIAGRAM

A Data Flow Diagram (DFD) is a graphical representation of the "flow" of Student Information System. A data flow diagram can also be used for the visualization of Data Processing [2].DFD shows the interaction between the system and outside entities. This context-level DFD is then "exploded" to show more detail of the system being modelled. A DFD represents flow of data through a system. Data flow diagrams are commonly used during problem analysis. It views a system as function that transforms the given input into required output. Movement of data through the different transformations or processes in the system are shown in Data Flow Diagram of Fig. 1
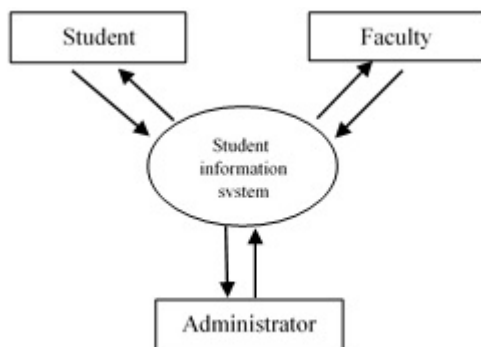


Fig. 1 Data Flow Diagram

This paper mainly focuses on the managing the information of the students, faculty, placement cell information, exam section, related information of the college which is maintained by the college administration through various levels of controlling. The function of the individual entities will be explained in detail in the flow graph.

### B. DETAILED FLOW GRAPH

The detailed flow graph is shown in Fig. 2 .The design of the student information management system includes the design of the home page which provides the way for all the students, staff and other user to access the SIMS. Every user of the SIMS has a unique username and password provided by the web master of the college. The home page mainly contains a login form through which a new user can register, or an existing user can login to the system by entering the username and password provided by the web master.
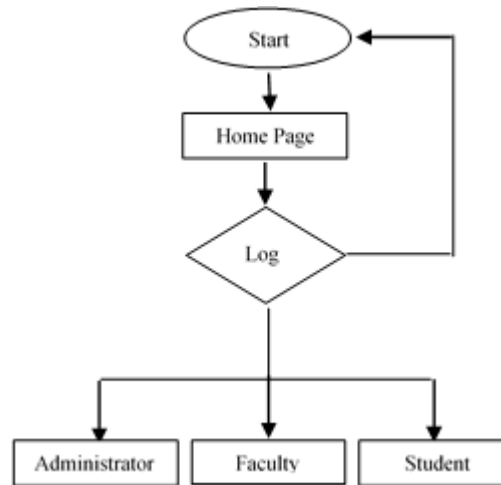


Fig. 2 Flow Chart

**STUDENT:** The student is of center focus, because in every college student plays the very important role. Student can access the information of course details, subject details, faculty details. The course details include information regarding branch he is studying, the academic curriculum of the college, year wise subject offered by the branch, the subject details, information regarding the staff handling the subjects, the subjects he presently registered for the semester he is presently studying. Also can update their personal information's.

**FACULTY:** The staff can update the information regarding the subjects they handle. They can also view the student details, subject details and time table. Also can update their personal information's.

**ADMINISTRATOR:** The administrator is responsible for entering the new student, new faculty and new subject, promoting the student from one class to another, from one semester to another and from one year to another. Managing the student accounts like any changes regarding to the name, address etc. The administrator also manages the faulty accounts like entering a new faculty, assigning the faculty to the subjects. The administrator can generate time table after assigning faculty to subject. The administrator will check the all the updates i.e. student updates, faculty updates etc. The administrator has the highest level of power in the student information system.
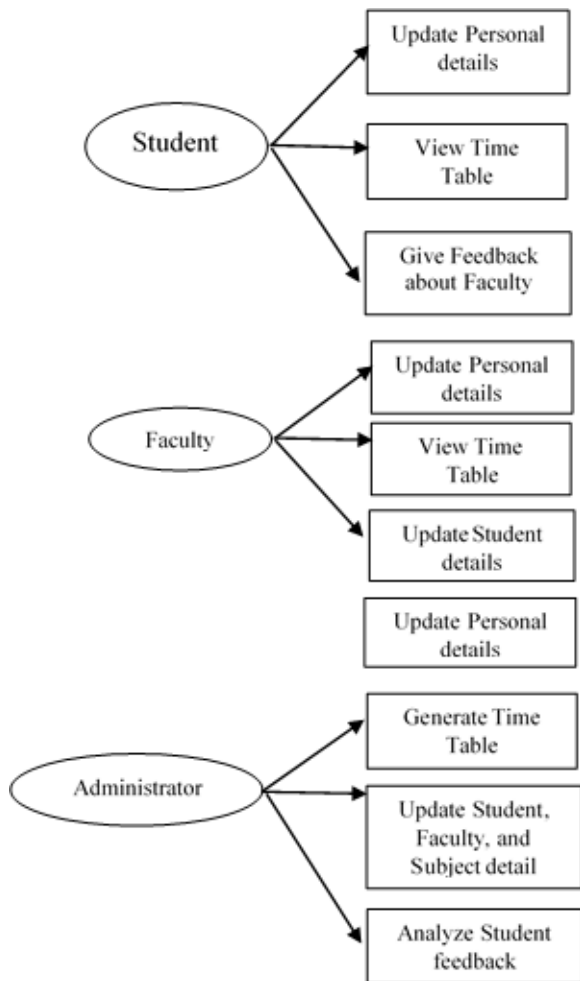
Fig. 3 Detailed flow graph

## D. FUNCTIONAL REQUIREMENTS

Student information management system aims to improve the efficiency of college information management, and the main function is managing and maintaining information [3]. The administrator and students are two major functional requirements in the system.

The Administrator will be given more powers (enable/disable/ update) than other users. It will be ensured that the information entered is of the correct format. For example name cannot contain numbers. In case if incorrect form of information is added, the user will be asked to fill the information again. Students use the system to query and enter their information only.

## E. NON- FUNCTIONAL REQUIREMENTS

☐ Performance Requirements:
The proposed system that we are going to develop will be used as the chief performance system for helping the organization in managing the whole database of the student studying in the organization. Therefore, it is expected that the database would perform functionally all the requirements that are specified.
☐ Safety Requirements:

The database may get crashed at any certain time due to virus or operating system failure. Therefore, it is required to take the database backup [4].
☐ Security Requirements:
We are going to develop a secured database. There are various categories of people namely Administrator, Student who will be viewing either all or some specific information from the database. Depending upon the category of user the access rights are decided. It means if the user is an administrator then he can be able to modify the data, append etc. All other users only have the rights to retrieve the information about database.

## F. DATABASE DESIGN PROCESS

It is fair to say that database play a critical role in almost all areas where computers are used, including business, electronic commerce, engineering, medicine, law, education, and library science. A database is collection of a related data.

**Database Management System (DBMS)** is a collection of programs that enables users to create and maintain a database. DBMS is a general purpose software system that facilitates the process of defining, constructing, manipulating, and sharing database among various users and applications. Defining a database involves the specifying the data types, structures, and constraints of the data to be stored in the database. The database definition or descriptive information is also stored in the database in the form of dictionary; it is called Meta data constructing the database is the process of storing the data on the storage medium that is controlled by the DBMS.

**Manipulating** a database includes functions such as querying the database to retrieve specific data, updating the database to reflect in the mini-world, and generating reports from the data. Sharing a database allows a multiple users and programs to access the database simultaneously.

**Application program** accesses the database by sending queries or request for data to the DBMS [5]. A query typically causes some data to be retrieved; a transaction may cause some data to be read and some data to be written into the database.

### III.CONCLUSION

This paper assists in automating the existing manual system. This is a paperless work. It can be monitored and controlled remotely. It reduces the man power required. It provides accurate information always. Malpractice can be reduced. All years together gathered information can be saved and can be accessed at any time. The data which is stored in the repository helps in taking intelligent decisions by the management. So it is better to have a Web Based Information Management system. All the stakeholders, faculty and management can get the required information without delay. This system is essential in the colleges/hostels and universities.

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