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ERP Software for College Management System with REST Web APIs

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Abstract: Online College Management System provides a simple interface for maintenance of student information as well as all the operations related to college. It can be used by educational institutes or colleges to maintain the records of any college operation. The creation and management of accurate, up-to-date information regarding a college academic career is critically important in the university as well as colleges. ERP System for College management system deals with all kind of student details, academic related reports, Promotional things, college details, course details, curriculum, batch details, placement details and other resource related details too. It will also have faculty details, batch execution details, students' details in all aspects, the various academic notifications to the staff and students updated by the college administration. It also facilitate us explore all the activities happening in the college, Different reports and Queries can be generated based on various options related to students, batch, course, faculty, exams, semesters, certification and even for the entire college The placement officer is responsible for updating the placement related information like eligible criteria for a particular company, arriving date for the company which is coming for recruitment, the list of students who are eligible for attending the recruit.

Keywords: Enterprise Resource Planning, Python, Django, REST Framework, Application Programming Interface, Web APIs, MVC, JWT, MD5, College Management, LMS.

INTRODUCTION

ERP School/college/university Management Module which is used by Schools as well as Colleges to manage their daily activities which include the management of Employees, Students, Books and Library Records, Parents details, Assignments, Admission Process, Results and Reports, Exams, Events, Attendance, Timetable, Fees and Other Reports ,marketing activities ,placements, etc. It provides one-point access to manage this wide range of activities both effectively and efficiently.

The system will be used by four people, which are super users, college and all branches details, owner details, Admin, Teacher, Librarian and Student, Principal, etc. Admin can login using valid credentials and perform various task such as Adding a Teacher/Professor, Student and Librarian and other employees and also can manage them. Super User can also add all employees and assign roles to them. We are adding developer who will manage all technical things i.e adding course modules, design new course, create new test ,challenges ,etc. Teacher/Professor can login and perform various task such as add assignment, mark attendance, upload result and view event. Librarian can login and perform task such as adding a single or multiple books, view added books, request a book, issue a book to students, return issued book from student and view event. Student can access the system by providing valid credentials access modules such as viewing their own profile, view books, view time-table, assignments, result, attendance and events, give exams, and solve challenges given by professors. Super user is the root node who adds the colleges into the system with their details. Also can view/delete a college from the system. Super user is also adding different branches of the college and also adds the whole management and director detail. In this project we are adding technical support module for whole college administrative work such as computer or any other machine repairing
Proposed system is easy to understand and user friendly too.

Managing a school, university, college or any educational institution without a perfect software solution in the present times is painful, same in the case of any enterprises or business. Hence an appropriate solution is required which can ensure the smooth functioning of the organization as a whole, and with ERP college Management Module, this problem can simply be solved.

PROBLEM DEFINITION

In this competitive world where every organization tries to be ahead of other organization in process of which many of the organization failed and the main reason behind that is their Business Management Process. Many organizations follow the traditional business process which leads to various problems like long decision-time making, message distortion, lack

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of individual authority, inability to adapt globally, overspecialization and too much of paperwork. So to solve the problem we require Enterprise Resource Planning.

MOTIVATION

Time is money for all students as well as staff of any company. Any one does not have to face any difficulty if the staff members can track all the problems related to their students. So that they can solve student's problems on time and without wasting time.as well as do whole management related work by any staff.

LITERATURE SURVEY

The system provides guidance to the admin to keep track of each student. The admin have the access to the database of system . In an educational institute management is crucial thing. College or any education industry want have to keep focus on marketing and growing of their business. Also wants to do technical support on time. So in order to reduce the efforts of every staff of college we are introducing our system. The system comes on with much functionality like lead generation and promotion, Admission & fees collection process, students learning management system, employee management system, inventory system, and technical support. It provides a additional feature newlines that helps the student to get connect with teachers as well as any experts. It also provide the Staff management system so management can provide less efforts on staff management. This system is paperless system. System provides functionality for every staff and management team to manage their activities on single platform.

Management can keep track on all staff and check their performance at any time from any place. In this application student can access uploaded notes, course details, can give sample tests, and can discuss his /her doubts with technical experts as well as with teaching staff. Student will get the event details, attendance details, results, fees reminder, through sms. Overall manpower and reduces the time required.

Now-a-days, education is playing very significant role in the society. Day-by-day, the percentage of illiterates are decreasing and the percentage of literates is increasing. Education will change the society in all the aspects and everyone wants to study higher professional degrees.

Admissions are increasing day by day so there by. Ratio of establishment new colleges and schools are also increasing. But the actual challenge is starting from now. Most of the schools and colleges are maintain student information in records.

When the number of records increased, it is difficult to maintain the information of each student in the old manual system.

Maintaining the records manually leads to error prone and required more man power and it consumes more time for processing the records.

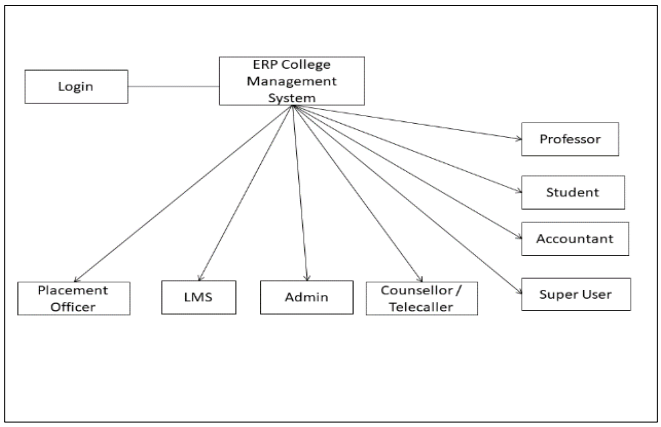

Fig. 1 Block Diagram

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ALGORITHMS

We are going to use various algorithms for various operations as follow

Naive Bayes

It is a classification technique based on Bayes theorem with an assumption of independence between predictors. In simple terms, a Naive Bayes classifier assumes that the presence of a particular feature in a class is unrelated to the presence of any other feature. For example, a student may place into company if he/she get above 60% in exam, solving given challenges, and completing assignments on time. Even if these features depend on each other or upon the existence of the other features, a naive Bayes classifier would consider all of these properties to independently contribute to the probability that this student will placed.
Naive Bayesian model is easy to build and particularly useful for very large data sets. Along with simplicity, Naive Bayes is known to outperform even highly sophisticated classification methods.
Bayes theorem provides a way of calculating posterior probability P(c|x) from P(c), P(x) and P(x|c). Look at the equation. below:
Formula-

$$P(c|x) = \frac{P(x|c) \cdot P(c)}{P(x)}$$

Here,
$P(c|x)$ is the posterior probability of *class* (*target*) given *predictor* (*attribute*).
$P(c)$ is the prior probability of *class.*
$P(x|c)$ is the likelihood which is the probability of *predictor* given *class*.
$P(x)$ is the prior probability of *predictor*.

Login Security

For providing Login security we are using JWT(Json web Based Token)Security where user password will be in the encrypted format when it reach to the client machine
To encrypt the password we are using following algorithm.

MD5 Encryption Algorithm

This protocol was purposely developed to offer data security as it can take inputs of arbitrary size to generate a 128-bit hash value output.
Under this protocol, the encryption technique follows 5 phases where every phase features a predefined task.
The five steps include:

- append padding (adding additional bits to the input) bits
- append the length
- initializing MD buffer
- message processing
- output

One notable advantage of MD5 is that the protocol allows the generation of a message digest using the initial message.

CODING

REST API

A REST API is a standardized way to provide data to other applications. Those applications can then use the data however they want. Sometimes, APIs also offer a way for other applications to make changes to the data.
There are a few key options for a REST API request:

- GET — The most common option, returns some data from the API based on the endpoint you visit and any parameters you provide
- POST — Creates a new record that gets appended to the database
- PUT — Looks for a record at the given URI you provide. If it exists, update the existing record. If not, create a new record
- DELETE — Deletes the record at the given URI

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- PATCH — Update individual fields of a record

Typically, an API is a window into a database. The API backend handles querying the database and formatting the response. What you receive is a static response, usually in JSON format, of whatever resource you requested.

We are using REST APIS to create a cross platform application. In future we can create hybrid applications also.

CONCLUSION

The project entitled as **ERP Software for College Management System With REST Web APIs** is the system that deals with the issues related to a particular institution.

- This project will successfully implement with all the features mentioned in system requirements specification.
- The application provides appropriate information to users according to the chosen service.
- The project is designed keeping in view the day to day problems faced by a college.
- Deployment of our application will certainly help the college to reduce unnecessary wastage of time in personally going to each department for some information.
- College can keep track on cost require for instruments required for college.
- Awareness and right information about any college is essential for both the development of student as well as faculty. So this serves the right purpose in achieving the desired requirements of both the communities.

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