

A Research Paper on E-learning Based Learning Management Systems (LMS)

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Abstract - E-learning fulfills the thirst of knowledge and offers online content that can be delivered for the learner at anywhere, anytime and any age through a wide range of e-learning solution while compared with traditional learning system. It also provides the rapid access to specific knowledge and information. With the rapid growth of voluminous information sources and the time constraint the learning methodology has changed. Learners obtain knowledge through e-Learning systems rather than manually teaching and learning. In this research paper proposes the cloud based online e-learning management system with frame work. This system supports the cross browser and fully integrated with databases. This system focused around the several features namely Content Management, Content Protection, Learning Management, Delivery Management, Evaluation management, Access Control, etc., and mainly focused on integrated platform needed for e-learning and managements.

Key Words: Learning Management System; E-learning; Online learning;

1. INTRODUCTION

Nowadays Learning Management Systems (LMS) are not restricted to distant uses. The aim of this project is to develop an e-learning system that will improve on the manual, large class learning techniques. Enhance the quality of learning and teaching. Meet the learning style or needs of students. Improve the efficiency and effectiveness. Improve user-accessibility and time flexibility to engage learners in the learning process. This projects aims to develop an online learning and teaching platform for students and teachers with the goal so that it is very easy to learn online as per your time. Develop a platform that allows instructors to build online courses on their preferred topics. Instructors can upload videos, PowerPoint presentations, PDFs, ZIP files etc. We focuses solely on the universities syllabus as well as digital competencies most in demand by today's hiring managers and ensure your students complete their training and advance their careers.

2. FEATURES

2.1 Basic Features

- Account Creation (Signup, Verification, Login/out)
- Searching (Course Searching & filtering)
- Scrapping of data
- Mobile Friendly UI/UX
- Dashboard
- Course CatLog

2.2 Advance Features

- Recommendation of Course
- Chatbot (To solve Queries & Provide Service)
- Analytics [Shows which course enrolled, Payment History, Course Competition, Profile Detail info etc.]
- Payment Integration (Subscription to the course)
- Advance detailed analytics dashboard [Page insight]
- Push Notification
- Live Classes

3. PLANNING PROCESS

The purpose of this project is to develop an e-learning system that will improve the existing learning techniques. Enhance the quality of learning and teaching. Meet the learning style or needs of students. Improve the efficiency and effectiveness. Improve user-accessibility and time flexibility to engage learners in the learning process. Our goal is to develop a website that would be attractive enough, have a professional look and user friendly. So that the students globally would be access and learn. Our job started with subdividing the entire task and setting milestones. The milestones would be a marker of percentage of the work actually accomplished and success story. The entire planning process took the following steps.

3.1 Defining Use Case Models

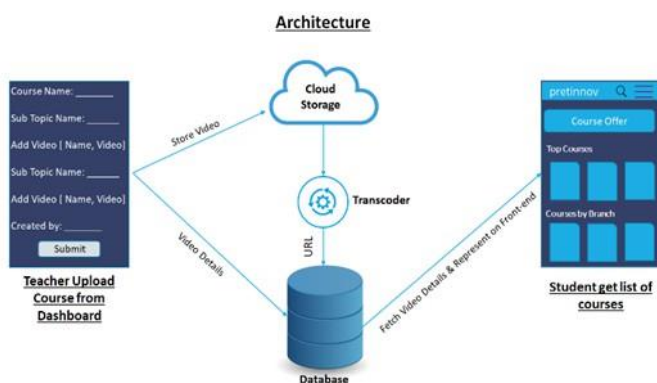
Writing use cases or stories of using a system - an excellent technique to understand and describe requirements. . An end user with internet browsing facility enabled registers into our site and logs into our site. Finds courses of his interest using the search option. Register themselves into the course and finally start learning online anytime, anywhere. So, from the stated use case model we found out the following to be the primary requirements.

Account Creation (Signup, Verification, Login, Logout)

- Search option (Course Searching & filtering)
- Dashboard
- Scrapping of data.
- Course CatLog

3.2 Architectural Pattern

The given architecture diagram state that, how overall system will work. Here the instructor will upload course with required course details from their dashboard. After that the video will store into the cloud storage meanwhile the video link and entered course details such as course name, sub topic, etc. will store into the database. The transcoder will manage the resolution of the video. After successfully upload of videos/course from instructor side. Now the video/course details will be fetched and represented on frontend i.e. on the student dashboard. Students can access videos/course from their dashboard. This is how the architecture will work.



4.0 DEVELOPMENT TOOLS

The entire development process has been subdivided into two: the front end development and the backend development. The front end comprises of the visually visible parts such as the home page, admin panel, contact page, shopping cart page. The back end contains the database and its interaction with the front-end.

A. Front End Development

Programming Languages Used - Vue.js framework, HTML, CSS, JS.

Software - Visual Studio Code IDE.

B. Back End Development

Programming Languages Used - Python, Django, Graph Software - PyCharm and Visual Studio Code IDE.

C. Database Design

One of the most important and challenging task is the database design. The information passed by the customer

while registering in the website is stored in the database. The products with their identification, description and image is stored in the database.

Moreover, if we update any of the featured products the update takes place in the database. So the program has a lot to do with the database.

The tables can hold different types of data for example: integer, variable characters etc. In our application we have chosen the MySQL DBMS to hold the database. MySQL is a relational database management system.

Database System Used - PostgreSQL, MySQL.

Content Delivery Network Storage - VIMEO.

D. Algorithm

ML and AI Algorithm are recommendation system based on Collaborative Filtering (CF)

User-Based Collaborative Filtering:-

User-Based Collaborative Filtering is a technique used to predict the items that a user might like on the basis of ratings given to that item by the other users who have similar taste with that of the target user.

Many websites use collaborative filtering for building their recommendation system.

Steps for User-Based Collaborative Filtering.

Step 1: Finding the similarity of users to the target user U.

$$Sim(a, b) = \frac{\sum_p (r_{ap} - \bar{r}_a)(r_{bp} - \bar{r}_b)}{\sqrt{\sum_p (r_{ap} - \bar{r}_a)^2} \sqrt{\sum_p (r_{bp} - \bar{r}_b)^2}}$$

r_{up} : rating of user u against item p
 p : items

Similarity for any two users 'a' and 'b' can be calculated from the given formula,

Step 2: Prediction of missing rating of an item

Now, the target user might be very similar to some users and may not be much similar to the others. Hence, the ratings given to a particular item by the more similar users should be given more weightage than those given by less similar users and so on. This problem can be solved by using a weighted average approach. In this approach, you multiply the rating of each user with a similarity factor calculated using the above mention formula.

The missing rating can be calculated as,

$$r_{up} = \bar{r}_u + \frac{\sum_{i \in users} sim(u, i) * r_{ip}}{\sum_{i \in users} |sim(u, i)|}$$

Libraries for Scrapping –

1. Beautiful Soup -

Beautiful Soup is an amazing parsing library in Python that enables the web scraping from HTML and XML documents. Beautiful Soup automatically detects encodings and gracefully handles HTML documents even with special characters. We can navigate a parsed document and find what we need which makes it quick and painless to extract the data from the webpages. In this article, we will learn how to build web scrapers using Beautiful Soup in detail.

2. Scrapy -

Scrapy is a Python framework for large scale web scraping. It gives you all the tools you need to efficiently extract data from websites, process them as you want, and store them in your preferred structure and format. You can read more about Scrapy here.

3. Selenium -

Selenium is another popular tool for automating browsers. It's primarily used for testing in the industry but is also very handy for web scraping.

5. TESTING AND BUG FIXING

Testing an application is an investigation to provide stakeholders with information about the quality of the product under test. Our testing technique included the process of executing the application with the intent of finding bugs (errors or other defects). It involved execution of the most important application components to evaluate the properties of interest. Among the several testing methods White-box testing was preferred. White-box testing also known as clear box testing, tests internal structures or workings of a program, as opposed to the functionality exposed to the end user. In white box testing an internal perspective of the system as well as programming skills are used to design test cases. The tester chooses inputs to exercise paths through the code and determine the appropriate outputs. This is analogous to testing nodes in a circuit. So based on the above test we can state that our web application is perfectly working. There were few bugs later fixed and now it is a full functioning website.

6. CONCLUSIONS

E-learning has changed entire education system because we do not have to spend time and money travelling to the coaching classes and institutes. One can pick up the pace of his online learning with the help of e-learning website. It is one of the cheapest means of studying online as it is e-learning development that has made it possible to reduce cost of promotion of courses and services.

There is no time barriers in selling the courses. One can log on the internet even at midnight and can sell or

purchase courses at a single click of mouse. An interactive user friendly and focused website in the form of online learning platform can generate better learning experience.

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