# Student Management System

Mr. Sangamesh K [1]
[1]Dept of , CSE
[1] TCE, Gadag

Mr.Akash Samanekar [2]
[2] Dept of CSE
[2] T C E, Gadag

Mr.Ningappa T Pujar [3]
[3]Professor,Dept of CSE
[3] T C E, Gadag

***Abstract* – Most of the Academic institutions face difficulty in managing records of students, attendance, accounts, admissions, etc., and track the information of their interest as they still rely on paperwork and manual processes. A web-based school management system will reduce the manual work by deploying centralized software incorporated with various loosely coupled services which interact with each other to address above mentioned issues and improves the communication between management and the student/guardian through notifications via email, SMS and push messages. As it is a server-side enterprise application it is designed to support desktop browsers, mobile browsers and native mobile applications. The use of micro-service architecture and ReST (Representational State Transfer) architecture makes it easy for designing and developing loosely coupled web services.**

***Index Terms* – Centralized software, loosely coupled, enterprise application, micro-service architecture, ReST.**

## I. INTRODUCTION

In the past days, companies have to develop Desktop applications which required a large team for deployment & maintenance. A lot of versions of deployment packages/codes had to be maintained by the companies. The development of web application led to the centralized deployment and maintenance. Web applications are deployed in a web container and shared by all users. Some of the latest web technologies are trendy in the world of web application development trends. One such technology is single page web application. It is a long scrollable page that provides complete information about the corresponding site to the users without navigating to any other web page. It has many benefits such as reduced cost of website designing, development and web hosting.

The media processed through the REST (Representational State Transfer) which utilizes the HTTP Protocol is cost-effective in terms of bandwidth and simplicity of use. In recent years, the design of the API that supports the REST interfaces is growing progressively.

Micro-services are widely used in the web applications development world as larger, more complex applications that are better developed and managed as a combination of smaller services that work cohesively together for larger, application-wide functionality.

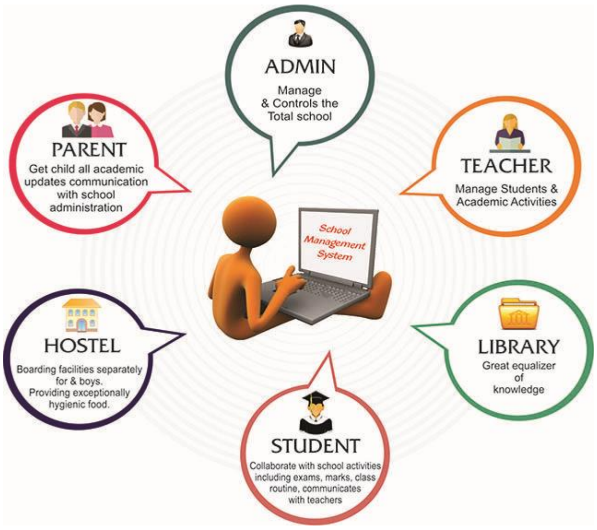

ADMIN
Manage & Controls the Total school
PARENT
Get child all academic updates communication with school administration
TEACHER
Manage Students & Academic Activities
School Management System
HOSTEL
Boarding facilities separately for & boys. Providing exceptionally hygienic food.
LIBRARY
Great equalizer of knowledge
STUDENT
Collaborate with school activities including exams, marks, class routine, communicates with teachers

Fig. 1.1 Student Management System

Managing an academic institution and bringing together various bodies associated with the institution to accomplish the mission is always a big challenge. Transforming these institutions with technology-enabled automation tools to facilitate the academic and administrative activities will make it easier to accomplish the mission. To manage everyday tasks of institutions, education must be modernized with cloud, mobile and digital technologies to enhance operational efficiency and also to manage the institution effectively.

Students/guardians no more have to stand for hours in the queue to get admission. Simplified registration and collection of fee through online forms, with the ability to send alerts and reminders via email, SMS alerts and push notifications makes the process easier.

Design of a course curriculum that can be adapted to the changing needs of the academic institution is essential. Having Course Management System institutions will be able to accomplish a lot with limited resources. Creating and tracking the course-work, assignments, and exam papers in a classroom environment to support the goal of graduating students.

Tracking of teachers' progress and assessing the effectiveness of teachers' work is crucial. The teachers' performance can be evaluated based on the students' feedback. Automated evaluation process help students to improve their learning skills, achievement and success.

The student discipline incidents are increasing because of communication gap between students and teachers. There is a need for platform to provide seamless communication between students, administrators, staff and teachers. Web based management system improves communication through notifications, email, SMS and push messages.

Teachers have to put lot of effort to manage and maintain student's records such as attendance, leave, discipline, assignments, etc. An automated student management system which delivers real-time status updates of student activities help institutions to maintain the student records and manage the things in an efficient manner.

Academic institutions are face difficulty in managing the finances and track fee collections. Web based administration management system can keep track of all the financial activities.

Web based management system considerably reduces the work load of the academic institution and help them focus and invest time on their actual goal.

## II. LITERATURE SURVEY

In India there are many academic institutions. But very few institutions are modernized and use software to manage their day to day work. In a city like Bengaluru there are around 1000 schools, more than 300 pre-university colleges and degree colleges. Most of these academic institutions still relay on traditional way of management which mainly involves paper-work, much of human effort.

The students, who are admitted to those institutions which are dependent on traditional way of managing things, have to struggle a lot just to get a certificate or any other documents. Also the administrations face difficulty in maintaining all the records, tracking the records and fetching the record of their interest in time. The administrations of those institutions also have to employ a number of employees just to maintain the records required to manage and support their daily work.

Some of the universities like PESIT and Christ University in Bengaluru have their own web application to address the previously mentioned issues.

The web application that is being used by these and many other institutions have the following features and functionalities such as, Login/Sign Up, Dashboard, Viewing of results, attendance, courses, time table, assignments and student's progress, upload/download documents and notifications.

## III. PROPOSED METHODOLOGY

The approach to develop and deploy the application is employing micro-service architecture. The micro-service architecture is implemented using spring-boot which is the opinionated instance of spring application and also a rapid application development platform. In the proposed methodology there are 5 stages which are gathering requirements, design, development and implementations, testing, and maintenance.

### *3.1 Gathering Requirements*

Before taking up any projects, the requirements must be collected and verified for the feasibility. The project can continued if the requirements are feasible. In this phase all the requirements necessary to develop and implement the project are collected by the stake holders and are conveyed to the developer and designer of the project. In this project, whose final product will be a web application, the requirements are categorized into six categories such as, *Student Management Service, Course Management Service, Attendance Management Service, Administration Management Service, Document Management Service, and Employee Management Service.*

#### *3.1.1 Student Management Service*

In this service, the student will be able to view their attendance, progress report, result, send request for any documents required, view notifications, view timetable, view and submit assignments. The students can give the feedback to the teachers' performance in the class.

#### *3.1.2 Course Management Service*

In this service, the admin will be able to add, modify and delete the courses. Admin will also be able to add, update and delete the subjects of the particular course. The teacher, guardian and students can only view the courses added by the admin.

#### *3.1.3 Attendance Management Service*

In this service admin will be able to submit the attendance, update and delete the attendance of students based on the course as well as the class they belong to. The teacher, guardian and students can only view the attendance.

#### *3.1.4 Administration Management Service*

In this service the admin will have access to all the resources. The admin can broadcast the notifications via email, SMS and push messages. The admin can also add, update and delete the student, guardian and employee details.

#### *3.1.5 Document Management Service*

In this service, the admin can add documents such as students' marks card, id proofs, syllabus of subjects, payment receipts, certificates and many other documents which are useful for smooth running of academic and financial activities of the institution.

#### *3.1.6 Employee Management Service*

In this service, the employee (teacher) will be able to view the details of the students under their mentorship. The teacher will be able to report the student activities and evaluate student's performance. Teacher will be able to upload the assignments and verify the assignments.

### *3.2 Design*

Once the requirements are collected and analyzed, they must be given a proper structure. In this phase the architecture of the project will be designed based on the requirements collected in the previous phase.

In this phase many architectural diagrams such as ER diagram, DFD (data flow diagram), Usecase diagram, etc. are designed. The ER diagram defines the relationship between the entities and how they are inter-dependent.

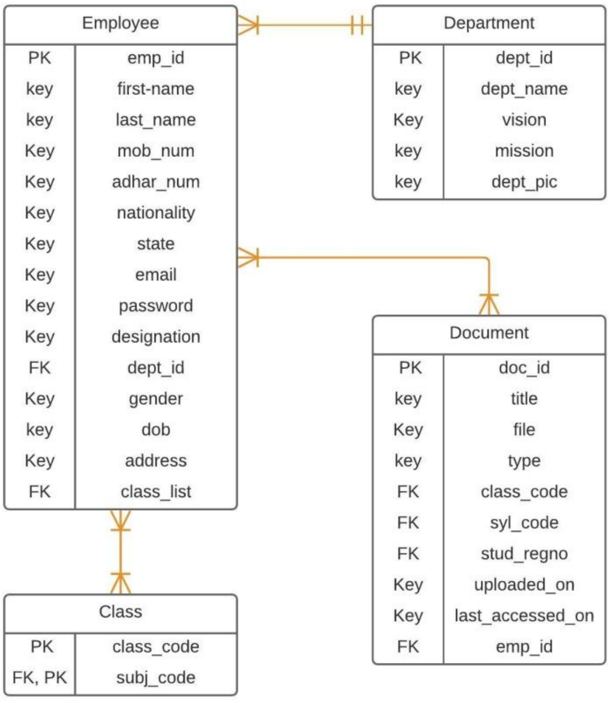


Fig. 3.1 ER-Diagram of Employee Management Service

In the Fig. 3.1, the relationship among the various entities of Employee Management Service is shown. In the latter figure it is indicated that an Employee belongs to one and only one Department, an Employee can manage One or more classes, an Employee can have one or more documents.
Below are the ER-diagrams of other services.

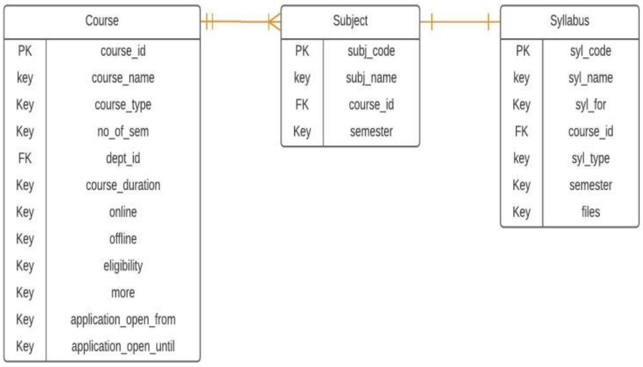


Fig. 3.2 ER-Diagram of Course Management System

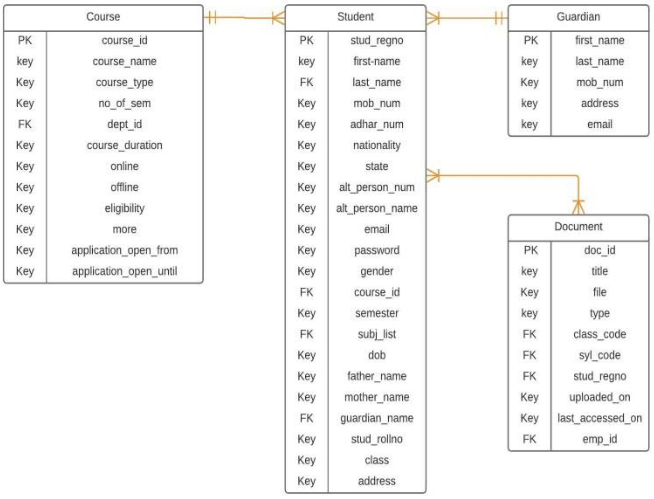


Fig. 3.3 ER-Diagram of Student Management System

### *3.3 Development and Implementation*

To develop the application based on micro-service architecture spring-boot is used. Various frameworks of Java such as Hibernate, Spring-Data-JPA are used to interact with the database. Spring-MVC architecture is also employed. As per the requirement and design 6 spring-boot applications are bootstrapped and are hosted independently so that all applications are almost independent and are loosely coupled. Each application will have the same directory structure to maintain the uniformity in the process of development.
To make the application a single page web application, the front end of the application is developed using Angular 2. The application is hosted and deployed in AWS, a cloud computing service provider.

### *3.4 Testing*

Any project before exposed to user must be tested to ensure that it behaves as expected. In this project, the application is tested by giving various types of input to check whether they are being validated or not and whether the application is behaving as expected or not.

### *3.5 Maintenance*

Once the application is tested and deployed, it must be maintained to satisfy the various constraints such as availability, reliability, etc. The newer versions of the applications can be developed depending on the success or feedback of the users.

## IV. EXPERIMENTS AND RESULTS

Here are some of the results of the application. Figures below show how the screen looks for the users and the features and the functionalities the application has. In the nutshell, the outcome of this project is set of web pages rendered by the web and application server.

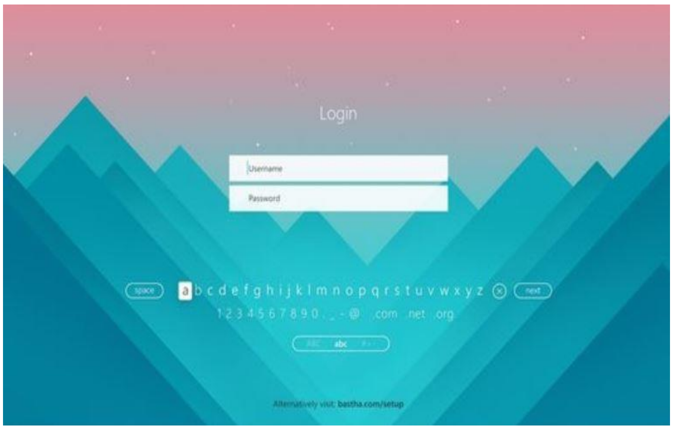

Login
Username
Password
space
a b c d e f g h i j k l m n o p q r s t u v w x y z
next
1 2 3 4 5 6 7 8 9 0 . _ - @ .com .net .org
ABC abc #+=
Alternatively visit: bastha.com/setup

Fig. 4.1 Login Page

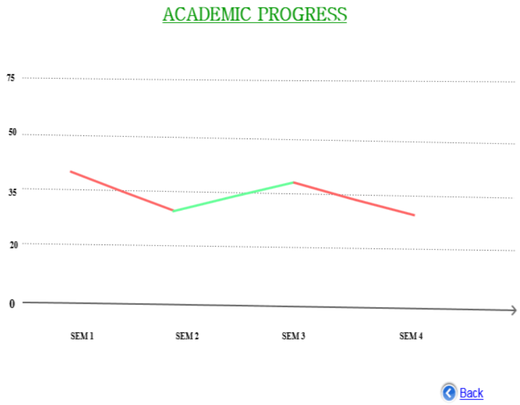
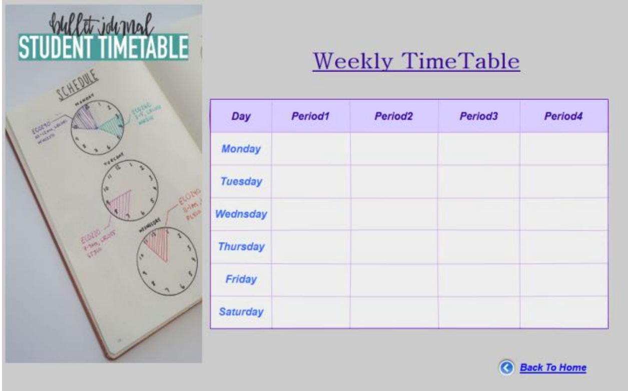


Fig. 4.2 Academic Progress Graph of Student



Weekly TimeTable

| Day | Period1 | Period2 | Period3 | Period4 |
|---|---|---|---|---|
| Monday | | | | |
| Tuesday | | | | |
| Wednsday | | | | |
| Thursday | | | | |
| Friday | | | | |
| Saturday | | | | |

Fig. 4.3 Time Table

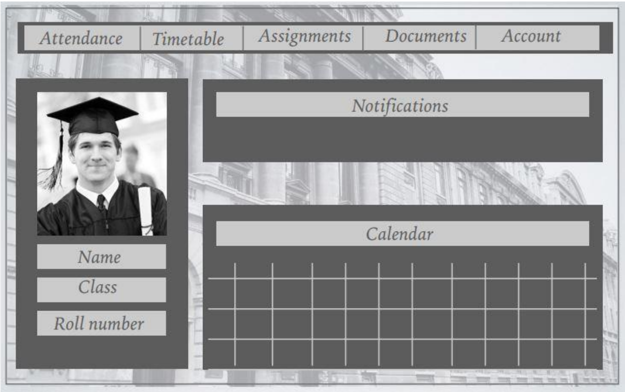


Fig. 4.4 Student Dashboard

## V. CONCLUSION AND FUTURE SCOPE

The results obtained from the experiments and testing ensures that the proposed method is efficient and user-friendly. As compared to existing methods of managing the academic institutions, this project which yields centralized software makes the work administration and management easier and provides detailed information about the topic of user's interest in just one mouse click. The educational institution can be provided with an easy-to-use user interface centralized software in which all services associated with the institution can interact with each other and share the data. As this is a ReST API hosted in the AWS Cloud server, the user will be able to access the resources from remote places. As the application is developed using micro-service architecture and agile methodology, in the future services can be added without having to make changes to the existing code.

## REFERENCES

[1] Christ University https://christuniversity.in/StudentLogin.html
[2] PESIT University https://pesuacademy.com/Academy
[3] Application development using Spring Boot https://spring.io/guides/gs/spring-boot/