

Commercial Website for Student Training and Consultancy using MERN Stack

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Abstract— Unfortunately, the quality of knowledge held by each engineering student has declined along with the number of students enrolled in engineering programs in our nation, despite the fact that the demand for engineers and technological experts has increased in this technological era. We have created a website for a learning management system that provides users with relevant links to help them self-learn their domain(s) of interest. The website also allows users to test their knowledge and take an approach to self-improvement by showing them a basic statistical overview of their scores from all the tests they have taken, broken down by domain.

Keywords— knowledge, Learning Management System, self- learning, self-improvement, domain.

I. INTRODUCTION

In this age of globalisation, knowledge is more important than ever. It is now incredibly easy to share and disseminate information because of technological advancements. With the advent of the Internet and WWW, the world has shrunk to the size of a global village. Getting information across the globe used to be a monumental task. But now more than ever, information can be easily shared and learned thanks to the Internet. The proliferation of online learning and the advent of LMSs have both been enormous boons to the field of education. Importance of a Technology-Driven Learning System

In the era of globalization, knowledge has become indispensable. Technological improvements have rendered the sharing and dissemination of knowledge quite simple. The world has become a global village. Online learning is an internet-based educational platform that facilitates connections among persons from diverse origins and viewpoints.

A Learning Management System (LMS) is a software application that administers educational courses, training programs, and learning and development initiatives through management, documentation, tracking, reporting, automation, and delivery. The quality of college graduates in our country has diminished as their numbers have risen, due to a neglect of essential knowledge during their educational tenure. A poll depicted in Figure 1 indicates that 60% of applicants are unable to produce compatible code, whilst just 1.4% can write functionally accurate and efficient code.

This project aims to resolve this issue by motivating users—whether students, graduates, or working professionals—to transition from a lack of knowledge in any topic to becoming proficient Software Developers with a comprehensive awareness of the contemporary IT market. This contributes to diminishing the job gap in the nation.

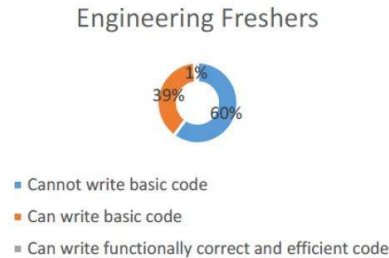


Figure 1. Engineering Fresher's Coding Knowledge

- A Learning System website gives users the ability to monitor their own learning progress and verify that they are meeting their performance goals by providing relevant statistics. This is one of the advantages of using a Learning Management System website. Users are able to identify areas of their learning course in which they may be falling short as well as areas in which they thrive for the most part because the majority of learning management systems offer reporting and analytical capabilities.
- A website in the Learning System provides the opportunity to eliminate expenses related to teacher travel, rents for online training sites, and printed eLearning materials. One can save a significant amount of money on their learning and development budgets by completing all of their training online, which is possible for an online learner.

Because it provides online learners with only the information they require in a straightforward and well-organized fashion, a Learning System website can also reduce the amount of time that is spent on online training. Online learners can simply click on the online modules that they require and absorb the knowledge in a fraction of the time that they would have to sit through a lengthy online training course that lasts for half an hour. In addition, they have the option of evaluating their comprehension through the use of online tests.

Identifying the Individuals Who Will Benefit from a Technology-based Learning System

Dear Students: The website encourages students to in still strong study habits and fundamental foundational themes early on in their studies because it is an approach that is beginner-friendly. This is because students are still in the process of learning.

People who have completed their degree but do not possess the necessary expertise and who wish to begin learning new domains from the ground up is another group of individuals who can benefit from using the website.

II. RELATEDWORKS

The fundamental information needed to create e-commerce websites utilizing the MERN stack was acquired. We made use of the data on the benefits and drawbacks of online shopping. We then made reference to the general layout of a simple e-commerce website. We also looked at the differences between the frontend and backend, as well as which MERN stack components were used at each step of the website's development [1].

We looked at the International Journal of Advanced Research in Computer and Communication Engineering to determine whether or not to make the website a full-fledged e-commerce website, as well as to learn about the different kinds of e-commerce and m-commerce websites, how they differ, and their benefits, drawbacks, and security.

The limitations and security concerns of such e-commerce applications were primarily discussed in this journal article.

After weighing these concerns against the benefits of such a web application, we decided to make the website a semi-e-commerce website for the time being, with most of the portal's content available for free and only specific content, like the Consultancy, being gated with paid membership, which is for future development [2].

In order to conduct additional analysis regarding the choice between traditional and e-commerce websites, we looked at the future of e-commerce in India, noting how it has been expanding in our nation and how it will continue to do so in the years to come. We also considered whether or not the profit would outweigh the security

risks associated with e-commerce websites[3].Next, we looked at the fundamental elements of MERN Stack technology, including the NodeJS platform, ExpressJS framework, ReactJS library, and MongoDB. describing the fundamental features of an e-commerce web application, including dashboard display, product and shop category display, sign-up and sign-in constructing a web application to look for goods retailers and a payment gateway using Braintree and MERN Stack technologies [4].

We then studied the steps, installation requirements, and techniques involved in creating a suitable web application using the MERN stack, as well as how to create a single-page web application that uses the whole MERN stack [5]. We first needed a thorough grasp of how e-commerce websites are constructed and what dangers need to be taken into account while operating one in order to determine whether or not our project should be established and operated as an e-commerce website. To do this, we looked at the steps involved in creating an e-commerce website, the prerequisites, and some popular tools and technologies [6].

The next step was to get a basic grasp of the definition and operation of an e-commerce website. To understand the fundamentals of e-commerce websites, their administration, and the benefits and drawbacks of operating them, we consulted the Introduction to E-commerce paper. In order to comprehend and observe some real-world instances of e-commerce websites and to determine whether or not choosing to pursue e-commerce for our project was the proper choice, we also consulted a few case studies on various e-commerce [7].

We finally researched the many sorts of e-commerce websites and noted which types are used in certain scenarios and use cases in order to completely understand the concept of e-commerce websites, as well as to learn about our various possibilities and what we were dealing with. We saw how other systems had already included our specific learning platform use case as an e-commerce application and commmodified the information they were offering on their own platforms. We were able to completely comprehend our possibilities and make a decision on the project's development as an e-commerce website thanks to this document[8].

Since the platform was to be built as a web-based platform rather than a downloaded program, we decided to use the MERN stack based on TypeScript for our project's development stack. This is because the former is far more accessible and attractive to the intended audience. By referring to the example guided project provided here [9], we learned the fundamentals of each of the frameworks in the stack and how to use them most effectively for our own project. We also gathered the software requirements that we needed for a fully functional web application and examined the development process of MERN stack applications.

III. METHODOLOGY

This project uses Model-View-Controller architecture. Each component is tailored for distinct application development tasks. MVC, a popular web development framework, creates scalable and adaptable projects. Figure 2 shows MVC components[9-10].

- **Model:** Model represents all user-worked data logic. This may be business logic data or data passed between View and Controller components. This project's MongoDB and Node frameworks manage Model.
- **View:** The View component handles all application UI logic. The Customer view will include all UI components the end user interacts with, such as text fields and dropdowns. This project's React framework handles View.
- **Controllers** communicate with Model and View components to handle business logic and incoming requests, alter data with Model, and generate results with Views. This project's Express framework handles Model.

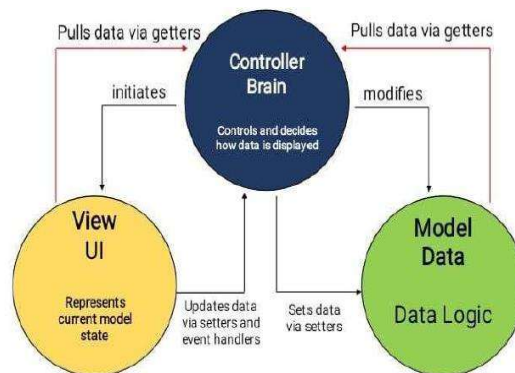


Figure 2. Web App Architecture

Learning management systems use analytics and reporting to detect training and learning gaps. LMMSs are mostly used for online learning, although they may also host asynchronous and synchronous courses, as seen in Figure 3.

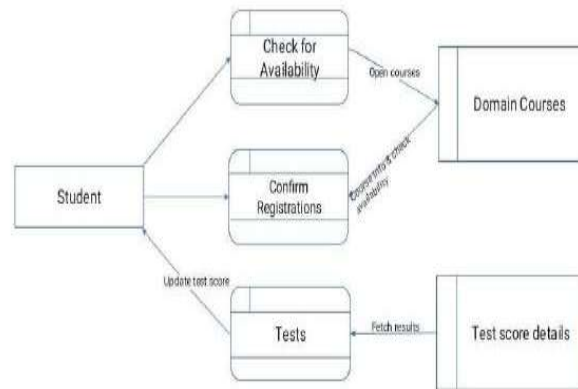


Figure 3. Process Flow of a Learning Management System

See Figure 3 for a Learning Management System Process Flow. JavaScript is a versatile programming language that allows web application development using Node.js and several built-in frameworks. Three key frameworks were used in this project:

- MongoDB: NoSQL backend database for JSON web objects.
- Express.js: A backend framework for web apps and APIs. It's the dominant Node.js server framework.
- React.js: A JavaScript toolkit for designing UI components for single-page and mobile apps.

We built the website using these three frameworks. MongoDB was utilized as a backend to hold all user data, Reactjs was used as a frontend since it was easier to learn and use, and Expressjs was used as a middleware.

Website content includes,

As with other registration sites, the Registration Page requires user credentials like Email ID, Name, and Password. This applies to the Database-connected User Schema. Multiple authentication actions and reducers preserve database consistency. Users can login with an existing account to send a get request to the back end for verification. MongoDB prevents SQL Injection attacks[11-12].

The User Dashboard shows what the user wants to learn from our website and how far they've come. The user's latest score in the domains they selected during profile registration is shown. The user receives valuable links to study the domain, encouraging self-learning. Also included is the amount of tests the user has taken since account creation.

From the Dashboard, enter the User Profile Page to view the details supplied during registration. If user profile is, If not accessible, users are led to the Profile creation page where they must add information like education, experience, and learning interests. Users can add details to their current profiles.

The Leader Board Page lists top users and their scores in descending order. By comparing users' performance on the platform, this page promotes healthy competition.

- The Admin Page allows for adding new domains to the database and creating new tests inside current domains. Admins can add up to 50 questions to a test. They can give beneficial links for users in the Domains the test is added to.
- The "Resume Builder" tool combines profile page information, formats it using Xelatex, and transforms it to a PDF using a Python script. The browser downloads the PDF file to the user's computer.
The Resume Builder uses Python to process user profile data in JSON format, write it to a Xelatex file, compile it using the OS library, and deliver it back to the user.
- The User Dashboard now includes a Developers Page. Developers that improved the project can submit their image and details to this page to be recognized.

IV. CONCLUSION

Users can self-learn and test their knowledge using the tests and graph their results. Leader boards let users compare their progress to others and create healthy peer competition. Downloading their CV as a PDF is simple. This project's results allow users to self-learn ideas, test their knowledge, and evaluate their test results using

linked graphs. Leader boards let users compare their progress to others and create healthy peer competition. The country's employment gap will decrease as people of all backgrounds learn new technical skills.

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