Development of MIS for Training Institute using MySQL, NodeJs, ExpressJs and Handlebars

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Abstract--**Due to the increase in data in each and every sector it is important to make a change from diary based data to digital data. Training institutes , coaching institutes have an important role in society as they shape the careers of individuals. A management information system is being developed for institutes that can cater needs from small size to medium size capacity. We have proposed data and access flow for the administrator along with a database schema for student and administrator communication with relation to fee payment.**

After brainstorming among teammates for the deployment process we had chosen heroku (platform as a service) and oracle MySQL (database as a service). With further development of frontend design testing was performed with the help of Selenium IDE and Selenium web driver (Gecko- Mozilla firefox)

Keywords—*management information system, erp system, information system, management system, training institute, higher education, web application*

I. Introduction

The project aims to provide a portal which caters the needs of training institutes, coaching classes with services which value their time and provides required data on certain clicks of mouse. Management is the core of any business without which business may be short-lived. So to better use your data will help institutes to be in contact with alumni of the institute.

The selection of technologies plays a crucial role in development of the project which is the foundation and examines the scalability, reliability and various factors.

Brief info about them and their role in our project is as follows:

1. [20] Nodejs
   It is one of the backend javascript frameworks which is being highly used in software development as it has large community support and advancements. It also covers environment variables in a confidential manner which saves server , database keys.

2. [14] Expressjs
   Routes are performed by the packages and out of which express js is one of the renowned and oldest packages, which covers a variety of use cases.

3. [15] Handlebars
   It is a rendering engine which has fast execution, mustache compatible (logic-less templates) and parameter passing features.

4. [17] MySQL
   Structured query database service used in order to basically focus on database schema with community support and industry support.

5. [16] MongoDB
   It is a nosql database as a service which focuses on performance and query execution, the collection and document concept which increases the complexity for our use case.

With techstack we will approach npm js as a package manager and have support with heroku, Various frameworks such as bootstrap, font awesome icons and name it, it will be present, it is a large repository of packages.

Heroku [21] caters for great scalability and engagement which increase in customer or high demand it has auto-scaling. It follows the concept of dyno's which is similar to processes and executes on a system.

II. Literature Survey

A. [8] Focuses on migration from text based records to ERP based records with proper procedure at different levels and concern about security. Basically the paper proposal is to ask students to log activities.

B. [10] It uncovers the use of artificial intelligence in LMS and suggests various ways to implement e-learning such that it is useful and reduces similar work to be repeated. Data analysis is the start for implementation.

C. [4] The paper designs the product and suggests various technologies to be implemented to achieve and make tuition classes smart and manage their data in an effective manner.

D. [3] This paper explains and points out that planning and successful implementation of ERP systems can avoid loss to the venture.

E. [9] The modules that investigated in this research are giving a clear thoughtful about the most important modules that contribute in enhancing the AP

F. [2] This paper aims on benefits, security checklists and percentage of customization of Educational ERP systems in Higher Education.

G. [7] This paper focuses on understanding the concept, advantages of MIS in an organization and majorly the role of MIS in decision making.

H. [6] Parents are unsatisfied with the traditional way of learning for the disabbled students, thus authors try to suggest a new way of blended learning(online- brick & mortar) for them.

I. [1] As students are not very active in the online mode of learning this paper suggests several ways in which an effective teaching learning process can be established.

J. [5] For an institution to function as an integrated whole, it needs IT infrastructure that adequately handles all the institutional processes and administrative functions and that also supports strategic decision-making by management and IT infrastructure needs to be developed as it is the need of the hour.
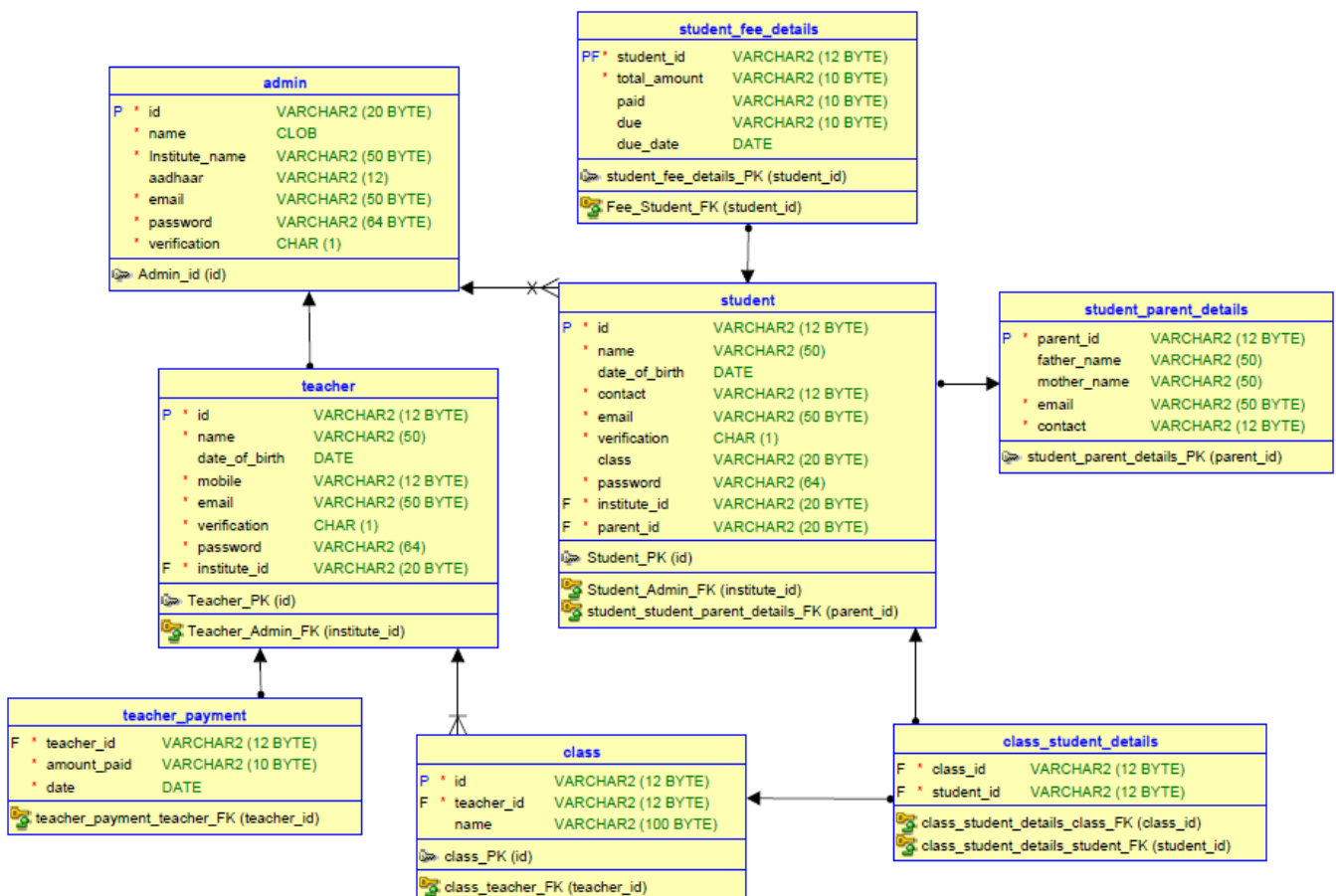
III. Implementation & Planning

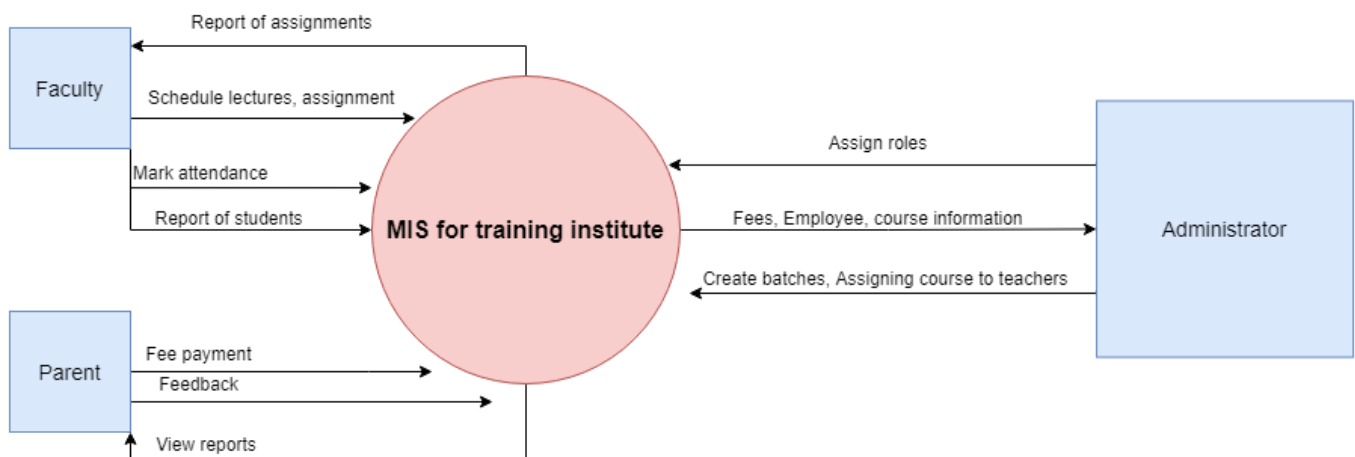Figure 1: Database schema representing relation b/w various tables

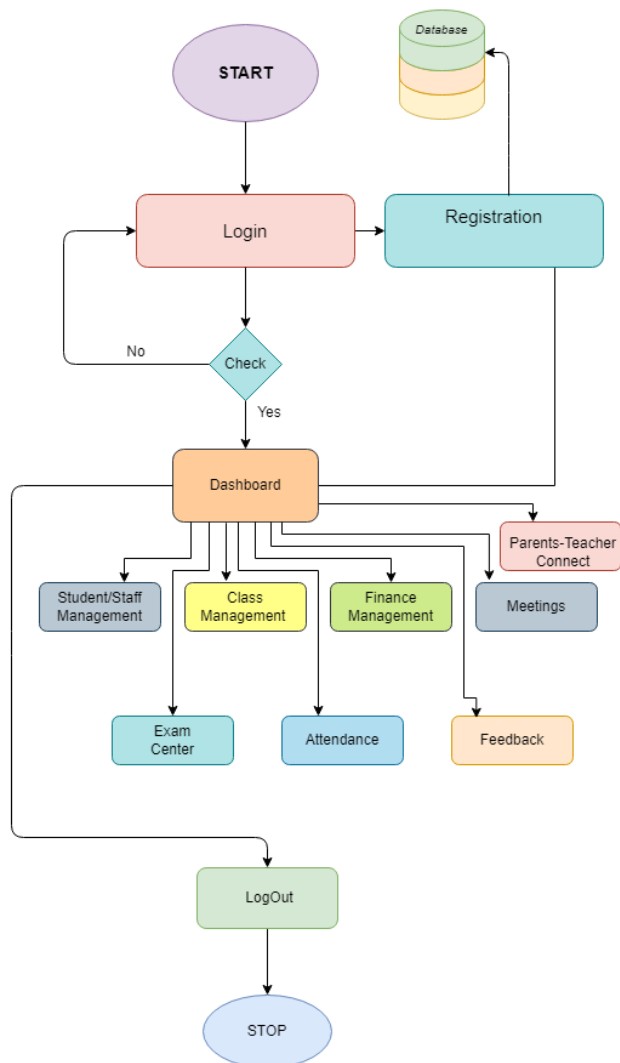Figure 2:In the MIS, a data flow diagram and the roles of different user types are shown.

Figure 3 : Administrator's dashboard

Competitors

A. [13] Emerging web and mobile application which caters the needs of school and academic institutions since the covid-19 outbreak to act as an intermediary between primary consumers and primary providers which one is not aware of and because of it's cost effective nature , various schools have adopted it and are engaged in it.

B. [11] This product is a necessity for many of the institutions as it offers a wide variety of services such as assignment, work submission, export functionality which makes it a key player.

C. [19] The web application offers a variety of services and is a key competitor which upgrades it's services and has an upper hand over clients.

IV. Result and Discussion

Feedback from stakeholders:

With 2 rounds of meetings with stakeholders, it resulted in addition and improvisation of various features such as :

1. Embed student photograph, the one who scores maximum marks in weekly tests as (It will boost the morale and keep the spirit high).

2. Faculty feedback was one of them from the students end and it should be interactive.

3. Sending reports to parents on a weekly/ monthly basis with graph/charts.

Feedback from external mentor:

For our project we had chosen a database technology MongoDB which is a unstructured query language, which with our perception was correct, but in the discussion with external mentor, we were briefed of the cons such as unnecessary reads on the database will increase the cost and cause performance issue, where sql with the help of joins will solve your problem, which is better for the use-case.

Deployment:

We had various deployment options such as:

1) Server
   a) Google cloud platform (PaaS)
   b) Amazon web services (PaaS)
   c) Heroku (SaaS)
2) Database
   a) Oracle MySQL (Autonomous DB)
   b) Google cloud platform (SQL)
   c) Azure SQL
   d) Amazon Relational database services

We will go with **heroku and oracle database**, heroku for it's easy build support and oracle for database because of availability in the near region. Heroku's PaaS will be easy to operate and oracle database as a service will be a plus point

Testing:

One of the important elements of SDLC which ensures reliability and security, out of 3 types of tests we conducted unit tests for the user interface and api's section of the app.
Black box testing

The results of tests conducted using Selenium Web driver specifically Mozilla Firefox.
An example of register script is as follows:

```
public void register() throws InterruptedException {
        /** Register on the portal **/
        driver.manage().window().setSize(new
Dimension(1000, 600));
        driver.get("localhost:8080/");
        Thread.sleep(2000);
        driver.findElement(By.linkText("Sign
up")).click();
        Thread.sleep(3000);

driver.findElement(By.xpath("//*[@id=\'admin-name\']")).
sendKeys("Pratik");
```

```
driver.findElement(By.xpath("//*[@id=\'mobNo\']")).send
Keys("1000056776");

driver.findElement(By.xpath("//*[@id=\'name\']")).sendK
eys("Test classes");

driver.findElement(By.xpath("//*[@id=\'email\']")).sendK
eys("abci2001@gmail.com");

driver.findElement(By.xpath("//*[@id=\'gstNo\']")).sendK
eys("01AAAAA2345B1ZC");

driver.findElement(By.xpath("/html/body/main/div/div/di
v/form/input[2]")).click();
                Thread.sleep(3000);
        }
```

With the use of figma tool [23] we designed user interface screens with the help of creatives from canva [24] , a creative design platform with a wide variety of features.

Sr No.	Test type	No. of unit test cases	Pass %
1	User Interface	5	99
2	Manual testing using Selenium IDE	7	90

The above results summarize the importance of user interface, user interactivity and proper use of entities as and when required. The test resulted in the website being vulnerable to a scripting attack.

V: Conclusion

Web application for administrators of training institutes to manage and manage their organization from single access with customized functionalities to cliente.
Features be like:
1. Topper's photo every weekend
2. Import user's functionality
3. Reports sent to parents

VI: Future Work

1. Autocomplete search (similar content)
2. Integrate google classroom with g suite access.
3. Identify repetitive tasks and suggest options to complete them.

4. Implementation of bulk fees and financial statements and feed it in the system.

VII: ACKNOWLEDGMENT

VIII: References

[1] Bao, W. COVID-19 and online teaching in higher education: A case study of Peking University. *Hum Behav & Emerg Tech*. 2020; 2: 113– 115. https://doi.org/10.1002/hbe2.191

[2] Bhamangol, Prof. Balasaheb Ningappa and Nandavadekar, Dr. Vilas Dattu and Khilari, Prof. Sunil Hanmant, Enterprise Resource Planning (ERP) System in Higher Education: A Literature Review (February 11, 2020). International Journal of Management Research and Development (IJMRD), Volume 1, Number 1, January - April (2011) , Available at SSRN: https://ssrn.com/abstract=3536089

[3] Almgren, Khaled. (2015). ERP Systems and its Effects on Organizations: A Proposed Scheme for ERP Success. 10.13140/2.1.2348.7049.

[4] Tanwar, Choudhary, Shinde & Dighe (2021). Expert Tution Management System - A Tution management System. https://ijisrt.com/assets/upload/files/IJISRT20MAY1036.pdf

[5] Pircher, Richard & Pausits, Attila. (2010). Information and Knowledge Management in Higher Education. Management Information Systems. 8-16.

[6] Smith, Sean & Burdette, P. & Cheatham, Gregory & Harvey, S.. (2016). Parental role and support for online learning for students with disabilities: A paradigm shift. Journal of Special Education Leadership, 92(2), 101-112.. 29. 101-112.

[7] Lahar Mishra, Ratna Kendhe & Janhavi Bhalerao (2015). Review on Management Information Systems (MIS) and its Role in Decision Making. http://www.ijsrp.org/research-paper-1015/ijsrp-p4671.pdf

[8] Dipin Budhrani, Yugchhaya Galphat, Vivek Mulchandani, "Student Information Management System", International Journal of Engineering Development and Research (IJEDR), ISSN:2321-9939, Volume.6, Issue 1, pp.8-10, January 2018, Available at :http://www.ijedr.org/papers/IJEDR1801002.pdf

[9] Shatat, Ahmad. (2019). The Impact of ERP System on Academic Performance: A Case Study Approach. Journal of Information & Knowledge Management. 18. 1950018. 10.1142/S0219649219500187.

[10] Aldahwan, Nouf & Alsaeed, Nourah. (2020). Use of Artificial Intelligent in Learning Management System (LMS): A Systematic Literature Review. International Journal of Computer Applications. 175. 16-26. 10.5120/ijca2020920611.

Websites:

[11] Google accounts. [Online]. Available: https://classroom.google.com/. [Accessed: 25-Jan-2022].

[12] "Difference between AWS, Azure, and Google Cloud Platform - javatpoint," *www.javatpoint.com*. [Online]. Available: https://www.javatpoint.com/aws-vs-azure-vs-google-cloud-platform. [Accessed: 25-Jan-2022].

[13] Getschoolos.com. 2022. *Toppr OS: Power your school to the future*. [online] Available at: <https://www.getschoolos.com> [Accessed 25 January 2022].

[14] Expressjs.com. 2022. *Express - Node.js web application framework*. [online] Available at: <https://expressjs.com> [Accessed 25 January 2022].

[15] Handlebarsjs.com. 2022. *Handlebars*. [online] Available at: <http://handlebarsjs.com> [Accessed 25 January 2022].

[16] MongoDB. 2022. *MongoDB: the application data platform*. [online] Available at: <https://www.mongodb.com> [Accessed 25 January 2022].

[17] Mysql.com. 2022. *MySQL*. [online] Available at: <https://www.mysql.com> [Accessed 25 January 2022].

[18] Npmjs.com. 2022. *npm*. [online] Available at: <https://www.npmjs.com> [Accessed 25 January 2022].

[19] smartclasses.in. 2022. *Best coaching class management software*. [online] Available at: <https://smartclasses.in/> [Accessed 25 January 2022].

[20] Node.js. 2022. *Node.js*. [online] Available at: <https://nodejs.org> [Accessed 25 January 2022].

[21] Heroku.com. 2022. *Cloud Application Platform | Heroku*. [online] Available at: <https://www.heroku.com> [Accessed 25 January 2022].

[22] Oracle.com. 2022. *Database as a service*. [online] Available at: <https://www.oracle.com/in/cloud/> [Accessed 25 January 2022].

[23] figma.com. 2022. Design as a service . [online] Available at: <https://www.figma.com/> [Accessed 29 January 2022].

[24] canva.com. 2022. Collaborate and create Amazing graphic design for free . [online] Available at: <https://www.canva.com/en_gb/> [Accessed 29 January 2022]

[25] github.com. 2022. Github . [online] Available at: <https://github.com/> [Accessed 29 January 2022]