

DESIGN AND DEVELOPMENT OF EFFICIENT VIRTUAL EDUCATIONAL SYSTEM



The Project submitted to
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Towards partial fulfilment of the Degree of
Bachelor of Engineering
In
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SHRI SANT GAJANAN MAHARAJ COLLEGE OF
ENGINEERING, SHEGAON (M.S.)
2023- 2024

**SHRI SANT GAJANAN MAHARAJ COLLEGE OF
ENGINEERING, SHEGAON**



2022-2023

CERTIFICATE

This is to certify that **Ms. Diksha Butekar, Ms. Harshada Parne, Ms. Nikita Patond, Ms. Prajesh Peshattiwar** students of final year B.E. (Information Technology) in the year 2022-2023 of the Information Technology Department of this institute have completed the project work entitled “**Design and Development of Efficient Virtual Educational System**” based on syllabus and has submitted a satisfactory account of his/her work in this report which is recommended for the partial fulfilment of the degree of Bachelor of Engineering in Information Technology.

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2023-2024

CERTIFICATE

This is to certify that the project work entitled “**Design and Development of Efficient Virtual Educational System**” submitted by **Ms Diksha Butekar, Harshada Parne, Nikita Patond, Prajesh Peshattiwar** students of final year B.E. (Information Technology) in the year 2022-2023 of the Information Technology Department of this institute, is a satisfactory account of his work based on the syllabus which is approved for the award of the degree of Bachelor of Engineering in Information Technology.

Internal Examiner

External Examiner

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ABSTRACT

The rapid advancement of technology has transformed the landscape of education, leading to the emergence of virtual learning environments as a viable alternative to traditional classroom-based education. This abstract presents a comprehensive overview of the design and development of an efficient virtual education system. The primary objective of this research is to address the limitations and challenges of existing virtual education platforms by proposing a novel system that maximizes learning outcomes and engagement while minimizing technological barriers. The proposed system incorporates cutting-edge technologies, pedagogical strategies, and user-centered design principles to provide an immersive and interactive learning experience for students. The design phase involves identifying the key features and functionalities required for an effective virtual education system. These include real-time communication tools, collaborative workspaces, multimedia content integration, assessment mechanisms, and personalized learning pathways. Additionally, the system will incorporate adaptive learning algorithms to tailor the learning experience to individual students' needs, optimizing their educational journey. The development phase encompasses the implementation of the proposed system, utilizing scalable and robust technology frameworks. It involves creating a user-friendly interface, designing intuitive navigation structures, and integrating seamless interactions between students, instructors, and educational resources. Attention will be given to ensuring compatibility across different devices and platforms, allowing students to access the virtual education system at their convenience. To evaluate the efficiency of the virtual education system, a comprehensive set of performance metrics will be defined. These metrics will assess factors such as student engagement, learning outcomes, system responsiveness, and accessibility. User feedback and usability testing will be crucial in iteratively refining the system to enhance its effectiveness. The successful implementation of an efficient virtual education system has the potential to revolutionize education by overcoming geographic barriers, enhancing access to quality education, and fostering lifelong learning.

Keywords: virtual education, online learning, educational technology, user-centered design, adaptive learning, interactive learning, performance metrics.

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1. INTRODUCTION

1.1 Preface

Our proposed program is an educational website. Creating an educational website creates a lot of business sense as we can do a lot of things with it, to ensure its success. An educational website, if it provides accurate and much-needed information, can help build brand credibility. If we want to market our school or college through our website, we can provide the kind of information that helps improve its market reputation. For this to happen, we need to just market the various features of our setup. You will see us as someone who wants to make a difference; this will improve reliability. Take the decision of the method you wish to take and build a website in accordance with that method. Today, education has become an asset, and what kind of knowledge we bring and how we present it, will determine our success. Our website will allow the user to present information in the best possible way. For many people, including companies and organizations; the coronavirus could have cast a spanner in the works. Due to the virus, also known by the World Health Organization nearly a billion people have been forced to stay indoors in 35 countries worldwide. With many of us not allowed to go outdoors, the best thing to do is to take advantage of the current situation by level. Through our website here's how you can do it. Created by our website as an initiative, this allows the user to write his/her own blog and asking the queries and giving the solution these will help the user to improve their communication skills as well as enhancing and improving their knowledge. Courses may range from a range of subjects, including economics, entrepreneurship, nutrition, mathematics, block chain, and more.

1.2 Statement of problem

To help students to get over the traditional methods of learning and make them accustomed to the internet where the knowledge and learning for their respective subjects are easily available. It provides an automation procedure of studying online.

The implementation of this project helps both the students and the teachers. The teachers can teach to the students using this portal and the students can gain knowledge from the portal. The aim of the system is to reach out each student (rural and urban areas).

1.3 Objectives of Project

The objective of this project is to develop an efficient website for student and teacher to help them and other students to reach help faster. So main objective of this project is a follow:

- To develop a Virtual Educational System which will provide a web for students to meet and interact with teachers.
- To manage the data of Student and Faculty.
- The Virtual Education Management manages all information about mock tests and courses.
- The project is totally built at administrative end and thus only the administrator is guaranteed the access.

1.4 Scope and Limitations of the Project

Scope:

Faculty opined that online learning helped ensure remote learning, it was manageable, and students could conveniently access teachers and teaching materials. It also reduced use of traveling resources and other expenses. It eased administrative tasks such as recording of lectures and marking attendance. Both the students and teachers had an opinion that online learning modalities had encouraged student-centeredness during this lockdown situation. The student had become self-directed learners and they learnt asynchronously at any time in a day.

Limitations:

Faculty members and students said that through online learning modalities they were unable to teach and learn practical and clinical work. They could only teach and assess knowledge component. Due to lack of immediate feedback, teachers were unable to assess students' understanding during online lecturing. The students also reported limited attention span and resource intensive nature of online learning as a limitation. Some teachers also mentioned that during online study, students misbehaved and tried to access online resources during assessments.

1.5 Organization of the Project

Project Planning:

Software project plan can be viewed as the following:

1) Within the organization: How the project is to be implemented? What are various constraints (time, cost, staff)? What is market strategy?

2) With respect to the customer: Weekly or timely meetings with the customer with presentation on status reports. Customers feedback is also taken and further modification and developments are done. Project milestones and deliverables are also presented to the customer.

For a successful software project, the following steps can be followed.

- Select a project.
 - Identifying project's aims and objectives
 - Understanding requirements and specification
 - Methods of analysis, design and implementation
 - Testing techniques
 - Documentation
- Project milestones and deliverables
- Budget allocation

- Exceeding limits within control
- Project Estimates
 - Cost
 - Time
 - Size of code
 - Duration
- Resource Allocation
 - Hardware
 - Software
 - Previous relevant project information
 - Digital Library
- Risk Management
 - Risk avoidance
 - Risk detection

Project Scheduling:

An elementary Gantt chart or Timeline chart for the development plan is given below. The plan explains the tasks versus the time (in weeks) they will take to complete.

Cost estimation of the project:

Software cost comprises a small percentage of overall computer-based system cost. There are a number of factors, which are considered, that can affect the ultimate cost of the software such as - human, technical, Hardware and Software availability etc.

The main point that was considered during the cost estimation of project was its sizing. In spite of complete software sizing, function point and approximate lines of code were also used to "size" each element of the Software and their costing.

The cost estimation done by me for Project also depend upon the baseline metrics collected from past projects and these were used in conjunction with estimation variables to develop cost and effort projections.

We have basically estimated this project mainly on two bases –

1) Effort Estimation - This refers to the total man-hours required for the development of the project. It even includes the time required for doing documentation and user manual.

2) Hardware Required Estimation - This includes the cost of the PCs and the hardware cost required for development of this project.

2. LITERATURE SURVEY

The study was presented by Rahim, Azitha Isti, Surjandari Enrico, Laoh 2018 5th International Conference on Information Science and Control Engineering (ICISCE) published in Year 2018, Volume1 conducted research and the result was that there are seven identical patterns within three months. There are certain patterns that describe the behavior of a visitor that may occur due to the agenda of the selection process. By knowing these patterns, an educational website can improve the interface and quality of the website by creating link recommendations on each tab view with high integration that enables visitors to access information and provide it easily and effectively. By keeping this in mind and using it properly, it will help make the user access the command easily. Publishing patterns on the website is a visitor's behavior is important for better access and user experience. [1]

Keeping the technical aspects of the educational website in mind research conducted by Gretchan H Geng Leigh P Disney et al 2010 2nd International Conference on Education Technology and Computer Published in 2010, Volume 1 in the targeted technology has helped them to find more use of educational websites. Website designers and online educators can find these useful results in improving online teaching and designing and implementing educational programs. [2]

In this it is one of the technical aspects that we can keep in mind the lesson and report presented by Nazish Nouman, Ahmer Umer, 2019, Seventh World Conference on Web Access to Information and communication The same way keeping the mind of the Web accessible to people shows that people with certain types of disabilities can use this website like everyone else. detect, navigate and interact with the web like any other user, It also provides adults who have been restricted to these types of use of technology.[3] Given that the web is an important resource and especially an Education-based website that should be made accessible in a simple way so that older people can

access it freely, therefore the purpose of this study is to show and analyze Empirical ways to test accessibility through an educational website. The results show that in 20 of the 25 pages, web access was tested with automated tools, 2 pages were tested by real users and another 3 pages with automated tools, real users and professionals. Evidence is required that all educational websites are analyzed in the paper to correct errors. In conclusion, educational websites do not meet any other type of web content availability and its compliance standards, according to the results, the construction methods show that website design can be improved through the automated testing process. The challenge for the education website is to reverse these changes and make a plan with it with great success. The comparative Analysis has been shown in table (1) respectively.

Paper 01:

Dawei Niu and Lu Gao, "Based on the MVC model of teachers' workload management system development," 2012 International Conference on Computer Science and Information Processing (CSIP), Xi'an, Shaanxi, 2012, pp. 1392-1395, doi: 10.1109/CSIP.2012.6309123.

Description:

Description: Statistics and audit of the workload of teachers is an important and tedious work in the management of teachers is an important basis for the assessment and payment of remuneration of teachers per semester teaching. Colleges and universities continue to expand and recruit the increasing number of school staff have to spend a lot of manpower, material and financial resources to manage the teacher information [1]. The traditional manual statistical methods are inefficient and prone to data omissions and calculation errors. And with the deepening of educational reform, emollment continues to expand, the amount of information is substantially increased and diversified distribution, and dynamic. How to use modem means to change the

traditional mode of management, the establishment and implementation of networked, intelligent, efficient information management has become an inevitable trend.

Modern information management system using computer technology, complete decision support and management system for effective human-computer interaction. With the development of network technology and the popularity of computer management information systems play an important role in the management. High efficiency, low error management system development is the need to adapt to the times and management [2], and the development model from the early C / S (client / server) to a B / S (browser / server), development the choice of tools are more tend to have crossplatform, scalability and maintainability. It is based on the situation, in order to help staff to improve work efficiency, reduce errors, while providing fast query retrieval and printing capabilities required workload statements, we use the MVC pattern in Java technology and the development of aweb-based teachers' workload management system.

Findings:

This paper analyzes the important role of the teacher workload management in teaching management, as well as exist today, Design suitable for colleges and universities of the future sustainability of the development of teachers' workload management system based on the MVC pattern, Modern management methods to improve the work efficiency, reduce the error rate. Design better adapted to the characteristics of the workload of teachers, and using the Struts development framework for better implementation of the MVC design pattern [8]. Through the above method allows the development of teachers' workload management system has good scalability and flexibility. Information systems involves the storage and use of large amounts of data in the work, its safety is vital. Java is a safe language; it is always the security as an important part of the design. Of course, Java also has some shortcomings, and can not meet all the safety requirements of the people, Way in the protection of the Java

application itself. Our system in this regard in the future should gradually strengthen and improve.

Paper 02:

I. N. Mohamed, A. T. Siddiqui, S. Ajaz and S. Mohamed Idhris, "Student Information Report System with SMS (SIRS)," 2016 International Conference on Computer Communication and Informatics (ICCCI), Coimbatore, India, 2016, pp. 1-4, doi: 10.1109/ICCCI.2016.7479922.

Description:

Student Information Report System (SIRS) is application software which is intended to initiate a conductive and controlled information exchange platform to integrate with students, faculties, parents and the college/school administration. The proposed system enables educational institution to administer entire student activities such as Sending regular reports to the parents, Update, Search, Insert, Delete student's information. Generate reports in letter format, Analyze the reports generated. The student data contains the information (like register number, address, mobile number, etc) entered in this system by the staff. All these information is saved into a database. SIRS application can be easily used in colleges, universities, and other educational institutions. It can be used in private and government educational institutions. SIRS is a web-based application which can be accessed from anywhere and provides the chance of regulating the details from almost anywhere. SIRS is an easy-to-use application with utmost user friendliness.

Findings:

The SIRS system has many features for the institutions who want to make regular reporting about their students. It also makes the institution keep in touch with the student's parent by notifying important messages and report in a regular manner. By providing, additional functionalities like student-staff interaction. We can enhance it by

making the same project to work on Internet through centralized system. Making this project to a model which can be adopted by various institutions and schools, many people will be benefitted. The Student Information Report System (SIRS) is a student-level data collection system that allows the Department to collect and analyze more accurate and comprehensive information, to meet federal and state reporting requirements, and to inform policy and programmatic decisions [11]. By providing additional functionalities like student-staff interaction. We can enhance it by making the same project to work on Internet through centralized system. Making this project to a model which can be adopted by various institutions and school, many people will be benefitted. It is worth mentioning that the primary implementation of this research is in C#.NET and ASP.NET on standalone machines.

Paper 03:

M. Vinodkumar Sadharam and A. Soni, "Natural Language Processing based New Approach to Design Factoid Question Answering System," 2020 Second International Conference on Inventive Research in Computing Applications (ICIRCA), Coimbatore, India, 2020, pp. 276-281, doi: 10.1109/ICIRCA48905.2020.9182972.

Description:

Natural language processing is the field where the question answering system can be built. It also comes under the artificial intelligence field where the answering of the questions is automatically given by the computer system [1]. The factoid QA system works with the natural language and the question is made in the natural language then the system answers for the questions asked are given through natural language processing of the available text or images [2]. In our proposed system the natural language processing is performed by which the system will be able to generate correct answers. Semantic analysis is done here for the answering and the validity is provided. Here in this paper used the TF-IDF (Term Frequency - Inverse Document Frequency) technique for finding the relevant words in the files or documents. This measures the number of occurrences of any word in the particular data given. For this task, the

multiplication of two matrices is done and the occurrence of that particular word is tested. The TFIDF is mostly done for text mining and the usage increase in the field of Natural Language processing.

In our paper, a factoid QA system is proposed that will provide the answers to the user in our natural language. In the proposed factoid QA system, the first task performed is the extraction of keywords and the keyword analysis is performed for the searching for the retrieval of an answer. The removal of stop words is done and the usage of Porter Stemmer is made for the accuracy calculation.

Findings:

Factoid QA is one of the important systems for answering the user's questions. The factoid QA system deals with a variety of articles and a variety of QA is done in this system. The presented system also works for the variety of QA and the methods used are lexical chain, NLP, AI and keyword analysis. The SQUAD dataset is used here, which contains various articles. Our experiment is tested on a variety of articles and the system tests many questions. Some of the articles analyzed are Indore, Bhopal, Durg, Jabalpur etc. The accuracy obtained for the system is of average 69.93%. The presented system can be used for the factoid QA system

Paper 04:

A. Jain, A. Kumar Tripathi, N. Chandra and P. Chinnasamy, "Smart Contract enabled Online Examination System Based in Blockchain Network," 2021 International Conference on Computer Communication and Informatics (ICCCI), Coimbatore, India, 2021, pp. 1-7, doi: 10.1109/ICCCI50826.2021.9402420.

Description:

Nowadays everything has been shifted on the Internet and anyone can access the information from anywhere. It raises the new challenges such as data security, transparency, and trust over the global network. Many universities and independent

organizations such as National Testing Agency (NTA) are conducting the examination online and it may be used world widely in near due to COVID-19. Trust and security are the major constraints for such online examination systems. Several global market players are offering private network lockers, password, One-Time Password (OTP) and strong security passwords etc. The information security is one of the key challenges in existing solutions due to involvement of third party. Blockchain is an emerging technology that starts the revolution of privatization and data is always on the user's hand. There is no third-party involvement in blockchain network for accessing and processing the services. In the blockchain networks data blocks are for storing and managing the data. Blockchain maintains the integrity of its data by validating each data block cryptographically. Every data block in the blockchain network is linked with a cryptographic hash code. Each data block has its unique hash code, which is generated by the applying of powerful cryptographic algorithm SHA-256. These hash codes are validated by validators, which applying different types of consensus mechanism to give the valid signature code to each data block [1]. Consensus mechanism is a process that enforces mathematical operations and techniques to achieve the best signature agreement on each data block in the blockchain distributed network. Blockchain is one of the best applications called decentralized Ledgers. Decentralized Legers are smartly contained entire data which is generated automatically after the completion of the task, so it's also called as Smart Contract of blockchain.

It is a proof of agreement for the work which is generated without the involvement of any third-party system. Blockchain has various application areas such as business, health, supply chain, education system etc [2]. In this paper, we have used the blockchain education system for conducting the trustworthy examination [3,5]. In this paper, we present an online examination system that enables blockchain. In this application, candidates register themselves for the examination and pay the fee for that examination. It assures that only authenticate users could participate in that examination. In the second process, they log in and insert the transaction hash to start the examination. After the completion of the exam, the entire data is sent to the

examination centre directly and securely on the blockchain network in a smart contract. The examination data such as questions, answers, transaction amount, and time stamp are merged into a smart contract. This smart contract is finally sent to both ends of the user and examination centre as proof.

Rest of the paper divided into four sections. In second section, we will compare the blockchain based examination system with cloud-based examination system. In third section we have reviewed the technology background for the blockchain based examination system. In fourth section we have presented our system and its working. In forth section we have described the future enhancements.

Findings:

In this paper, we have presented the importance of a blockchain network on the education system. We have developed the online examination system based on blockchain. In this paper, we have also compared the cloudbased system and blockchain-based system. In this, we used the public blockchain platform Ethereum and one of the best application Smart contracts. In this study of the Ethereum platform on the blockchain which is used to design and manage the smart contract using solidity language. Solidity language is used for creating and managing the smart contract. This paper is relevant to our research to successfully adopt smart contracts in the modern education system. In this paper, there is a smart contract application that is used for developing the online examination system. This paper explored the Decentralized Application of this examination system which enable smart contract and its usage which leads to the main research question of this study. This analysis shows that transparency and trust are the main benefits of the smart contracts in enterprises as well as includes data security and privacy, resource management, and decision-making process for the education system.

Paper 05:

Z. Mushtaq and A. Wahid, "Mobile Application Learning: the next generation e-learning," 2018 3rd International Conference on Inventive Computation Technologies (ICICT), Coimbatore, India, 2018, pp. 826-829, doi: 10.1109/ICICT43934.2018.9034399.

Description:

Nowadays internet has covered almost all the disciplines of modern-day life directly or indirectly. The ubiquity of internet and its different modalities have made common man to depend on its serviceability. Globe has shrunk into logical framework what we technically call as "global village" in general and "internet of things" in particular. The applicability of internet has tremendously revolutionized the domain where it is servicing its purpose like medical sciences, environmental science, chemical exploration, space and scientific research transportation, tourism etc. For every human being "survival for fittest" is the basic requirement. Education is the only way out that helps every individual right from childhood to explore the universe to acquire what is required, when is required and how is required. Educational industry has evolved both vertically and horizontally to cope the modern challenges to cater the necessities of students in particular and Individuals in general. Educational institutes which serve quality education right from preparatory schools through colleges to universities have implemented all the modern aides which were explored from time to time to ease reading/ writing and learning process. The inception of modern technology in education sector evolved right from the adoption/ implementation of projector screens (overhead and slide), multimedia presentations. Smart stylus input devices, graphical designers, digital writing pads, smart classrooms, virtual classrooms, online learning etc. These applications where indeed very effective in building higher standards in delivering quality education.

Findings:

In the future mobile devices will look completely different from today's hence higher education must plan to deliver education to meet the demands of new generations of students. We are in the first generation of mobile learning. Since it is in its early stage of development. In the next generation of technology there will be more smart systems everywhere that learners can learn from. The current educational system is outdated because it was developed before the advent of information and communication technologies. The current model is still based on face-to-face delivery of lectures. Also, teachers are being trained for current model of education. With the advent of MobApp Learning teacher must be trained for technology- enhanced educational system.

Paper 06:

Y. Huang, X. Zhai, S. Ali and R. Liu, "Design and Implementation of Traditional Chinese Medicine Education Visualization Platform Based on Virtual Reality Technology," 2016 8th International Conference on Information Technology in Medicine and Education (ITME), Fuzhou, 2016, pp. 499-502, doi: 10.1109/ITME.2016.0119.

Description:

Traditional Chinese medicine (TCM) is the quintessence of China, gaining a great influence in the world [1]. It is the science dealing with human physiology, pathology, diagnosis, treatment and prevention of diseases. In the background of the information society, digital information education will play an important role and has the profound impact on the area of TCM education. Internationalization of TCM education is the development trend and a necessary process [2]. This is an important task for the Chinese government and Chinese education institutes. With the development of science and technology, research of Virtual Reality (VR) technology has already made important progress in the world. It is widely used in military, industrial, and education. VR, also known as immersive multimedia or computer-simulated reality [3], is a computer technology that replicates an environment, real or imagined, and simulates a user's

physical presence and environment in a way that allows the user to interact with it [4]. Virtual realities artificially create sensory experience, which can include sight, touch, hearing, and smell. In recent years, the virtual reality technology used in the education field, rich and developed the education pattern, what can construct life like learning environment and let learners experience reality. VR is the new trend to promote the educational development. In this paper, we use Unity 3D as the development platform for virtual reality. We firstly introduce the definition of VR, its applications and study area. And then, we present the goal of the system, implementation methods and key technologies. At last, we analyze the result of the system, summed up the advantages and disadvantages. The rest of the article is structured as follows: Section 2 provides a description of the research process. Section 3 describes the methodology and implementation of the platform. Section 4 presents the experimental results and analysis. Section 5 presents the advantages and limitations of the platform. The last section summarizes the paper and provides some conclusions.

Findings:

In this paper, we firstly introduce TCM education and internationalization development trend. And then, we present a TCM visualization platform include the definition of VR, its applications and study area. We present the system goals, implementation methods and key technologies. At last, we tested the TCM visualization platform, including the user interface of the system, function, performance etc. The results showed the feasibility and effectiveness of the method proposed in this paper.

Paper 07:

C. Liu and K. Wang, "An Online Examination System Based on UML Modeling and MVC Design Pattern," 2012 International Conference on Control Engineering and Communication Technology, Shenyang, China, 2012, pp. 815-817, doi: 10.1109/ICCECT.2012.189.

Description:

Online examination system is an effective way to evaluate students' grasp of knowledge and to get instant feedback for both teachers and students to improve teaching and learning respectively. Compared with the traditional way of offline paper-based examination which includes preparing examination papers and scoring them, online examination is more efficient. Furthermore, it overcomes time-space restriction, saves a lot of time and gives fast results. Students can choose a prepared exam or even generate an exam automatically from question bank for themselves in the system. When they submit their answers, the online examination system will show them the correct answers and related explanations immediately. There is evidence that the frequent users of online examination system perform better in actual examinations. To improve teaching quality, motivate students' self-learning and meet the international examination standards for medical students and professionals, such as the United States Medical License Examination (USMLE), we developed the bilingual question bank and online examination system for medical students and young doctors. In the design of this system, we applied Unified Modeling Language (UML) modeling and Model-View-Controller (MVC) design pattern. The functional requirements are traced from use case models to component model via analysis and design models, thus the components derived using this approach form the components of MVC architecture. It's proven helpful to smooth the communication between medical teachers and system developers, increase code reuse and speed up the development. The system was developed in PHP language and MySQL database. In order to obtain a robust, low-coupling application, we take advantage of the ThinkPHP framework on the server side and JQuery JavaScript framework on the client side respectively.

Findings:

The online examination system fully meets the demands of teachers and students. Teachers' and students' comments of the system have been overwhelmingly positive. Teachers are pleased with the time-saving and labor-saving features, and students are

pleased with the high efficiency and freedom to use. The advanced analysis and design method ensures the high quality and robustness of the system.

Paper 08:

S. S. Pawaskar and A. M. Chavan, "Face Recognition based Class Management and Attendance System," 2020 IEEE Bombay Section Signature Conference (IBSSC), Mumbai, India, 2020, pp. 180-185, doi: 10.1109/IBSSC51096.2020.9332212.

Description:

The technology is evolving and is becoming a very essential part of our life. People love and enjoy our new way of life which is supposedly called "The Smart Life" as it reduces human efforts and saves ample amount of time. Using the technology in the tiniest thing, say for toasting the bread is what people are used to. The question arises when you're in the school or college and you find your professors struggling with management of class attendance. The question arises when you see the professors wasting their time, energy, and efforts just to record the list of present students.

The traditional approach of calling out students' names, passing the attendance sheet is not only limited to being time-consuming but also gives rise to malpractices like manipulation in the attendance, proxy, etc. There are a few attendance systems which use technology like sensors and biometrics like fingerprint, iris scanning (which at times can be unreliable). However, the system proposed in this conference stands out as it is a one-stop system to manage and record the class attendance.

The system follows four steps of working. Firstly, the record of each student is added (Roll Number and Name) and a video is captured, the images are taken from the frames of the video. In the training process - the second step, the images of the student are trained using LBPH and Haar Cascade and saved in the form of a YML file. In the tracking process - the third step, the database of trained images is compared with the

student's face to track the student's face. Lastly, the attendance is marked in the CSV file for the tracked student with respective time and date. The block diagram of the system is as shown in Fig. 1. In this system, the list of students in the class can be viewed, and the record of the particular student can be deleted as well. The efforts put and the skills used for this project will transform and smarten the classrooms.

Findings:

The process of conducting attendance automatically by using the face recognition and detection algorithms like LBPH and Haar Cascade is a reliable and efficient system. The Haar Cascade provides a high accuracy level irrespective of the illumination. The system can give an accuracy of about 96.88%. To get better results and accuracy, the class should be well illuminated. This system improves the productivity of the class since there is no longer any source of disturbance caused by taking attendance manually and also an ample amount of time is saved.

This project stands out from the existing systems as it is a one stop system where the faculty can manage the class data and also keep a record of the attendance. The face recognition-based class management and attendance system will make every classroom a smart class. The faculty can simply use a laptop having a webcam to track the attendance of the class. There is no need for other fancy equipment and hence this system is also cost-efficient.

Paper 09:

Z. Wu, P. Agyemang, M. Chan, H. Zhou and Y. Xiang, "Improved one-class collaborative filtering for online recommendation," 2017 International Workshop on Complex Systems and Networks (IWCSN), Doha, Qatar, 2017, pp. 205-209, doi: 10.1109/IWCSN.2017.8276528.

Description:

Recently, e-commercial online market is developing explosively. Various online advertising strategies are employed to attract customers. Sales information is overflowed, making customers evermore difficult to locate the needed commodities. To address this problem, researchers develop and implement recommendation systems to provide users with needed information. Based on the item history and its similarity with other commodities, recommendation system can generate a list of suggestions to the users by predicting user preferences. In that case, the generated suggestions can be more relevant and useful for customers.

Recommendation systems include many research areas and focuses, such as semantics and scalability etc. Temporal dimension, which incorporates changes in the recommendation process over time, is becoming popular recently [1]. It is observed that both user preference and system contents can be changed and updated over time [2]. Thus, to provide more relevant user recommendations, timing information must be included, e.g., the user profile should be updated regularly.

In this work, we focus our efforts on applications which include visual decision factors over time. The purpose of our work is to build a rated time-visually-aware recommendation system, which is scalable, personalized, temporally evolving, and interpretable on Amazon data. In that case, our improved recommendation system should be able to provide more matching and evolving recommendations for users. In this paper, we present a complete framework on rating, visual signals, and timing factor during the recommendation process in a content-based environment. In online commercial environment, content-based technique can have better performance where there are some characteristic values that represent item content. In general, our recommendation system can keep close recommendation relevance even with the changing user preferences.

The rest of the paper is organized as follows. Section II presents the existing recommendation system algorithms; Section III shows the overall system design and implementation; Section IV describes the evaluation of our technique with realworld data; and Section V concludes the entire paper.

Findings:

Modeling visual-temporal appearance and gaining a deeper understanding of users' preferences, especially in domains like book, games, baby products etc is of great important. In this paper, we built scalable models on top of product images and user real number feedback to capture the relevancy of products.

We found that the model is useful for modeling visual dimensions as well as the associated user preferences with time dynamics. Our framework significantly outperforms state-of-the-art approaches in uncovering rating dimensions and modeling user-item interactions.

Paper 10:

S. N. M. S. Pi and M. A. Majid, "Components of Smart Chatbot Academic Model for a University Website," 2020 Emerging Technology in Computing, Communication and Electronics (ETCCE), Bangladesh, 2020, pp. 1-6, doi: 10.1109/ETCCE51779.2020.9350903.

Description:

The websites have been popular in today's world, where people tend to search and get the information through browsing a website. Websites are making the searching information process easier toward people's daily life as compared to twenty years ago. Thus, most of the companies, institutions even government have built up their own websites including the universities. The use of websites could be various purposes based on the owner's intention to have it. However, the growing adoption of the websites has brought many problems in engaging the engagement between the university websites and the stakeholder. The stakeholder defined in this study as a person or a group of people who are involved as internal or external with the organization and beneficial to the organization.

Based on researchers Pittsley and Memmott, they have stated in their studies, that usability studies of LibGuide have focused on four selected university website and has addressed the navigation issue [1]. However, navigation is one of the factors that increase the likelihood of stakeholder to return to the site again [1]. Besides, complicated navigation structures, dynamic website content, and heavy graphical user interfaces are the major obstacles of website accessibility [2].

Another important criterion that used to disseminate information to a stakeholder is website accessibility and the major problem of this criterion is when it comes to persons with disabilities [2]. This group of stakeholders must be provided with high web accessibility when browsing it.

In order to increase the interactivity of the website, most website's owner has implemented an added technology to overcome it. One of the rise technologies currently is Chatbots. In addition, researchers [3] have studies the implementations of a Chatbot in hotels and guesthouses websites. Both Lasek and Jessa found that there are 63% of stakeholder prefers to interact with the Chatbots through the website [3]. This shows that added technology is an alternative way to improve website engagement.

However, there are still lacking in generalizing the identified components that need to have in order to develop a Chatbot. Having an embedded Chatbot in a website could be an interesting yet added the additional value to the University Website. Thus, this paper is purposely to identify the components needed for developing the Smart Chatbot Model for University Website.

The outlines of this paper as follows. The first section is the introduction of the research study. Section 2 describes the literature review from the previous researcher. Section 3 describes the methodology of this research study. The next section shows the finding which is the result gained of this research study. Meanwhile, the conclusion has been discussed in Section 5. This paper ends with a description of the future work as describes in Section 6.

Findings:

In conclusion, a Smart Chatbot has increased in demand as it is the best tool that provides fast response in order to interact with the users. It is very helpful as it allowed the users to enter the questions in natural language to communicate with humans and able to gain the responses in time. Apart from that, it can be related to the concept of sign language recognition as it is needed for realizing a human-oriented interactive system as it can be performed similarly to the normal communication with human [37]. Besides, it is similar to the human reactive behavior that will respond whenever there is a request on any question [38]. In this research study, the components which act as the guideline in developing a Smart Chatbot have been identified and presented. The information has been gained from the Literature Review. Meanwhile, the limitation of this research study is lacking a validation of the components of the Smart Chatbot, thus it is unable to proceed with the designing and development of the Smart Chatbot. To ensure the Smart Chatbot able to keep lots of data, a cloud service is required.

Paper 11:

M. Rakhra et al., "E-Commerce Assistance with a Smart Chatbot using Artificial Intelligence," 2021 2nd International Conference on Intelligent Engineering and Management (ICIEM), London, United Kingdom, 2021, pp. 144-148, doi: 10.1109/ICIEM51511.2021.9445316.

Description:

Il facets of our lives are created through technology. ECommerce cannot be held aside, particularly as it is the product of this growth. In the present Era most of the people have a smartphone with quick messaging and networking applications ;people may use applications to communicate with sellers, so it will be quite handy for sellers to respond to various customers without spending too much time. A chat bot, is a piece of software that uses "quick messaging as the Program Interface" and allows customers to add the bot's name to their list in the same way they add contacts and colleagues. Conversations are unique as they bridge the gap between human-human interaction and human-

computer interaction (HCI). Basically, a chatbot is a tool by this kind of communication that can comprehend the context along with delivery of an appropriate response. Communication can be comprehended for various commercial purposes. ChatCommerce is used to describe these kinds of applications. Conversational commerce is described as "using chat, texting, and other natural language frameworks to communicate with individuals, brands, or services, as well as bots that have no real position in the bi - directional, asynchronous messaging. The average conversion rate on a website generally sits in the ~1% range. That's a lot of work to do for a lot of wasted traffic! One of the most effective ways we see bots being used is to help nudge leads who might not have converted without chat over the hump. Sometimes a quick question or a proactive offer to help can be the difference between average conversion rates, and filling your pipeline full of qualified leads. AI chatbots can understand language outside of a set of pre-programmed commands and continue learning based on the inputs it receives. They can also make changes based on patterns and become smarter over time as they experience new situations. This means AI bots can be applied to a range of uses – from sentiment analysis to making predictions about what a visitor is looking for on your website.

In fact, a Chatbot responds to simple chat by handling user requests based on a collection of questions specified in the knowledge base. A chatbot is currently being created to react smarter, quicker, and more reliably. There are many processes in the chatbot framework, including data parsing, data crawling and pattern matching. Some experiments do not use the whole procedure in order to reduce computation time. According to some studies, the chatbot system only employs two processes: sorting and data crawling. Based on the outcome of the 1500 queries, only 1200 can be answered correctly or about 80% accuracy. Other researchers only recommended pattern matching and data crawling, with a 95 percent accuracy and response times ranging from 7.5 seconds to 48 seconds.

A consumer who visits an e-commerce can search for a particular product or visit a website in general. To view multiple results in the user query, keywords are used for

the search tools. Out of these results, some may be applicable to the user or the output may not be available [1]. This could be a poor UI. Often, if a consumer has no good understanding of the product he wants to purchase, programmes cannot give those users the requisite results [2].

Findings:

The Chatbot uses artificial intelligence and hence understands how users react more effectively. Chatbot is able to react like a human so that the effort taken by human beings can be easily produced. Therefore, this paper is intended to introduce a chatbot based on the Ecommerce engine which seeks to improve the user's engagement with E-Commerce engine. Chatbot stores a variety of answers, but can also consider intricate user feedback and hence includes appropriate answers and product recommendations. Grammar-based data parsing is needed for efficient Chatbot applications in order for the user to comprehend the intended sentence by defining phrases that are suited to the complexities of the grammar used. By eliminating unnecessary content and selecting during the parsing process, a successful pattern matching process can be developed if the implemented pattern can sequentially extract information that is useful for evaluating the related text. Crawling data is the final stage in the process of scanning a database for data that fits the results of pattern matching. So this research will propose Chatbot system to render the customer services on ecommerce.

Paper 12:

Z. Ren, H. Wang and X. Li, "A Multimedia Platform Constructed for Technical English Teaching," 2007 First IEEE International Symposium on Information Technologies and Applications in Education, Kunming, China, 2007, pp. 453-455, doi: 10.1109/ISITAE.2007.4409323.

Description:

For years, reading and writing has been the focus of technical English teaching practice. However, students' feedback show that they also have a strong desire for improvement of oral communication skills in technical English. Thus, it is necessary for teachers to introduce some form of listening and speaking practice into inclass or after-class activities [1][2]. Since 2004, we made attempts to introduce various multimedia materials (including educational films, TV programs, etc.) into classroom lecturing. This educational reform comes up with positive response from students: (1) Less students are absent from class (2) Classroom interactivities are increasing (3) More time is spent on learning technical English after class. In September 2006, we decided to start a project of developing a multimedia platform for technical English course. It is for two majors: electronic information engineering and communication engineering, for which the technical English course is assigned 60 hours in two semesters. According to the course innovation plan, the time in-class activity is as follows: (1) 32-hour reading and translation (2) 20-hour listening and speaking (3) 8- hour technical writing. The platform is expected to have the following features: (1) ease of use for both classroom lectures and self-study after class (2) accessible in campus network as well as in removable disk (3) repeated practice at sentence level (4) structural and progressive mode (5) easy to be upgraded

Findings:

This multimedia platform is not only a teaching assistant for technical English professors, but also a portable learning tool for engineering students. With more wonderful video materials and powerful development software are available, this platform is bound to be more mature and user-friendly

Paper 13:

H. Sastypratiwi and Y. Yulianti, "Web Application Development using MVC-component-based approach," 2019 International Conference on Data and Software

Engineering (ICoDSE), Pontianak, Indonesia, 2019, pp. 1-5, doi: 10.1109/ICoDSE48700.2019.9092609.

Description:

Software is the most important product for transferring information [1]. In the process of designing and developing a software, it is compulsory to have a model. In this research, Component Based Software Engineering (CBSE) will be used in the process of developing an information system. According to Pressman, CBSE is a model of the software development process using existing software components. While the component itself is a part of the system that is replaceable as long as it still realizes the same interfaces. The interface on the component only describes the services provided by the component, not the implementation. The physical implementation of a component is hidden to its users because the component can only be accessed through its interface; therefore, represented by the interface of a component must be clearly defined [2]. Regarding the components mentioned, it is also explained that the component is not a technology. Components are about how a person relates to software [3]. There are currently a considerable number of frameworks and component models, which have been developed by various research groups and organizations. Most of them have their origins in the traditional Software Engineering domain, e.g. components with operational interfaces and various types of port-based objects. This study aims to produce another form of a component in the Model-View-Controller (MVC) based software model which can later be implemented in website development with similar themes.

Findings:

From the results of the design of the vehicle assess system application, it can produce components (development for reuse) and assess the reuse of components in the application as explained above. It can be concluded that the components produced from this study can be reused (development with reuse). The conclusion of this research is

the MVC-based component model with the CBSE approach produced can be in the form of a library and it is a development of component forms from the previous as stated by Fowler in his book entitled "UML distilled: a brief guide to the standard object modeling language" . In the programming language web components can be in the form of libraries. The components in the form of the library are located at the third tier.

3. ANALYSIS

3.1 Detailed Statement of the Problem

This study aims to develop E-learning platform for university students. The specific objectives can be summarized in combining electronic content management systems and social networks, help students to exchange ideas which help to think creatively, accessibility of educational materials, encourage students to participate, enhancing student interaction. The critical success factors for our project is increasing students' interaction among themselves, helps each other understand the content of the material they are studying and sharing appropriate educational content for students Also it provides different forms of questions, exams and quizzes to be a bank of questions In order to build this system we study its specifications and requirements by analyzing the system and using uml diagrams to draw all the system stages. For the implementation, we use design programs to design the system interfaces. This project will be carried out using unified modeling language (UML), PHP programming language, and MySQL databases to implement the system.

Faculties can login and have access for viewing, uploading documents, projects, assignments, home-work and much more. Admin can login and manage the faculties and student details and also view projects, assignments, home-work.

This is how the new concept of virtual learning came into existence, which is an easier and smarter system for Institutes.

In this new era of electronics, we know the concept of virtual learning which does not include the use of paper and pen. There are many advantages of 'Design & Development of Efficient Virtual Educational System'. In this System we can assign projects to students and can share documents and more easily.

This system has three modules including student, faculties and Admin. Students can login, they have access to main menu, calendar, projects, documentation, to upload, view the things uploaded by the faculties, knowledge books, also send messages to

faculties. Also, we can take video lectures or can provide recorded lectures for the student. So, that student can learn anytime.

3.2 Requirement Specifications

Development of software systems requires analyzing of the process to be digitized in order to enable a correct system, a system that functions as required and also to assist the potential users of the system understand the general functionality of the system. The target specifies the system's objectives and constraints to which designers have to confirm. The objective of doing analysis is to remodel the anatomy's major inputs into organized specification.

3.2.1 Software Requirement

- ❖ Operating System
- ❖ Application Server
- ❖ IDE
- ❖ Version control
- ❖ Diagrams
- ❖ Collaboration

3.2.2 Hardware Requirement

- ❖ Laptop/PC
- ❖ System: Intel Processor i5/above
- ❖ Hard Disk: 40GB
- ❖ RAM:2GB

3.3 Functional Requirements

In this section we will discuss different functional requirement of different user.

3.3.1 Admin

- FR1: Create usernames and passwords.
- FR2: Manage student's account.
- FR3: Ability to login and update profile.
- FR4: Ability to logout after the completion of process.
- FR5: Ability to create, edit or delete courses.
- FR6: Ability to create, edit or delete test.
- FR7: Ability to create, edit or delete assignments.
- FR8: Ability to create, edit or delete specialties.

3.3.2 Students

- FR1: ability to download tests
- FR2: Ability to view assignments.
- FR3: Ability to share solutions of assignments.
- FR4: Register data.
- FR5: Ability to login and update profile.
- FR6: Ability to logout after the completion of the process.

3.4 Non-Functional Requirement

In this section we will discuss different Non-functional requirement of different user.

- Consistency.
- Convenience.
- Availability.
- Usability.
- Security.

- Reliability.
- Database Design

This section describes the six tables that are linked to our project. These six tables is described in the following point

- Admin.
- Students.
- Specialties.
- Courses
- Assignments.
- Tests.

❖ Admin

The admin table stores the information about Admin profile. All the Admins who will manage the system will be saved in this table.

Table 3.4.1 Admin

| Field Name | Data Type | Length | Key | A_T | Default value |
|----------------|-----------|--------|-------------|-----|---------------|
| Admin_id | Int | 11 | Primary key | √ | None |
| Admin_email | VARCHAR | 150 | | | None |
| Admin_password | VARCHAR | 100 | | | |
| Admin_name | VARCHAR | 50 | | | |

❖ Students

The table Student stores the information about Student profile. The entire Student who signs up the system will be saved in this table.

Table 3.4.2 Student

| Field Name | Data Type | Length | Key | A_T | Default value |
|--------------------|-----------|--------|-------------|-----|---------------|
| Student_id | Int | 11 | Primary Key | √ | None |
| student_username | VARCHAR | 20 | | | None |
| student_password | VARCHAR | 20 | | | None |
| Student_email | VARCHAR | 50 | | | None |
| Student_name | VARCHAR | 50 | | | None |
| Student_collage_id | Int | 10 | | | None |
| Student_address | VARCHAR | 50 | | | None |
| Student_level | VARCHAR | 11 | | | None |
| Student_mobile | VARCHAR | 11 | | | None |

❖ Specialities

The table specialty stores all specialties requested through the platform will issue. All of these specialties data will be in this table.

Table 3.4.3 Specialities

| Field Name | Data Type | Length | Key | A_T | Default Value |
|-----------------|-----------|--------|-------------|-----|---------------|
| Specialty_id | INT | 11 | Primary Key | √ | None |
| Specialty_title | VARCHAR | 20 | | | None |

❖ Courses

The table course stores all courses belong to specialty through the platform. All of these course's data will be in this table.

Table 3.4.4 Courses

| Field Name | Data Type | Length | Key | A_T | Default Value |
|--------------------|-----------|--------|-------------|-----|---------------|
| Course_id | INT | 11 | Primary Key | √ | None |
| Course_title | VARCHAR | 20 | | | None |
| Course_description | TEXT | | | | None |

❖ **Assignments**

The table Assignment stores all Assignments which added by students through the platform. All of these Assignments data will be in this table.

Table 3.4.5 Assignments

| Field Name | Data Type | Length | Key | A_T | Default Value |
|------------------------|-----------|--------|-------------|-----|---------------|
| Assignment_id | INT | 11 | Primary Key | √ | None |
| Assignment_title | VARCHAR | 50 | | | None |
| Assignment_description | TEXT | | | | None |
| Assignment_file | VARCHAR | 50 | | | None |
| Course_id | Int | 11 | Foreign key | | None |

❖ **Tests**

The table tests store all tests belong to courses through the platform added by admin. All these course's data will be in this table.

Table 3.4.6 Tests

| Field Name | Data Type | Length | Key | A_T | Default Value |
|------------------|-----------|--------|-------------|-----|---------------|
| Test_id | INT | 11 | Primary Key | √ | None |
| Test_title | VARCHAR | 20 | | | None |
| Test_description | TEXT | | | | None |
| Test_file | VARCHAR | 50 | | | None |
| Course_id | Int | 11 | Foreign key | | None |

3.5 Feasibility Study

3.5.1 Edmodo

Edmodo is a global education network that helps connect all learners with the people and resources needed to reach their full potential. It is a free educational social networking application. It is being used as an alternative to LMSs by universities and Ministries of Educations and schools all over the world because of its Cost is free, it is designed for teachers and students and online learning. It does not have or promote

commercial content, It supports low-bandwidth communications so students and

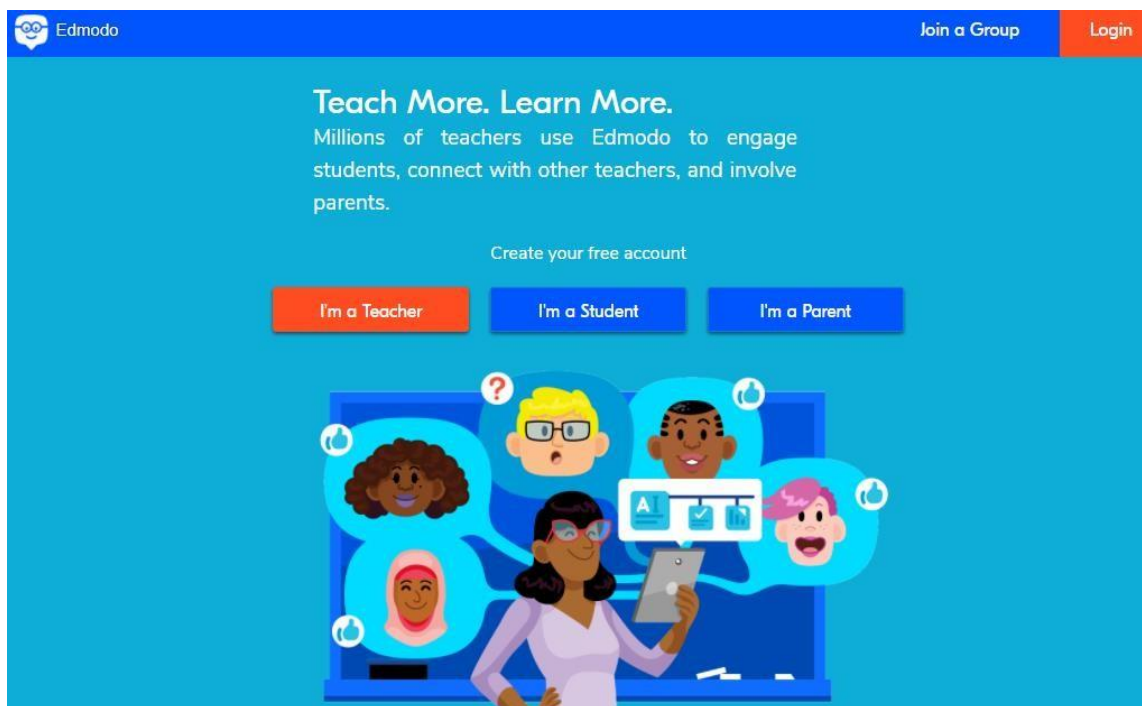


Figure 3.5.1.1: Edmodo platform.

instructors can carry on synchronous (real-time or live) and asynchronous (delayed) conversations without the need for a lot of bandwidth. Additionally, students or instructors with smart phones can access the Edmodo app and/or access the course via their phones, versus a computer, it makes for an excellent course site, allowing for readings to be housed in a library, the formation of small groups, discussions to be archived, third-party apps, and posting of photos and videos. And Edmodo mimics Facebook in use and structure and should thus require very little training to use. It mimics an application with which, many instructors and students are familiar. Shown in figure 3.5.1.1

3.5.2 Moodle

Moodle is an acronym for "Modular Object-Oriented Dynamic Learning Environment." It is an online educational platform that provides custom learning environments for

students. Educators can use Moodle to create lessons, manage courses, and interact with teachers and students. Students can use Moodle to review the class calendar, submit assignments, take quizzes, and interact with their classmates.



Figure 3.5.2.1: Moodle platform

Moodle is used by thousands of educational institutions around the world to provide an organized and central interface for e-learning. Teachers and class administrators can create and manage virtual classrooms, in which students can access videos, documents, and tests. Course chat allows students to communicate with the teacher and other students in a secure environment.

Each Moodle classroom and course can be customized by the class administrator. For example, one teacher may choose to provide a wiki that students can edit, while another may opt to use a private web forum for online discussions. Some teachers may use Moodle to simply provide documents to students, while others may use it as the primary interface for quizzes and tests. Individual class sizes can be scaled from a handful of students to millions of users.

In order to create a Moodle learning environment, the Moodle software must be downloaded and installed on a web server. The Moodle platform is open source and is built using a modular design, so advanced users can modify the platform as needed. Individual users, such as teachers and students, can sign up for an account on the Moodle server and access content through either the web interface or the "Moodle Desktop" application. Shown in figure 3.5.2.1

3.5.3 Degreed

Degreed is an enterprise LMS solution. It enables businesses to manage thousands of courses and platforms in one place so employees can learn at will. There are customizable learning paths, and administrators can track an employee's progress, even outside what the company mandates..

Administrators can purchase and manage credits for various platforms in a single place, while employees can choose where to spend the dollars, which can be on any learning activity they want. Pricing information is not publicly available, so if this option sounds interesting to you, you will have to request pricing and a demonstration. Shown in figure 3.5.3.1



The image shows the Degreed logo on the left, which consists of a blue icon of two interlocking circles and the word "degreed." in a sans-serif font. To the right is a promotional banner. The banner features a background image of two men, one in a blue shirt and one in a dark shirt, both looking towards the right. The text on the banner reads: "A MILLION WAYS TO LEARN - One place to discover, track, and measure all of it." Below this is a blue horizontal line, followed by the text "Designed for large and mid-sized organizations," where "large and mid-sized organizations" is in orange. Below that is the text "Degreed is an award-winning learning platform built for the way today's workers really learn and fuel their careers." At the bottom right of the banner is a dark blue box with the text "GET A FREE DEGREED DEMO." in white. Below this are two input fields: "FIRST NAME *" and "LAST NAME *", each with a white input box.

Figure 3.5.3.1: Degreed platform

3.5.4 BizLibrary

BizLibrary LMS offers custom content management, virtual classroom management, certification management and social learning. This is a great option if your business happens to be within a regulatory environment that requires any kind of ongoing

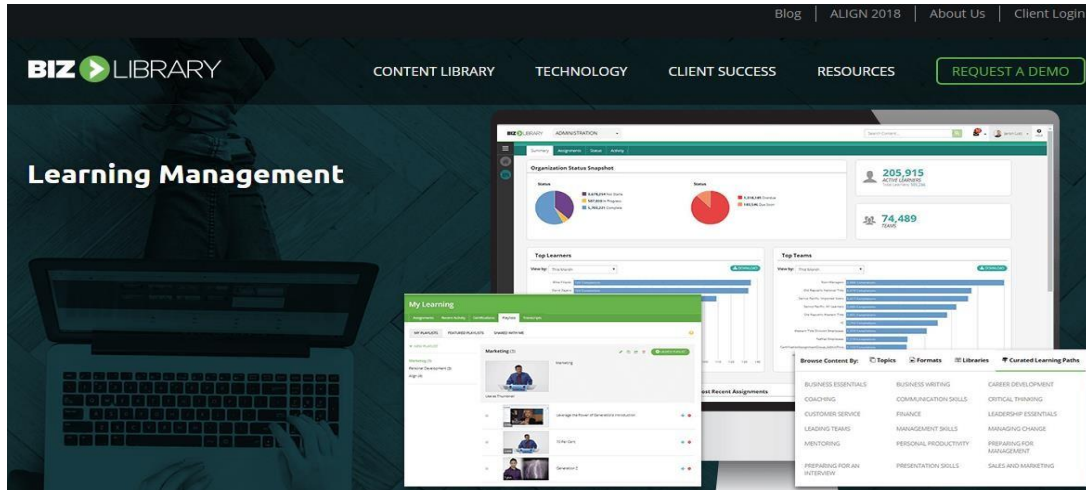


Figure 3.5.4.1: BizLibrary platform.

licensing, certifications, or security training to remain in good standing. Everything is scalable and can be white-labeled for your business.

Entrepreneurs and businesses can choose which courses to mandate for their staffs and the platform will allow for self-enrollment. Pricing information is not publicly available, but you sign up for a free trial. Shown in figure 3.5.4.1

3.5.5 Talent MS

Talent MS is an enterprise-friendly learning-platform, or LMS, that can be white-labeled for use by businesses or educators. It's a mobile-friendly cloud platform where users can learn from their tablets, smartphones or laptops. A readily white-labeled solution means enterprises; universities and just about any team, organization or individual can incorporate it, or even re-sell the platform as their own. Added benefits include complete reports, embedded tools and built-in tests. TalentLMS has a free plan

for up to five users and 10 courses. Paid plans range for \$29 per month to \$349 per month, billed annually, and include anywhere from 25 users to 1,000 users or a customized tailor-made plan up to 50,000 users and unlimited. Shown in figure 3.5.5.1

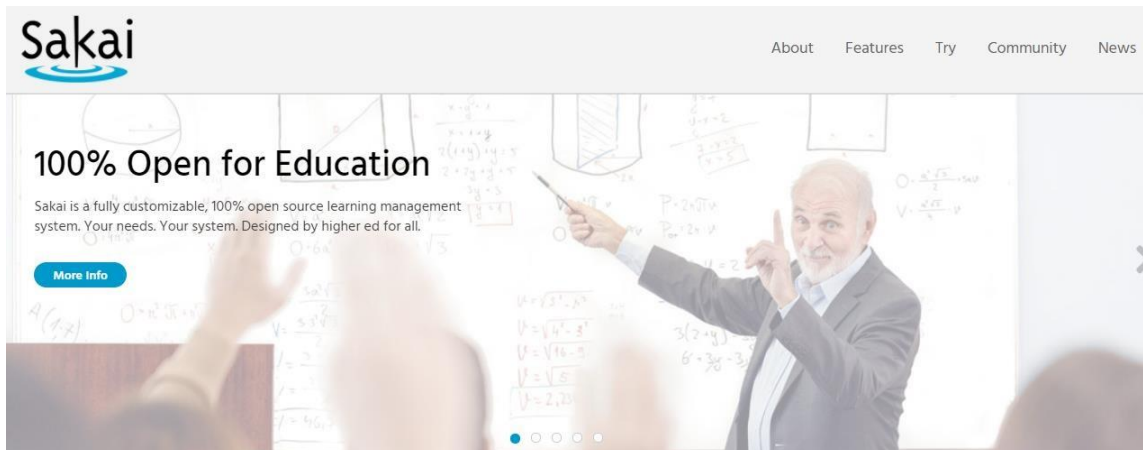


Figure 3.5.5.1: Talentlms platform.

3.5.6 Sakai

Sakai is a freely available, feature-rich technology solution for learning, teaching, research and collaboration. Sakai is an open-source software suite developed by its diverse and global adopter community.

The community surrounding the Sakai project includes individuals, institutions and organizations worldwide that share a common commitment to enhancing teaching, learning and research. This commitment is reflected in how community members come together to pool knowledge, define the needs of academic users, create and share software tools and support each other adopting and using Sakai. Shown in figure 3.5.6.1



Welcome to Sakai

Figure 3.5.6.1 Sakai platform.

Online assessments are one of the core features of a learning platform, and in Sakai 11, the Tests & Quizzes tool benefits from several enhancements. Using funds raised from the 2014 Sakai Virtual Conference, the Samigo Tests & Quizzes Enhancements Project (STEP) produced several new features and improvements, including:

- Section, group, and individual-specific delivery settings (e.g., due date, length of time to complete the assessment, etc.)
- New question type: Image Map
- Improved reporting capabilities, including the ability to see all assessment submissions for a student
- New side panel that allows students to track question progress in an assessment
- Over 30 other enhancements

3.6 Use Case Diagrams

Unified Modeling Language, UML for short, is the international standard notation for OOAD. It is a standardized specialization language that can be used for Object

Modeling. It has been defined by the OMG and has already become the de-facto standard for designing Object- Oriented Software Applications. In the field of software engineering, the UML is a standardized specification language for object modeling.

UML is a general-purpose modeling language that includes a graphical notation used to create an abstract model of a system, referred to as a UML Model.

According to the OMG specification, "The Unified Modeling Language (UML) is a graphical language for visualizing, specifying, constructing, and documenting the artifacts of a software-intensive system.

UML offers a standard way to write a system's blueprints, including conceptual things, such as business processes and system functions as well as concrete things such as programming language statements, database schemas, and reusable software components." (Grady, Unified Modeling Language User Guide)

The UML is purely process independent, i.e., it is not tied up with a SDLC process. The basic purpose behind UML modeling is visualizing, constructing, specifying and documenting a system.

It should be noted that UML is a standard; it is not a methodology, process or a procedure. Rather, we use UML as a standard that uses some predefined standard notations with a view to modeling and defining a software system, to document it and define the artifacts involved.

UML is not restricted to modeling software. UML is also used for business process modeling, systems engineering modeling and representing organizational structures. UML has been a catalyst for the evolution of model-driven technologies, which include Model Driven Development MDD, MDE, and MDA

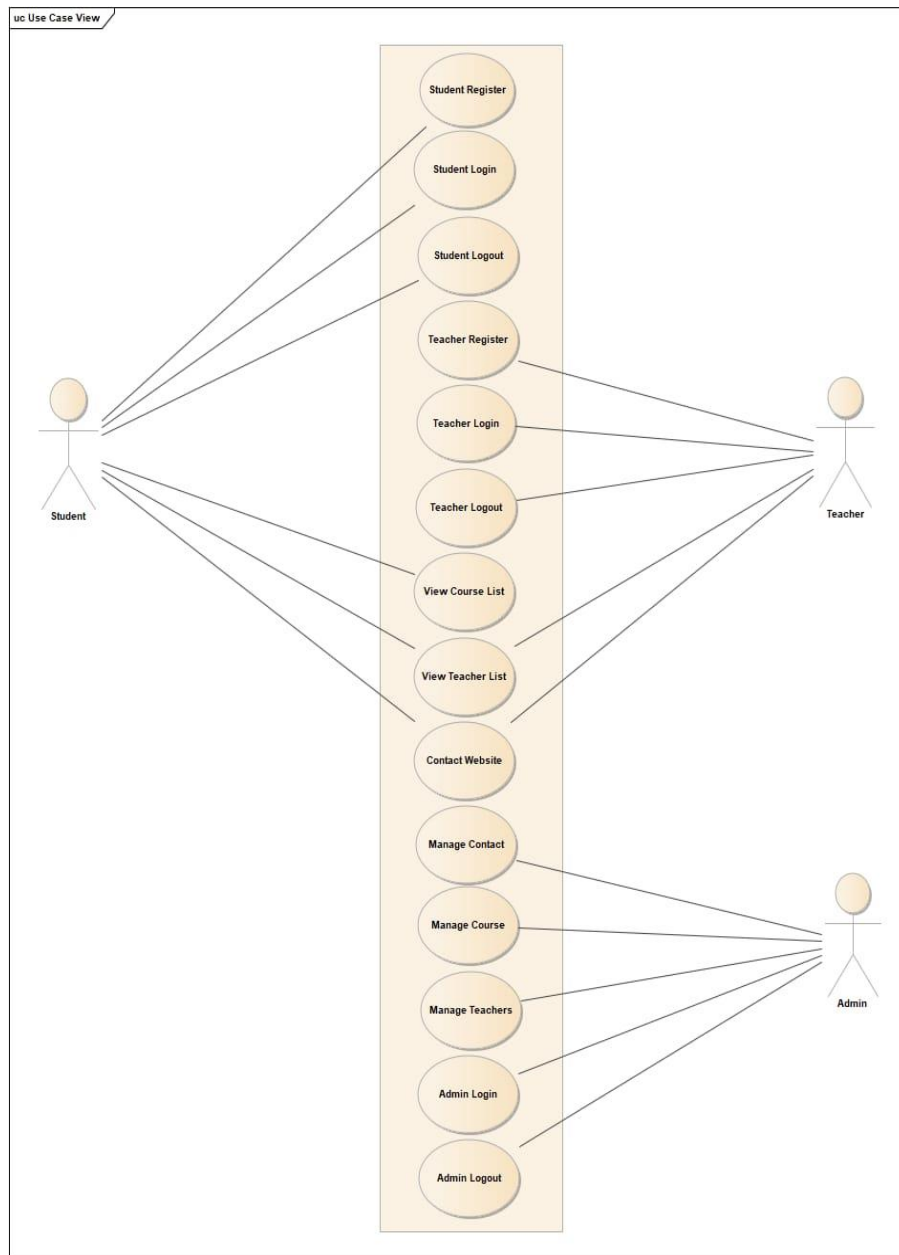


Figure 3.6.1: Use case View of Design and Development of Efficient Virtual Educational System

3.7 Use Case Specification

3.7.1 Student/Teacher Register

In the Use Case diagram, we observe student and teacher class in which they can register with the help of their name, email, username, and password to be filled in this page.

3.7.2 Student/Teacher/Admin Login

In the Use Case diagram login class are present then after registration student, teacher and admin can login into page of website.

3.7.3 Student/Teacher/Admin Logout

In the Use Case diagram Logout class is present after working is completed then student, teacher and admin can logout into account of website.

3.7.4 View Course/Teacher list

In the View Course and teacher list is class in which define which Courses and teachers present in the classes.

3.7.4 Contact Website

In the Use Case diagram Contact Website this class is present in which if any new teacher is supposed to contact to class, then can contact with the website.

3.7.5 Manage Contact/Course/Teachers

In the Use Case diagram in which Manage contact, Courses and teacher's classes manages simultaneously.

4. DESIGN

4.1 Design Goals

E-learning system is a Web-based system for training programs and information sharing between individuals giving them the flexibility to access it from their workplace or home. Authorized individuals have 24/7 access to this unique system through URL or through a unique User ID and Password.

The E-learning system goes far beyond conventional training by sharing every idea, managing individual training requirements and reporting training progress. Most E-learning platforms are Web-based and facilitate “anytime, anyplace, any pace” access to learning content and administration.

E-learning platforms enable an organization to effectively train a large group of students spread across the organization. With a Learning Platform, training and e-Learning are managed by software that allows users and administrators alike to easily access tests and assignments reports.

Our E-learning platform is being extensively used in universities and of course colleges. The UML was invented primarily to address the challenges faced in the design and architecture of complex systems. The basic objectives or goals behind UML modeling are (James, Unified Modeling Language Reference):

- Define an easy to use and visual modeling language for modeling a system's structure
- Provide extensibility
- Be language and platform independent so that it can be used for modeling a system irrespective of the language and platform in which the system is designed and implemented
- Incorporate the best possible practices at par with the industry standards
- Provide support for Object Orientation, design and apply frameworks and patterns.

4.2 Design Strategy

Design is a meaningful engineering representation of something that is to be built. It can be traced to a customer's requirements and at the same time assessed for quality against a set of predefined criteria for good design. In the software engineering context, design focuses on four major areas of concern: data, architecture, interfaces, and components. The design process translates requirements into representation of software that can be accessed for a quality before code generation. Design is the process through which requirements are translated to blueprints for constructing software. Initially the blueprint depicts the holistic view of software. This is the design represented at the high level of abstraction. During various stages of system development and design following strategies have been set up for a complete architecture

- Planning
- Analysis
- Design
- Implementation
- Testing
- Deployment

4.3 Module Diagram

Module diagrams are used to show the allocation of classes and objects to modules in the physical design of a system, that is, module diagrams indicate the partitioning of the system architecture. Through these diagrams it is possible to understand the general physical architecture of a system. The two essential elements of a module diagram are modules and their dependencies. The first three icons denote file specifications and the body icon denotes files containing the declaration and definition of entities.

Module diagrams define the logic of the model. The following Figure 4.3.1 shows the convolution layers at different stages and how they are concentrated and diverged between different layers.

Numerous educational advantages have resulted from the A number of educational advantages have been derived from the rapid expansion of the World Wide Web (WWW) and Internet. Online learning has opened up new markets for higher education institutions. When they must juggle obligations to their families, work, and studies, many adult learners could appreciate the flexibility. According to Bell and Fedeman (2013), the extensive use of different technology advancements by universities' online programmes may improve communication between students and instructors as well as among staff as a whole. Additionally, because of the anonymity offered by the online setting, more students who would otherwise avoid attending face-to-face classes due to their shy personalities may be able to participate in online education.

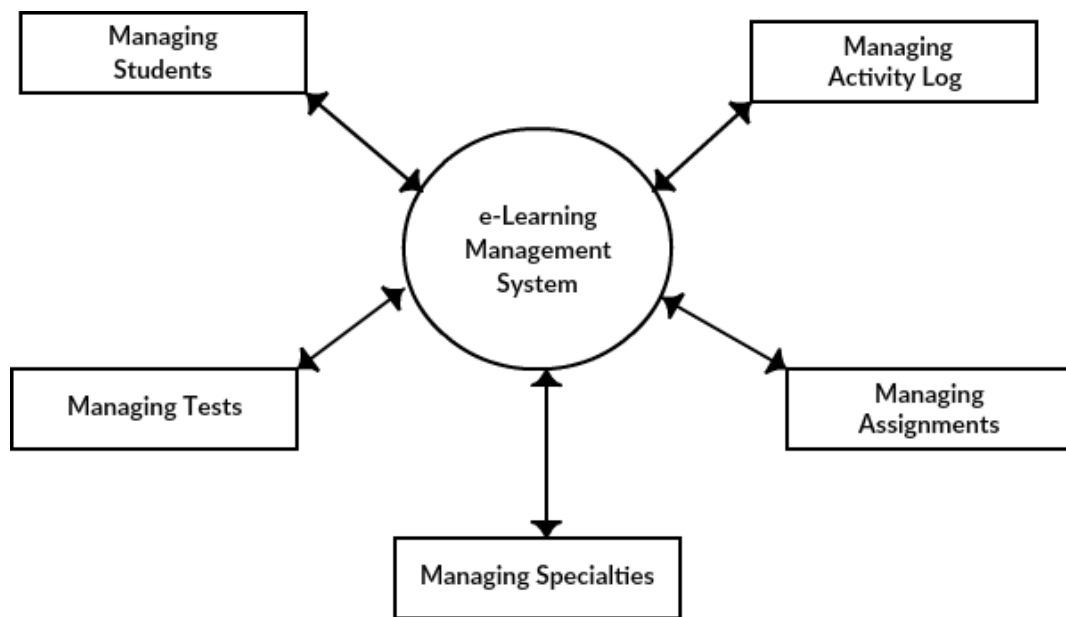


Figure 4.3.1: Module Diagram for Design and Development of Efficient Virtual Educational System

4.4 Architecture diagram

This kind of ER (entity relationship) diagram shows the model of e-learning platform entity. The entity-relationship diagram of e-learning platform represents all the visual instrument of database tables and the relations between students, tests, specialties and assignment. It used structure data also to define the relationships between structured data sets of e-learning platform functionalities. The main entities of the e-learning platform are students, courses, tests, specialties, assignment.

This system's architecture is very straightforward. Image 4.4 (b). From this web application, users can quickly find all the options they require. The VACP system supports access across multiple platforms and web-based internet browsers or software. Users can be classified as either bidders, sellers, or system administrators. The system is made up of eight main parts: user registration and authentication, user profile, the auction system for buying and selling goods, payment processing, the AI chat system, the recommendation system, and feedback.

The client-side and server-side are where the system is primarily implemented. Some fundamental system requirements must be met in order to design the VACP System in accordance with the planning.

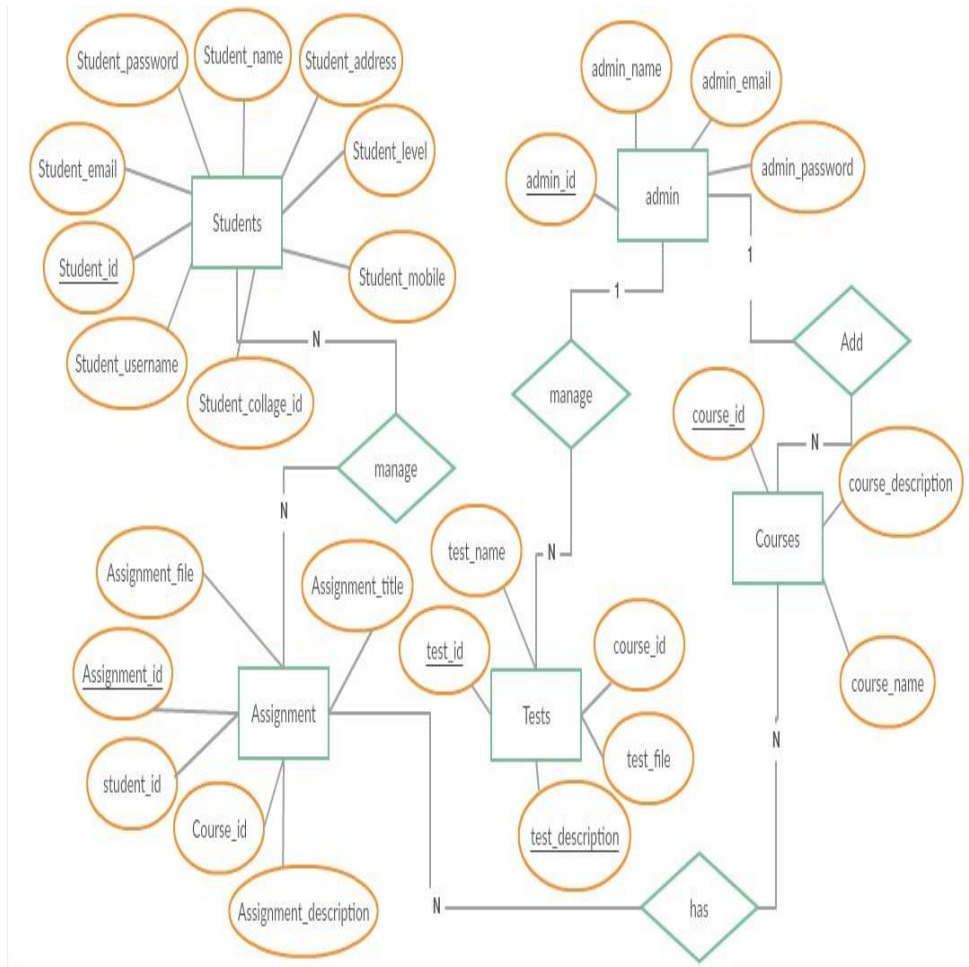


Figure 4.4.1: Architecture diagram for Design and Development of Virtual Educational system

e-learning platform entities and their attributes:

- **Student entity:** attributes of students are student_id, student_college_id, student_name, student_mobile, student_email, student_password, student_username, student_password, student_address, student_level
- **Course entity:** attributes of courses are course_id, course_name, course_description.

- **Specialties entity:** attributes of specialty are specialty_id, specialty_name, specialty description
- **Test entity:** attributes of test are test_id, test_name, test_file, test_description, course_id
- **Assignment entity:** attributes of assignments are assignment_id, assignment_name, assignment_file, assignment_description, course_id, student_id

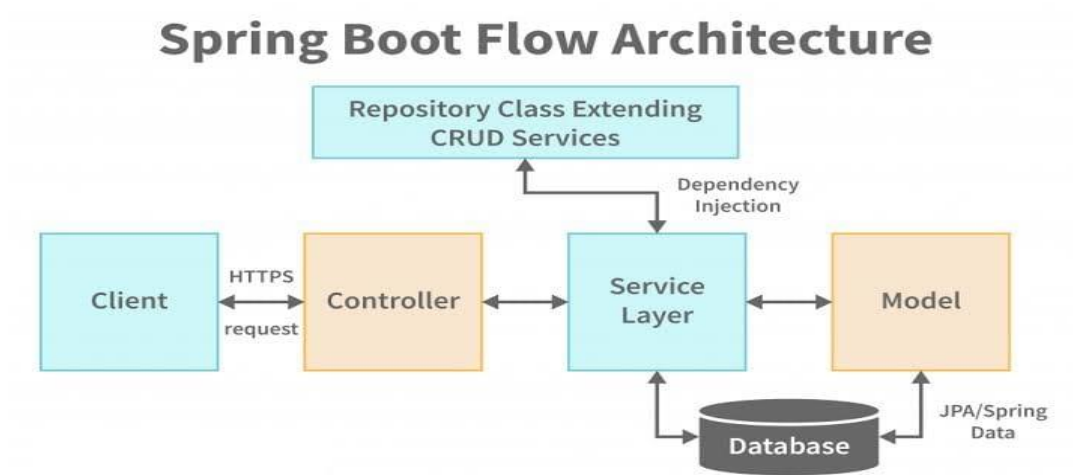


Figure 4.4.2: System Architecture diagram for Design and Development of Virtual Educational system

Description of e-learning platform database:

- The details of courses is store into the course tables respective with all tables
- The details of students is store into the students tables respective with all tables
- The details of specialties is store into the specialties tables respective with all tables
- Each entity (courses, students, assignments, tests, specialties) contains primary key.

- The entity tests, assignment has related with course, students' entities with foreign key
- There are one-to-one and one-to-many relationships available between courses, students, assignments, tests, and specialties
- All the entities courses, students, assignments, tests, specialties are normalized and reduce duplicity of records
- I have implemented indexing on each table of e-learning platform tables for fast query execution.

4.5 Class Diagram

The class diagram is a static diagram. It represents the static view of an application. Class diagram is not only used for visualization describing and documenting different aspects of a system but also for constructing executable code of the software application. The class diagram describes the attributes and operations of the class and also the constrain imposed on the system. The class diagrams are widely used in the modelling of the object oriented system because they are the only UML diagram which can be mapped directly with object oriented languages. UML provides mechanism to represent class members, such as attributes and method and additional information about them.

Purpose of Class Diagrams

The purpose of class diagram is to model the static view of an application. Class diagrams are the only diagrams which can be directly mapped with object-oriented languages and thus widely used at the time of construction.

UML diagrams like activity diagram, sequence diagram can only give the sequence flow of the application, however class diagram is a bit different. It is the most popular UML diagram in the coder community.

As shown in figure 4.5.1 E-learning platform Class Diagram describes the structure of a E-learning platform classes, their attributes, operations (or methods), and the relationships among objects.

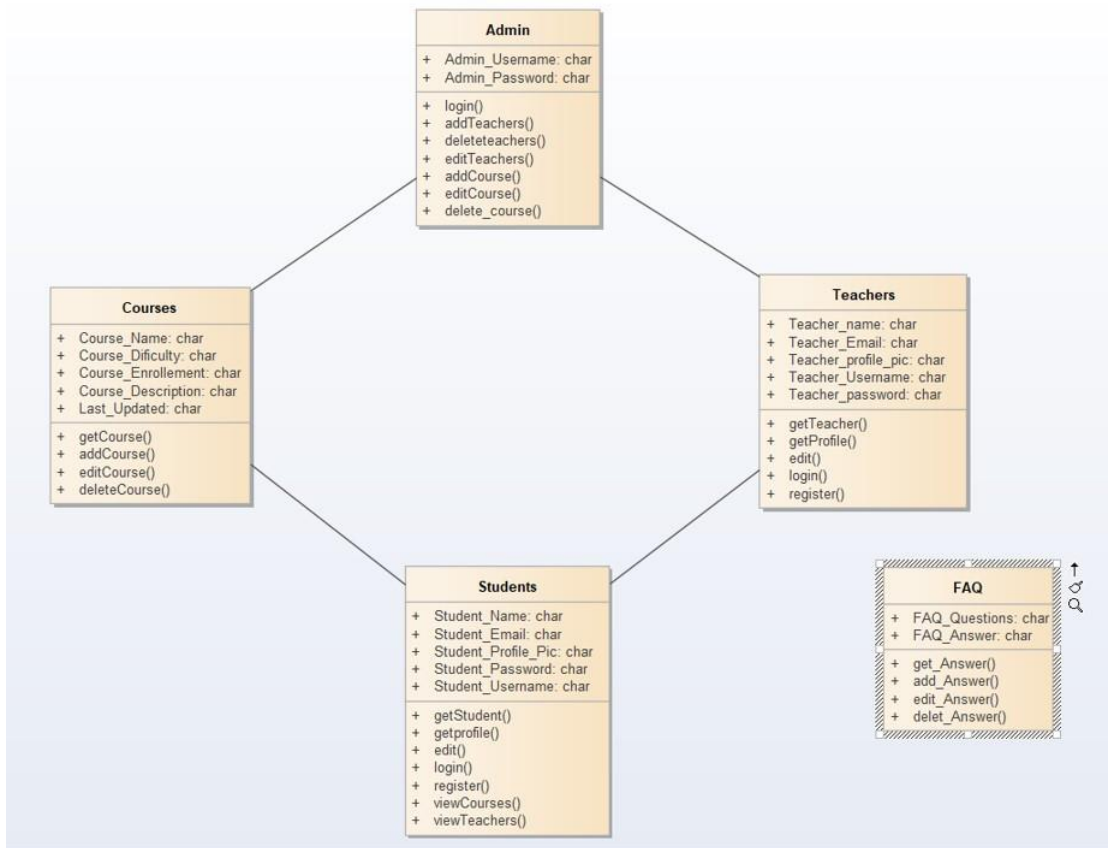


Figure 4.5.1: Class Diagram for Design and Development Efficient Virtual Educational System

The purpose of the class diagram can be summarized as –

- Analysis and design of the static view of an application.
- Describe responsibilities of a system.
- Base for component and deployment diagrams.
- Forward and reverse engineering

4.6 Sequence Diagram

In this sequence diagram, Design and Development of Efficient Virtual Educational System. The system Provides online information and education to teacher and students which lives in rural areas.

A Sequence diagram is a powerful visual representation of events in time and the relationships between them. In e-learning, it is used to visualize the flow of online course processes from start to finish, such as student enrollment, contextual search, content delivery and assessment tasks. A Sequence diagram can help students understand the logical sequence of course processes, enabling them to develop skills and knowledge in an efficient and effective manner. It also allows tutors to track the progress of learners and design their courses accordingly. By leveraging a Sequence diagram, e-learning can provide an engaging learning experience to students and help them reach their educational goals.

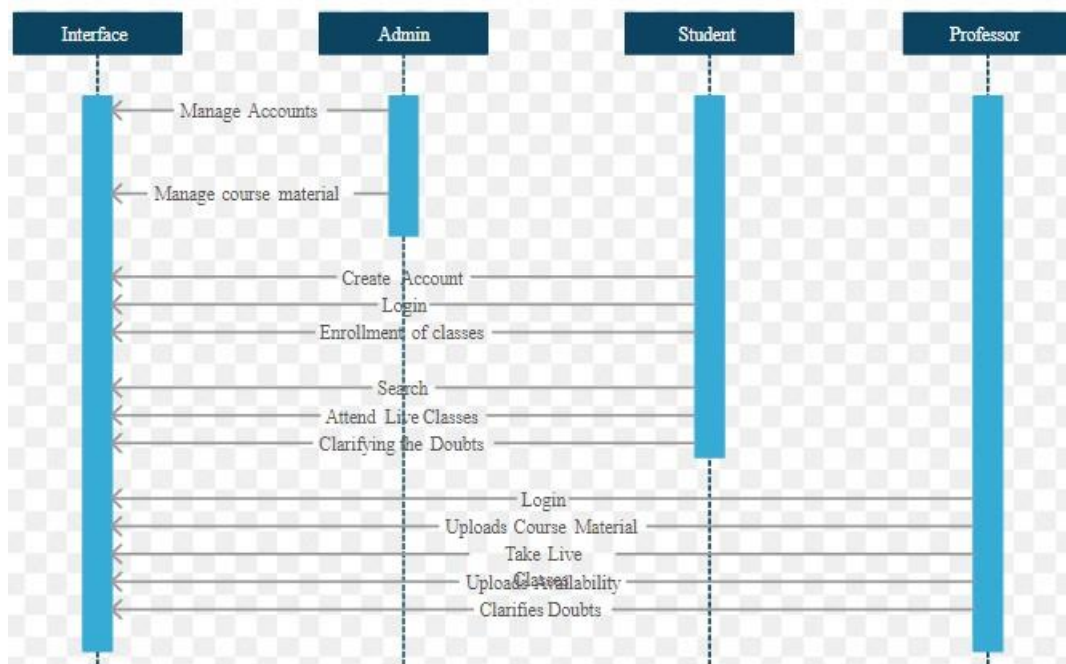


Figure 4.6.1: Sequence Diagram for Design and Development of Efficient Virtual Educational System

It helps in envisioning several dynamic scenarios. It portrays the communication between any two lifelines as a time-ordered sequence of events, such that these lifelines

took part at the run time. In UML, the lifeline is represented by a vertical bar, whereas the message flow is represented by a vertical dotted line that extends across the bottom of the page. It incorporates the iterations as well as branching.

Purpose of Sequence Diagrams

- To model high-level interaction among active objects within a system.
- To model interaction among objects inside a collaboration realizing a use case.
- It either models generic interactions or some certain instances of interaction

4.7 Collaboration Diagram

The collaboration diagram known as communication diagram in collaboration are used to show how objects interact to perform the behavior of a particular use case or part of use case.

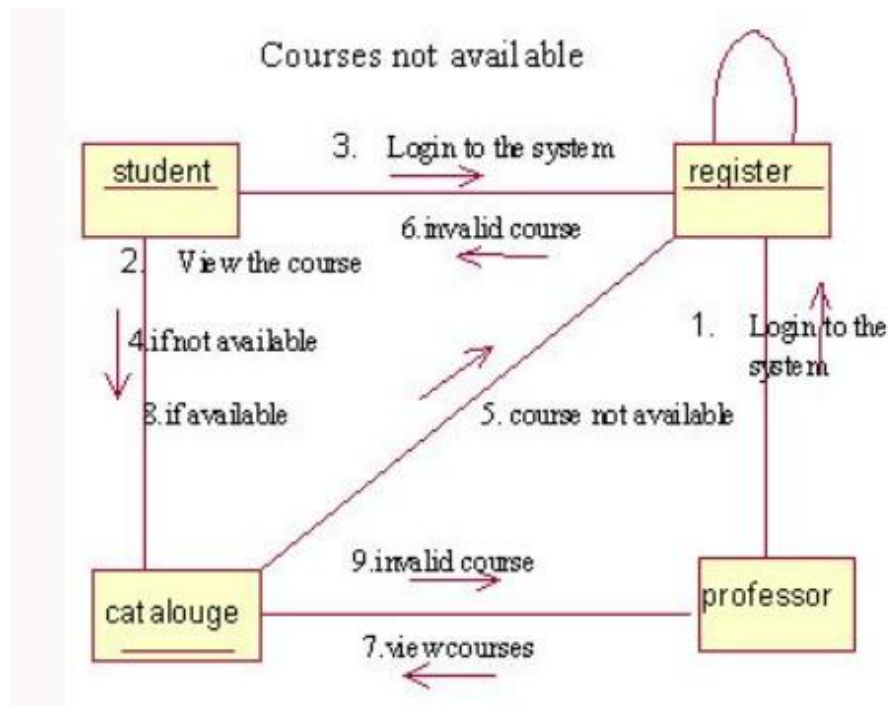


Figure 4.7.1: Collaboration Diagram for Design and Development of Efficient Virtual Educational System

Collaboration diagrams (known as Communication Diagram in UML 2.x) are used to show how objects interact to perform the behavior of a particular use case, or a part of a use case. Along with sequence diagrams, collaboration is used by designers to define and clarify the roles of the objects that perform a particular flow of events of a use case. They are the primary source of information used to determining class responsibilities and interfaces.

A Collaboration is a collection of named objects and actors with links connecting them. They collaborate in performing some tasks. A Collaboration defines a set of participants and relationships that are meaningful for a given set of purposes. A Collaboration between objects working together provides emergent desirable functionalities in Object-Oriented systems. Each object (responsibility) partially supports emergent functionalities. Objects are able to produce (usable) high-level functionalities by working together. Objects collaborate by communicating (passing messages) with one another in order to work together.

Unlike a sequence diagram, a collaboration diagram shows the relationships among the objects. Sequence diagrams and collaboration diagrams express similar information, but show it in different ways.

Because of the format of the collaboration diagram, they tend to be better suited for analysis activities (see Activity: Use-Case Analysis). Specifically, they tend to be better suited to depicting simpler interactions of smaller numbers of objects. However, if the number of objects and messages grows, the diagram becomes increasingly hard to read. In addition, it is difficult to show additional descriptive information such as timing, decision points, or other unstructured information that can be easily added to the notes in a sequence diagram. So, here are some use cases that we want to create a collaboration diagram for:

- Model collaborations between objects or roles that deliver the functionalities of use cases and operations
- Model mechanisms within the architectural design of the system
- Capture interactions that show the messages passing between objects and roles within the collaboration
- Model alternative scenarios within use cases or operations that involve the collaboration of different objects and interactions
- Support the identification of objects (hence classes) that participate in use cases
- Each message in a collaboration diagram has a sequence number.
- The top-level message is numbered 1. Messages sent during the same call have the same decimal prefix but suffixes of 1, 2, etc. according to when they occur.

The collaboration diagram shows that the different components of the system work together to detect a fall, confirm it, and notify nearby people and relatives.

Purpose of Collaboration Diagrams

- The collaboration diagram is also known as Communication Diagram.
- It mainly puts emphasis on the structural aspect of an interaction diagram, i.e., how lifelines are connected.
- The syntax of a collaboration diagram is similar to the sequence diagram; just the difference is that the lifeline does not consist of tails.
- The messages transmitted over sequencing is represented by numbering each individual message.
- The collaboration diagram is semantically weak in comparison to the sequence diagram.
- The special case of a collaboration diagram is the object diagram.
- It focuses on the elements and not the message flow, like sequence diagrams

4.8 State Chart Diagram

In this architecture, student first logs in the Learning Management System e.g., Moodle. The system verifies the username & password. After verifying the username password, student will search the course category & courses (subjects). Students will enroll for subject in which they are interested. This enrollment information is stored in database as Moodle store each & every action of student. The state machine diagram for Learning Management System is shown in figure 4.8.

After collecting the data from student which is stored in Moodle database, the next stage is to gather & prepare the data. In this step, first we select the data from database which is relevant. After that we clean & transformed into the format for testing.

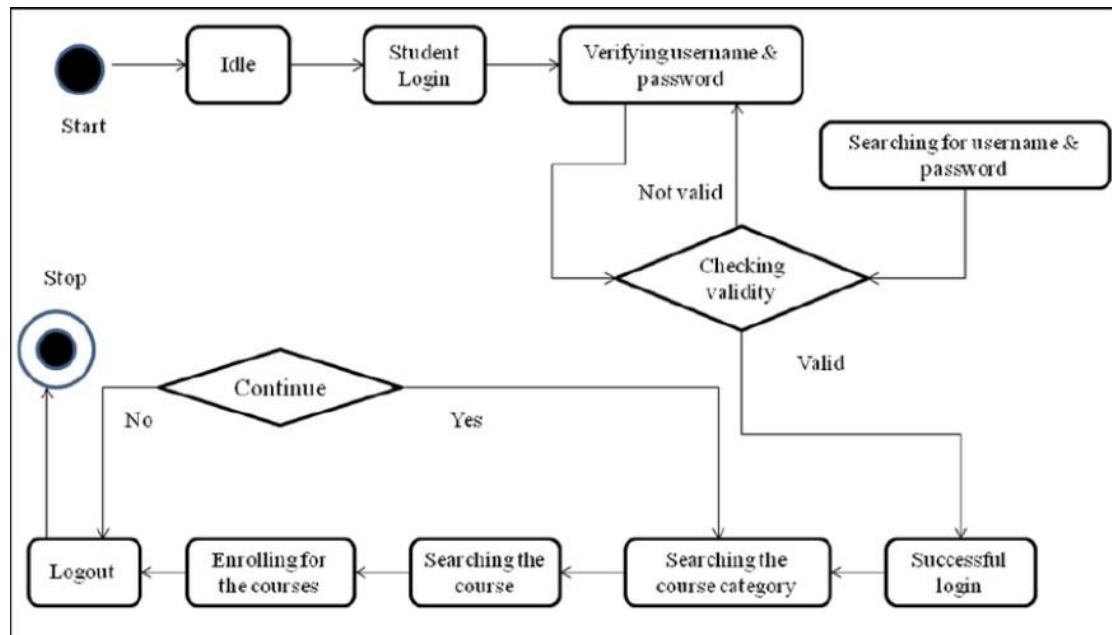


Figure 4.8.1: State Chart Diagram for Design and Development of Efficient Virtual Educational System

To test the result, we use the open-source data mining tool WEKA. Since our project is to find the best combination of subject, we use the Apriori machine algorithm for testing the result.

In the step, build the model; we try to develop the algorithm which may be combination of various data mining algorithm. We find out the result using this model & compare the result with result obtained using already existing algorithm in WEKA. Finally, we deploy the result.

Purpose of State Chart Diagrams

State chart diagram is one of the five UML diagrams used to model the dynamic nature of a system. They define different states of an object during its lifetime and these states are changed by events. State chart diagrams are useful to model the reactive systems. Reactive systems can be defined as a system that responds to external or internal events. State chart diagram describes the flow of control from one state to another state. States are defined as a condition in which an object exists and it changes when some event is triggered. The most important purpose of State chart diagram is to model lifetime of an object from creation to termination.

State chart diagrams are also used for forward and reverse engineering of a system. However, the main purpose is to model the reactive system.

Following are the main purposes of using State chart diagrams –

- To model the dynamic aspect of a system.
- To model the life time of a reactive system.
- To describe different states of an object during its life time.
- Define a state machine to model the states of an object.

4.9 Activity Diagram

This Education Management System Activity Diagram describes the flow of activity through a series of actions. The activity diagram is a critical diagram for explaining the system. An activity diagram depicts the overall control flow. We will learn how to draw

an activity diagram for a project involving a student information system or a student management system. The School Management System UML Activity Diagram also gives programmers fresh ideas and guides them through the system development process. Students and School Faculties are key users in developing an activity diagram for the School Management System. Building interactions and activities in the system will be much easier if you know who the system's users are.

Activity diagram is another important behavioral diagram in UML diagram to describe dynamic aspects of the system. Activity diagram is essentially an advanced version of flow chart that modeling the flow from one activity to another activity.

Activity Diagrams describe how activities are coordinated to provide a service which can be at different levels of abstraction. Typically, an event needs to be achieved by some operations, particularly where the operation is intended to achieve a number of different things that require coordination, or how the events in a single use case relate to one another, in particular, use cases where activities may overlap and require coordination. It is also suitable for modelling how a collection of use cases coordinate to represent business workflows

1. Identify candidate use cases, through the examination of business workflows
2. Identify pre- and post-conditions (the context) for use cases
3. Model workflows between/within use cases
4. Model complex workflows in operations on objects
5. Model in detail complex activities in a high-level activity Diagram

Purpose of Activity Diagrams

The basic purpose of activity diagrams is similar to other UML diagrams. It captures the dynamic behavior of the system. Other UML diagrams are used to show the message flow from one object to another but the activity diagram is used to show message flow from one activity to another. Activity is a particular operation of the system.

Activity diagrams are not only used for visualizing the dynamic nature of a system, but they are also used to construct the executable system by using forward and reverse engineering techniques. The only missing thing in the activity diagram is the message part.

It does not show any message flow from one activity to another. Activity diagram is sometimes considered as the flowchart. Although the diagrams look like a flowchart, they are not. It shows different flows such as parallel, branched, concurrent, and single.

The purpose of an activity diagram can be described as:

- Draw the activity flow of a system.
- Describe the sequence from one activity to another.
- Describe the parallel, branched and concurrent flow of the system

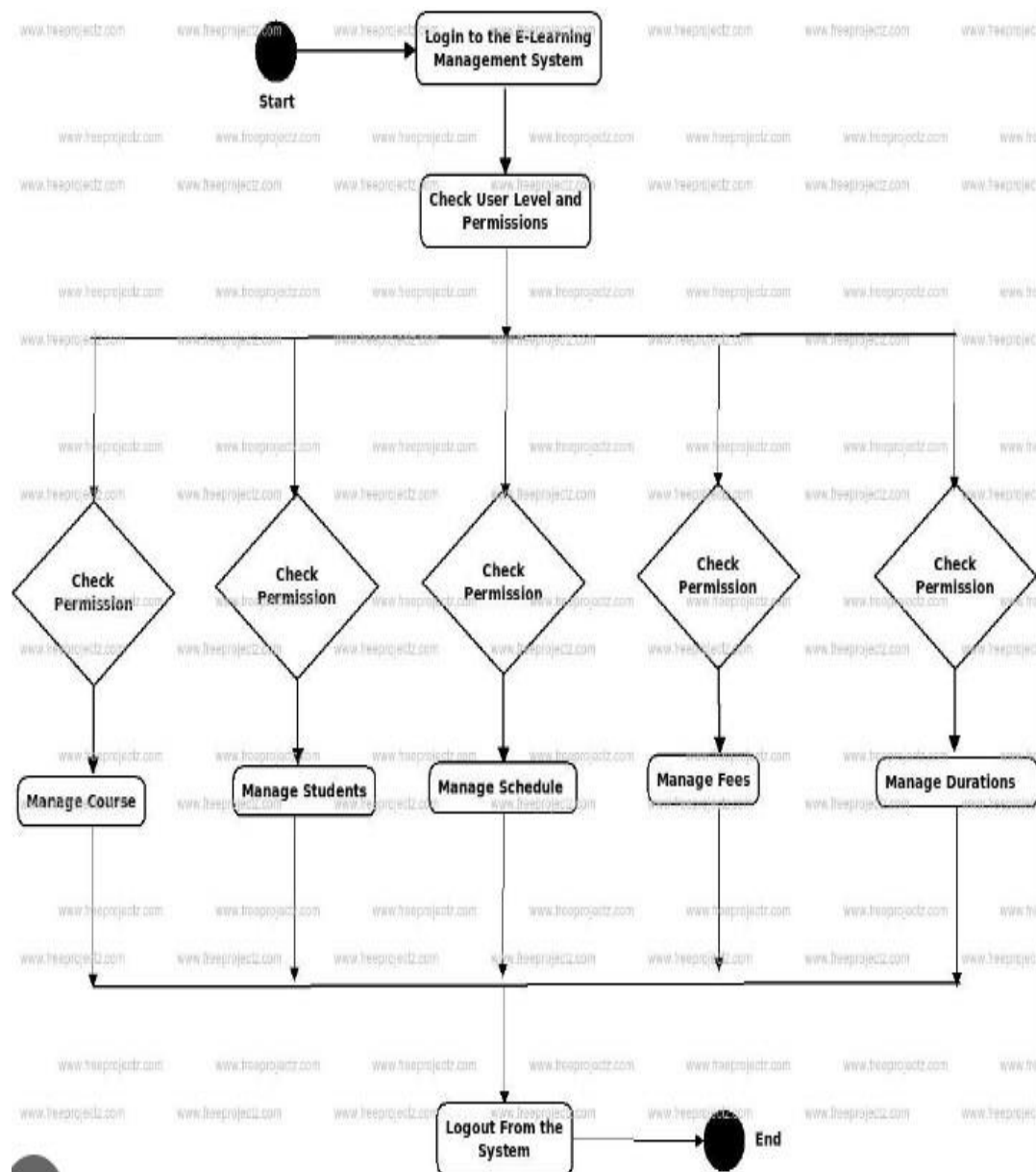


Figure 4.9.1: Activity Diagram for Design and Development of Efficient Virtual Educational System

5. IMPLEMENTATION

5.1 Implementation Strategy

There are many systems that have such type of facility which alerts the person on detection of fall but these systems need to be accurate and reliable. In order to build such a system their need to be certain strategy while making it. Planning plays an important role while building any project and the second most important thing comes is the execution of the same. If execution does not go in correct way, then there is possibility that the project would not finish successfully. So here we are using an agile technique which is an iterative approach to project management and software development that helps team to deliver value to their customers faster and with fewer headaches. Basically, the project can be divided into three main parts: Hardware part that is the Arduino related part, second comes the user interface the android app and finally combining both the parts so that the project gets complete expected output.

5.2 Hardware Platform Used

- Disk space: 160MB free (min) plus as much as you need to store materials. 5GB is probably a realistic minimum.
- Backups: at least the same again (at a remote location preferably) as above to keep backups of the site
- Memory: 256MB (min), 1GB or more is strongly recommended. The general rule of thumb is that e-learning platform can support 10 to 20 *concurrent* users for every 1GB of RAM. 'Concurrent' really means web server processes in memory at the same time (i.e., users interacting with the system within a window of a few seconds). It does NOT mean people 'logged in'.

5.3 Software Platform Used

The last phase of the lifecycle, which comprises all activities associated with the application of the application form. These attempts include programming, testing, training and installing of the system in a creation setting and transition of ownership of the software from the Project Group| to the performing customer.

5.4 Deployment Diagram

Deployment diagrams are used to visualize the topology of the physical components of a system, where the software components are deployed as shown in below Figure. Deployment diagrams are used to describe the static deployment view of a system. Deployment diagrams consist of nodes and their relationships.

Deployment diagrams are used to visualize the topology of the physical components of a system, where the software components are deployed. Deployment diagrams are used to describe the static deployment view of a system. Deployment diagrams consist of nodes and their relationships.

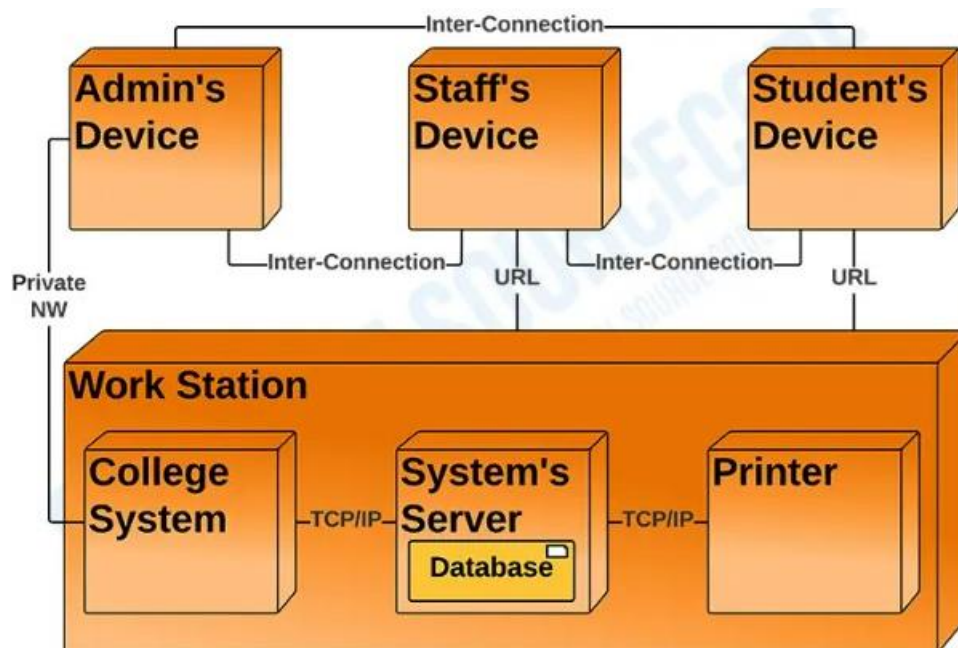


Figure 5.4.1: Deployment Diagram of Design and Development of Efficient Virtual Educational System

Purpose of Deployment Diagrams

The term Deployment itself describes the purpose of the diagram. Deployment diagrams are used for describing the hardware components, where software components are deployed. Component diagrams and deployment diagrams are closely related.

Component diagrams are used to describe the components and deployment diagrams shows how they are deployed in hardware.

UML is mainly designed to focus on the software artifacts of a system. However, these two diagrams are special diagrams used to focus on software and hardware components. Most of the UML diagrams are used to handle logical components but deployment diagrams are made to focus on the hardware topology of a system. Deployment diagrams are used by the system engineers.

The purpose of deployment diagrams can be described as –

- Visualize the hardware topology of a system.
- Describe the hardware components used to deploy software components.
- Describe the runtime processing nodes.

5.5 Implementation Level Details

5.5.1 Spring Boot:

Spring Boot Tutorial provides basic and advanced concepts of Spring Framework. Our Spring Boot Tutorial is designed for beginners and professionals both.

Spring Boot is a Spring module that provides the RAD (Rapid Application Development) feature to the Spring framework.

Our Spring Boot Tutorial includes all topics of Spring Boot such, as features, project, maven project, starter project wizard, Spring Initializer, CLI, applications, annotations, dependency management, properties, starters, Actuator, JPA, JDBC, etc.

Spring Boot Features:

- Web Development
- Spring Application
- Application events and listeners
- Admin features
- Externalized Configuration
- Properties Files
- YAML Support
- Type-safe Configuration
- Logging
- Security

Spring Boot flow architecture

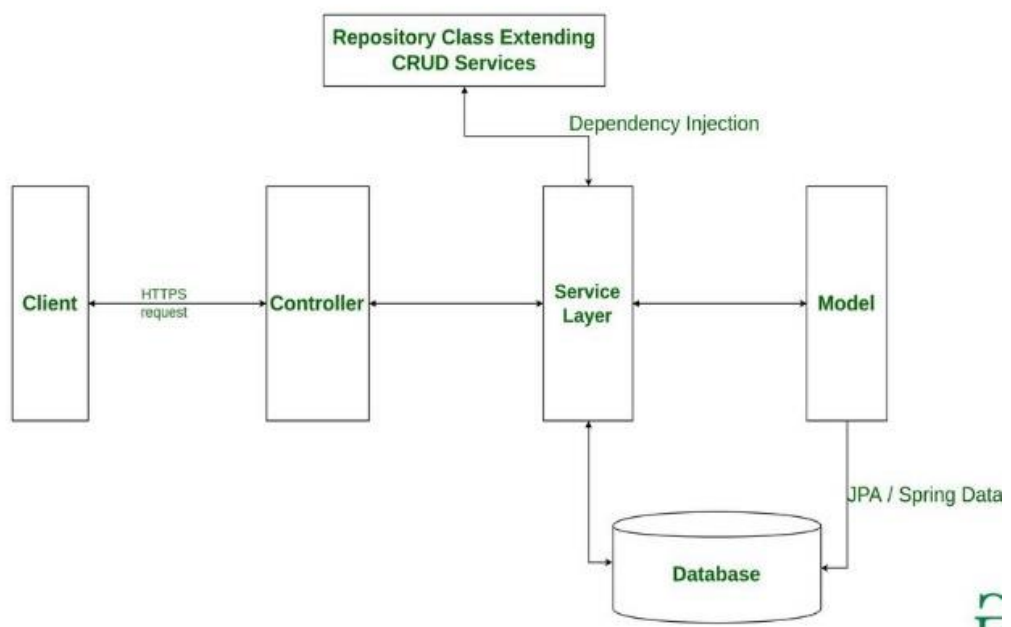


Figure 5.5.1.1: Architecture of Spring Boot

Spring Boot Application:

Application Events and Listeners:

Spring Boot uses events to handle the variety of tasks. It allows us to create factories file that is used to add listeners. We can refer it to using the Application Listener key. Always create factories file in META-INF folder like META-INF/spring. Factories.

Admin Support:

Spring Boot provides the facility to enable admin-related features for the application. It is used to access and manage applications remotely. We can enable it in the Spring Boot application by using `spring.application.admin.enabled` property.

Externalized Configuration:

Spring Boot allows us to externalize our configuration so that we can work with the same application in different environments. The application uses YAML files to externalize configuration.

Properties Files:

Spring Boot provides a rich set of Application Properties. So, we can use that in the properties file of our project. The properties file is used to set properties like `server-port =8082` and many others. It helps to organize application properties.

YAML Support:

It provides a convenient way of specifying the hierarchical configuration. It is a superset of JSON. The Spring Application class automatically supports YAML. It is an alternative of properties file.

Type-safe Configuration:

The strong type-safe configuration is provided to govern and validate the configuration of the application. Application configuration is always a crucial task which should be type-safe. We can also use annotation provided by this library.

Logging:

Spring Boot uses Common logging for all internal logging. Logging dependencies are managed by default. We should not change logging dependencies if no customization is needed.

Security:

Spring Boot applications are spring bases web applications. So, it is secure by default with basic authentication on all HTTP endpoints. A rich set of Endpoints is available to develop a secure Spring Boot application

5.5.2 Spring Boot H2 Database:

In-memory database relies on system memory as oppose to disk space for storage of data. Because memory access is faster than disk access. We use the in-memory database when we do not need to persist the data. The in-memory database is an embedded database. The in-memory databases are volatile, by default, and all stored data loss when we restart the application.

The widely used in-memory databases are H2, HSQLDB (Hyper SQL Database), and Apache Derby. It creates the configuration automatically.

H2 is an embedded, open-source, and in-memory database. It is a relational database management system written in Java. It is a client/server application. It is generally used in unit testing. It stores data in memory, not persist the data on disk.

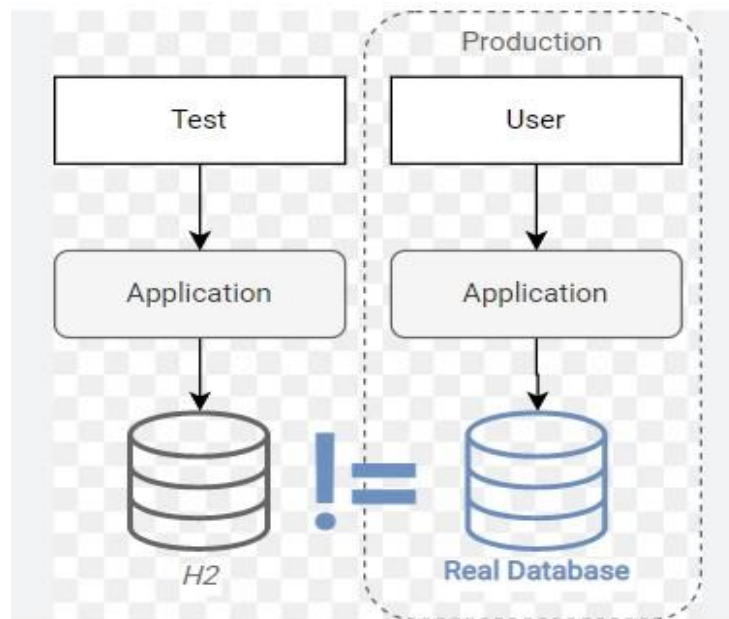


Figure 5.5.2.1: Spring Boot H2 Database

Advantages:

- Zero configuration
- It is easy to use.
- It is lightweight and fast.
- It provides simple Configuration to switch between a real database and in-memory database.
- It supports standard SQL and JDBC API.
- It provides a web console to maintain in the database.

5.5.3 Spring Boot Thyme leaf:

The Thymeleaf is an open-source Java library that is licensed under the Apache License 2.0. It is a HTML5/XHTML/XML template engine. It is a server-side Java template engine for both web (servlet-based) and non-web (offline) environments. It is perfect for modern-day HTML5 JVM web development. It provides full integration with Spring Framework.

It applies a set of transformations to template files in order to display data or text produced by the application. It is appropriate for serving XHTML/HTML5 in web applications.

The goal of Thymeleaf is to provide a stylish and well-formed way of creating templates. It is based on XML tags and attributes. These XML tags define the execution of predefined logic on the DOM (Document Object Model) instead of explicitly writing that logic as code inside the template. It is a substitute for JSP

The architecture of Thymeleaf allows the fast processing of templates that depends on the caching of parsed files. It uses the least possible amount of I/O operations during execution.

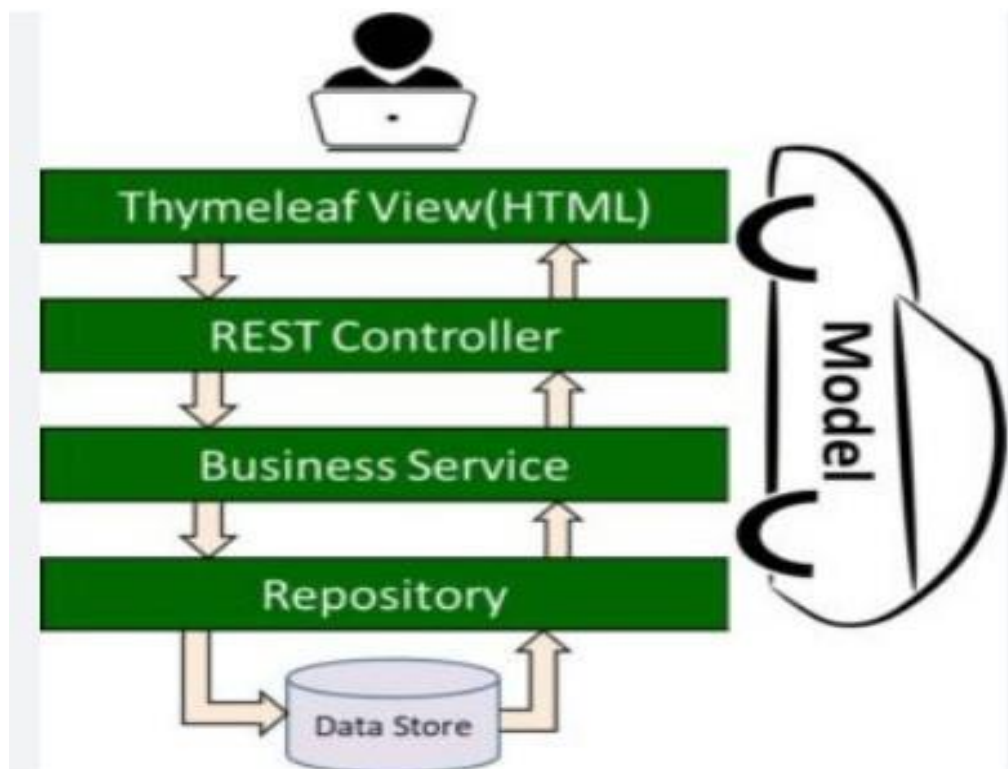


Figure 5.5.3.1: Spring Boot Thymeleaf

The architecture of Thymeleaf allows the fast processing of templates that depends on the caching of parsed files. It uses the least possible amount of I/O operations during execution.

JSP is more or less similar to HTML. But it is not completely compatible with HTML like Thymeleaf. We can open and display a Thymeleaf template file normally in the browser while the JSP file does not. Thymeleaf supports variable expressions (`{...}`) like Spring EL and executes on model attributes, asterisk expressions (`*{...}`) execute on the form backing bean, hash expressions (`#{...}`) are for internationalization, and link expressions (`@{...}`) rewrite URLs. Like JSP, Thymeleaf works well for Rich HTML emails.

Thyme leaf Features:

- It works on both web and non-web environments.
- Java template engine for HTML5/ XML/ XHTML.
- Its high-performance parsed template cache reduces I/O to the minimum.
- It can be used as a template engine framework if required.
- It supports several template modes: XML, XHTML, and HTML5.
- It allows developers to extend and create custom dialect.
- It is based on modular features sets called dialects.
- It supports internationalization.

5.5.4 Virtual Educational Website

Virtual education, also known as online education or e-learning, refers to a system of education where students and teachers interact and learn through virtual platforms and technologies rather than traditional face-to-face classrooms. It utilizes the internet, computers, and various digital tools to deliver educational content and facilitate communication and collaboration among students and instructors.

Here are some key aspects and information about the virtual education system:

1. **Learning Platforms:** Virtual education relies on dedicated learning management systems (LMS) or online platforms that serve as a centralized hub for course materials, assignments, discussions, and assessments. Popular examples include Moodle, Canvas, Blackboard, and Google Classroom.
2. **Flexibility and Accessibility:** One of the main advantages of virtual education is its flexibility. Students can access course materials and participate in learning activities from anywhere, at any time, as long as they have an internet connection. This accessibility is particularly beneficial for individuals with busy schedules or geographical constraints.
3. **Diverse Course Offerings:** Virtual education opens up opportunities for a wide range of courses and subjects. Students can access educational programs offered by various institutions worldwide, allowing them to pursue specific interests, explore niche topics, or engage in professional development without the need for physical relocation.
4. **Multimedia and Interactive Content:** Virtual education incorporates multimedia elements such as videos, interactive simulations, and virtual reality (VR) experiences to enhance the learning process. These engaging materials can make complex concepts more accessible and promote active learning.
5. **Communication and Collaboration:** While physical distance separates students and instructors in virtual education, communication tools such as video conferencing, discussion forums, and chat functions facilitate interaction. Students can collaborate on projects, participate in group discussions, and receive feedback from their instructors remotely.

6. **Assessment and Evaluation:** Virtual education employs various methods for assessing student performance, including online quizzes, exams, assignments, and project submissions. Some platforms even provide automated grading features, while others involve real-time assessments through video conferencing or live presentations.
7. **Support and Feedback:** Virtual education systems often include mechanisms for students to seek support and receive feedback. This can be through virtual office hours, email communication, or discussion forums where students can ask questions and engage in discussions with their peers and instructors.
8. **Technological Requirements:** To participate in virtual education, students typically need a computer or mobile device with an internet connection. Some courses may require specific software or tools, so students should ensure their devices meet the technical requirements of the program.
9. **Challenges and Considerations:** While virtual education offers numerous benefits, it also presents challenges. Some students may struggle with self-motivation and time management in the absence of a structured classroom environment. Additionally, access to reliable internet and technology may be a barrier for certain individuals or regions.
10. **Blended Learning Approaches:** Virtual education is often used in combination with traditional face-to-face instruction, forming a blended learning approach. In this model, students engage in both virtual and in-person learning activities, capitalizing on the advantages of both methods.

It's important to note that the specific implementation and features of virtual education systems can vary depending on the educational institution, course format, and technological infrastructure available.

5.5.5 Research On Virtual Educational System

Research on virtual education systems encompasses a wide range of topics, including their effectiveness, impact on student outcomes, technological requirements, instructional strategies, and student engagement. Here are a few key research findings in this area:

- **Effectiveness and Student Outcomes:**
A study conducted by the U.S. Department of Education found that students who participated in online or blended learning environments.
- Research has shown that virtual education can be particularly beneficial for students who are self-directed learners or who require flexibility due to personal circumstances, such as adult learners or students with health issues.
- A meta-analysis published in the *Journal of Educational Psychology* found that online learning can be as effective as traditional classroom learning when the instruction and course design are well-structured.

2 Instructional Design and Strategies:

- Effective instructional design is crucial for virtual education systems. Research suggests that well-designed online courses should include clear learning objectives, organized content, interactive activities, and opportunities for student engagement and collaboration.
- The use of multimedia elements, such as videos, simulations, and interactive exercises, has been shown to enhance student engagement and learning outcomes in virtual education.

- Research supports the importance of instructor presence and interaction in online courses. Frequent and timely feedback from instructors, as well as opportunities for synchronous or asynchronous discussions, can positively impact student engagement and satisfaction.

3 Technological Requirements and Access:

- Access to reliable internet and appropriate technology is a critical factor for successful participation in virtual education. Research has highlighted the importance of addressing the digital divide and ensuring equitable access to technology and internet connectivity, particularly among disadvantaged populations.
- Studies have shown that mobile learning (m-learning), which utilizes mobile devices such as smartphones and tablets, can enhance access to education, especially in regions with limited infrastructure.

4 Student Engagement and Motivation:

- Virtual education requires students to be self-motivated and disciplined. Research has explored various strategies to promote student engagement, including active learning approaches, gamification, and social interaction through online discussions and group work.
- Personalized learning approaches, where students have some control over their learning pace and content, have been found to enhance student motivation and engagement in virtual education environments.

5 Teacher Roles and Professional Development:

- Virtual education systems require instructors to adapt their teaching practices to the online environment. Research emphasizes the importance of providing professional development opportunities for

teachers to develop the necessary skills and competencies for effective online instruction.

- Studies have highlighted the need for ongoing support and collaboration among online instructors to share best practices, address challenges, and continuously improve virtual education programs.

It's worth noting that research in the field of virtual education is ongoing, and new findings continue to emerge as technology advances and online learning evolves.

5.5.6 Virtual Educational System Market

The virtual education system market has experienced significant growth in recent years and is expected to continue expanding in the coming years. The market encompasses a wide range of products, services, and technologies related to online education and e-learning. Here are some key points about the virtual education system market:

1. **Market Size and Growth:** The virtual education system market has witnessed substantial growth due to the increasing adoption of online learning across various sectors, including K-12 education, higher education, corporate training, and professional development. The market size is expected to reach significant values in the coming years.
2. **Increased Demand for Online Learning:** Factors such as the flexibility of online learning, the need for lifelong learning, the demand for upskilling and reskilling, and the advancement of technology have contributed to the increased demand for virtual education systems. The COVID-19 pandemic also accelerated the adoption of online learning globally.
3. **Market Segmentation:** The virtual education system market can be segmented based on the type of product or service. This includes learning management

systems (LMS), virtual classroom software, content management systems, authoring tools, assessment and testing solutions, and others.

4. **Learning Management Systems (LMS):** LMS platforms are a significant segment within the virtual education system market. They provide the infrastructure for hosting and delivering online courses, managing course materials, facilitating student-teacher interaction, and tracking student progress. Some popular LMS platforms include Moodle, Canvas, Blackboard, and Google Classroom.

5. **Technological Advancements:** The virtual education system market is influenced by advancements in technology, such as cloud computing, artificial intelligence (AI), augmented reality (AR), and virtual reality (VR). These technologies are increasingly being integrated into virtual education systems to enhance the learning experience and offer immersive and interactive learning environments.

6. **Regional Market Trends:** The virtual education system market is global, with significant growth observed in various regions, including North America, Europe, Asia Pacific, and Latin America. The market dynamics and adoption rates can vary in different regions due to factors like educational policies, digital infrastructure, and the readiness of institutions and learners to embrace online learning.

7. **Market Players and Competition:** The market consists of numerous players, including educational technology (EdTech) companies, learning platform providers, content developers, and traditional education institutions that have transitioned to online learning. Competition among market players is intense, with companies striving to offer innovative solutions, improve user experience, and differentiate their offerings.

8. **Corporate Training and Professional Development:** The virtual education system market extends beyond traditional educational institutions. Many organizations and businesses are adopting online learning platforms for corporate training and professional development initiatives. This segment of the market is expected to grow due to the increasing emphasis on continuous learning and upskilling in the workforce.

9. **Government Initiatives and Policies:** Government initiatives and policies that promote online education, digital literacy, and e-learning infrastructure development play a significant role in the growth of the virtual education system market. Public-private partnerships and collaborations are also observed to foster the adoption of virtual education systems.

10. **Challenges and Opportunities:** The virtual education system market faces challenges such as ensuring equitable access to technology, addressing the digital divide, maintaining student engagement and motivation in online learning, and designing effective online assessments. However, these challenges also present opportunities for innovation and development of new solutions to enhance virtual education experiences.

Overall, the virtual education system market is dynamic and evolving, driven by the increasing demand for online learning and advancements in technology. The market offers a range of opportunities for businesses, educational institutions, and technology providers to contribute to the growth and transformation of the education sector.

5.5.7 Need Of Virtual Educational System

Virtual education has become increasingly necessary and valuable due to several key factors:

1. **Accessibility and Flexibility:**

Virtual education provides access to education for individuals who may face geographical barriers, time constraints, or other limitations that make attending traditional physical classrooms difficult. It allows learners to access educational resources and participate in courses from anywhere at any time, offering flexibility and convenience.

2. **Expanded Educational Opportunities:**

Virtual education opens up a world of educational possibilities by providing access to courses and programs that may not be available locally. Learners can explore diverse subjects, pursue specialized certifications, or access educational resources from renowned institutions worldwide without the need for physical relocation.

3. **Personalized Learning:**

Virtual education systems often incorporate personalized learning approaches, allowing learners to progress at their own pace and tailor their learning experience to their individual needs and interests. Adaptive technologies and data analytics enable the delivery of targeted content, personalized feedback, and adaptive assessments, enhancing the learning process.

4. **Lifelong Learning and Professional Development:**

Virtual education offers opportunities for continuous learning and professional development throughout one's life and career. Professionals can update their

skills, acquire new knowledge, and stay relevant in a rapidly changing job market through online courses, webinars, and virtual workshops.

5 Cost-Effectiveness:

Virtual education can be more cost-effective compared to traditional face-to-face education. It eliminates the need for expenses associated with commuting, textbooks, physical infrastructure, and other resources required in traditional classrooms. This cost-effectiveness makes education more affordable and accessible to a broader range of learners.

6 Enhanced Learning Experience:

Virtual education leverages various technologies and multimedia elements, such as videos, interactive simulations, and virtual reality (VR), to create engaging and immersive learning experiences. These tools can make complex concepts more accessible, foster active learning, and promote deeper understanding and retention of the material.

7 Continuous Innovation and Adaptation:

The virtual education landscape is constantly evolving, driven by advancements in technology, pedagogical research, and learner needs. This environment encourages continuous innovation, enabling the development of new instructional strategies, interactive learning tools, and collaborative platforms that enhance the effectiveness and engagement of virtual education. Virtual education can be more cost-effective compared to traditional face-to-face education

8 Response to Disruptions and Emergencies:

Virtual education systems have proven crucial during disruptions like natural disasters, public health emergencies, or other unforeseen circumstances. They

provide a means for uninterrupted learning, allowing educational institutions to transition seamlessly to online modes during times when physical classrooms are inaccessible.

9 Inclusion and Diversity:

Virtual education can foster inclusion and diversity by providing opportunities for learners from different backgrounds, abilities, and demographics to access quality education. It can help bridge educational gaps and promote equal access to learning resources, particularly for underprivileged communities or individuals with disabilities.

10 Environmental Sustainability:

Virtual education contributes to environmental sustainability by reducing the carbon footprint associated with commuting, physical infrastructure, and resource consumption in traditional education settings. It aligns with global efforts to reduce greenhouse gas emissions and promote eco-friendly practices.

In summary, virtual education addresses the evolving needs and challenges of the modern education landscape by providing accessible, flexible, personalized, and innovative learning experiences. It expands educational opportunities, facilitates lifelong learning, and empowers learners to acquire knowledge and skills in a dynamic and rapidly changing world.

5.5.8 Virtual educational system Advantages

1. Flexibility:

Virtual education provides learners with the flexibility to access educational content and participate in courses at their own pace and convenience. They can

study from anywhere, allowing for a more personalized and flexible learning experience.

2. Accessibility:

Virtual education breaks down geographical barriers, enabling individuals from diverse locations to access education and learning resources that may not be available locally. It promotes inclusivity by providing opportunities for education to people with disabilities or those facing mobility challenges.

3. Diverse Course Options:

Virtual education offers a wide range of courses and programs, including specialized subjects and certifications, that learners can choose from. It allows individuals to explore their interests and acquire specific skills or knowledge tailored to their career goals.

4. Self-Paced Learning:

Virtual education often incorporates self-paced learning, allowing learners to progress through the material at their own speed. This flexibility accommodates various learning styles and allows individuals to spend more time on challenging concepts or move quickly through familiar topics.

5. Cost-Effectiveness:

Virtual education can be more cost-effective compared to traditional education. It eliminates expenses associated with commuting, housing, and physical resources, making education more affordable and accessible to a broader range of learners.

6. Enhanced Learning Resources:

Virtual education leverages multimedia tools, interactive simulations, videos, and online libraries to provide a rich and engaging learning experience. These resources can enhance understanding, promote active learning, and cater to diverse learning styles.

5.5.9 Virtual educational system Disadvantages

1. Limited Face-to-Face Interaction:

Virtual education lacks the same level of face-to-face interaction found in traditional classrooms. This reduced personal interaction with instructors and peers may hinder socialization, collaboration, and the development of interpersonal skills.

2. Technological Challenges:

Access to reliable internet connectivity and appropriate technology is essential for virtual education. In areas with limited infrastructure or disadvantaged populations, access to technology and digital resources may be limited, posing challenges to equitable education.

3. Self-Motivation and Discipline:

Virtual education requires learners to be self-motivated and disciplined. The absence of direct supervision and structured schedules can make it challenging for some individuals to stay focused and maintain a consistent study routine.

4. Potential for Distractions:

Learning from home or other non-traditional settings can lead to distractions, such as household responsibilities, external noise, or the temptation to engage

in non-academic activities. Maintaining focus and creating a conducive learning environment can be more challenging in a virtual setting.

5. Limited Hands-on Experience:

Certain fields of study, such as laboratory-based sciences or hands-on vocational training, may require physical presence and practical experience. Virtual education may have limitations in providing the same level of hands-on learning opportunities.

6. Limited Networking Opportunities:

Virtual education may offer fewer networking opportunities compared to traditional education. Building professional relationships, networking with peers, and accessing mentorship or internship opportunities may require additional effort in a virtual setting.

5.6 Testing

The "Learner" domain captures traits and results associated with students and their participation in the course. The "Course and Instructor" domain gathers information about the overall course design and the instructor's facilitation, whereas the "Organization" domain recognizes the effects of the course's environment.

Learner

1. Learner Characteristics

Explains how to develop and deliver online learning to fulfil the demands of different types of learners by studying their characteristics. The traits of an online student can be roughly divided into demographic traits, academic traits, cognitive traits, affective traits, self-regulation traits, and motivational traits.

2. Learner Outcomes

Learner outcomes are declarations that detail what the student will accomplish at the conclusion of the course or programme. Online courses must carefully consider learner outcomes including success, retention, and dropout rates.

3. Engagement

As they are removed from the teacher and peers in the online context, engaging the learner in the course is crucial. Interaction, participation, community, cooperation, communication, involvement, and presence are all evaluated through the lens of engagement.

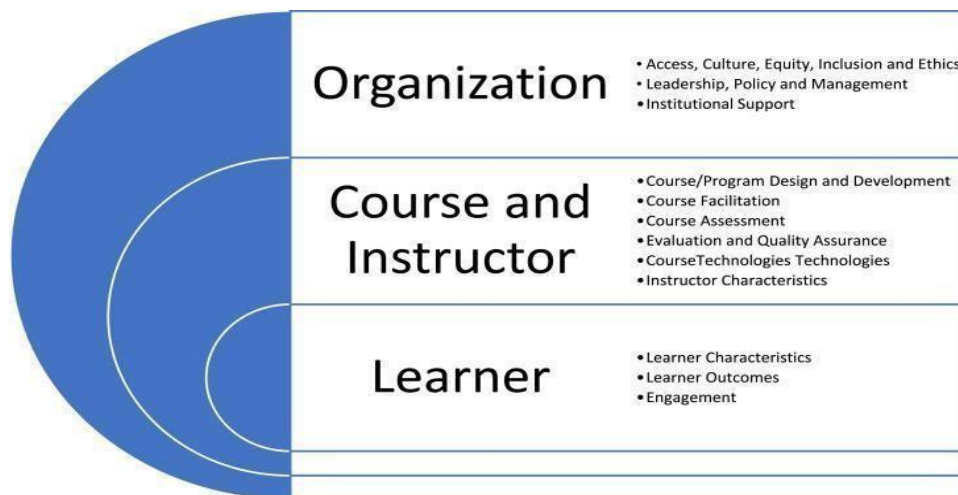


Figure 5.6.1 Organization, Learner, Course and Instructor

Course and Instructor

1. Course or Program Design and Development

Course planning and design are essential in online learning because they interest students and aid them in achieving their learning objectives. The online course is created using a variety of models and procedures, utilizing various design components to satisfy the objectives of the students.

2. Course Facilitation

As crucial as course design is how the course is delivered or facilitated. The course facilitation process looks at the facilitation techniques utilized in the course delivery, such as communication and modelling techniques.

3. Course Assessment

Course assessments are modified and presented online. We look at formative evaluations, peer evaluations, differentiated evaluations, learner choice in evaluations, feedback system, online proctoring, plagiarism in online learning, and alternative evaluations like portfolios.

4. Evaluation and Quality Assurance

Evaluation is the process of passing judgement on a procedure, a final result, or a programme. Research is required to determine the effectiveness and calibre of online courses. This has been investigated through pedagogical assessments, surveys, analytics, and course evaluations. Research has also been conducted on quality assessment tools like Quality Matters.

5. Course Technologies

Numerous online course technologies, such as learning management systems, online textbooks, online audio and video tools, collaborative tools, and social networks for building online communities have been the subject of research.

6. Instructor Characteristics

The number of instructors that teach online courses has increased along with the number of online courses. Through their responsibilities in online teaching, experiences, and levels of satisfaction, instructors' qualities can be investigated. Beyond the bare minimum, a competent instructor must possess masterful subject-

matter expertise. The success factors and effective traits of a good educator are explored. The instructor's attributes should include the capacity to comprehend people and work well with them, the desire to teach, subject-matter expertise, enthusiasm. Instructor must be prepared for the subject.

Various technological tools are employed to support various online learning approaches. One category of online learning models enables users to participate at their convenience by using asynchronous communication technologies (such as email, newsgroups and threaded discussion boards). Webcasting, chat rooms, and desktop audio/video technology, for instance are synchronized technologies that mimic face-to-face teaching techniques including giving lectures and having meeting with groups of students. One model or the other was frequently used in earlier online programs. Asynchronous and synchronous online contacts, as well as sporadic face-to-face interaction, are frequently combined in more modern applications. In order for every BLE packet scanner to quickly identify a packet, devices advertise the same packets across all three advertising channels.

Due to its promise to offer more convenient access to information and instruction at any time and from any location, online learning has gained popularity. The focus is frequently on (a) making learning opportunities more accessible to students who cannot or prefer not to participate in traditional face-to-face offerings, (b) creating and distributing instructional content more cheaply, or (c) allowing instructors to manage more students while maintaining learning outcomes of a standard that is comparable to face-to-face instruction.

Virtual Education: A New Approach to Education:

Making the decision to provide their children with an education that is both morally sound and enticing to them has always been difficult for parents. Each child has unique

educational requirements and preferences, and education should be given to them in accordance with those needs and desires.

The ideal replacement for traditional educational modules, virtual education is one of the most impressive innovations of our time. Kids who struggle to adjust to the idea of attending actual school benefit the most from this type of education delivered through the internet. In fact, virtual schools have been lauded as the next big thing in education that will undoubtedly alter how instruction is imparted to students. To learn why virtual education is such a fantastic start in the field of education, read this article.

The type of education offered in traditional schools is not comparable to that offered online. The nicest thing about this type of schooling is that it gives parents and children the chance to receive the correct counselling so they can determine what will be most beneficial for each student.

6. CONCLUSION

The eLearning system is one of the most important systems that help students to obtain and share the forms of assignments and tests among students and allow them to share their opinions and discuss these duties, which facilitates their learning process and increases their understanding of the subjects. The eLearning system is designed to accommodate future upgrading and development without the need for building a new system to fit with the growing needs and demands of the system. Having this system hosted online means the ability of both technicians and administrator to track and respond to demands of students at any time beyond the boundaries and walls of college which add one more advantage to replacing the paper-based style. Virtual education often incorporates self-paced learning, allowing learners to progress through the material at their own speed. This flexibility accommodates various learning styles and allows individuals to spend more time on challenging concepts or move quickly through familiar topics. Virtual education can be more cost-effective compared to traditional education. It eliminates expenses associated with commuting, housing, and physical resources, making education more affordable and accessible to a broader range of learners.

FUTURE WORK

Implementation is the completing, execution, or routine with regards to an arrangement, a technique, or any outline, thought, display, particular, standard or strategy for accomplishing something. All things considered, execution is the activity that must take after any preparatory reasoning with the end goal for a remark happen.

Testing Stages

With the exception of little projects, frameworks ought not to be tried as a solitary, solid unit. Vast frameworks are worked out of sub-frameworks that are worked out of modules, which are made out of techniques and capacities. The testing procedure ought to thusly continue in stages where testing is done incrementally in conjunction with framework execution. The most generally utilized process comprises of five phases:

1. Unit Testing: Individual segments are tried to guarantee that they work accurately. Every part is tried autonomously without other framework segments.
2. Module Testing: This includes the testing of autonomous segments, for example, systems and capacities. A module epitomizes related parts so it can be tried without other framework modules.
3. Subsystem Testing: This stage includes testing accumulations of modules which have been incorporated into sub-frameworks. Sub-frameworks might be freely planned. The most widely recognized issues which emerge in vast programming frameworks are sub-framework interface confounds. The sub-framework test process ought to consequently focus on the recognition of interface blunders by thoroughly practicing the interfaces.
4. System Testing: Sub frameworks are coordinated to make up the whole framework. The testing procedure is worried about discovering mistakes that outcome from unexpected cooperation's between sub-frameworks and framework parts. It is likewise worried about approving that the framework meets its utilitarian and non-useful prerequisites.

User Manual

Home Page

The Home page contains the start button where registered users can enter through the entrance gate, there is also the menu contains whole pages links which students can enter to find tests, courses assignments, about page and frequently asked questions that help students to find answers for questions about the system use.

There is a search button that helps students to search for anything related to any course. The virtual educational system's website, which is open in localhost 8080 in Figure has four sections: Home, Courses, Teachers, and Explore. The Home section is where we explore our website; it is shown above in Figure :

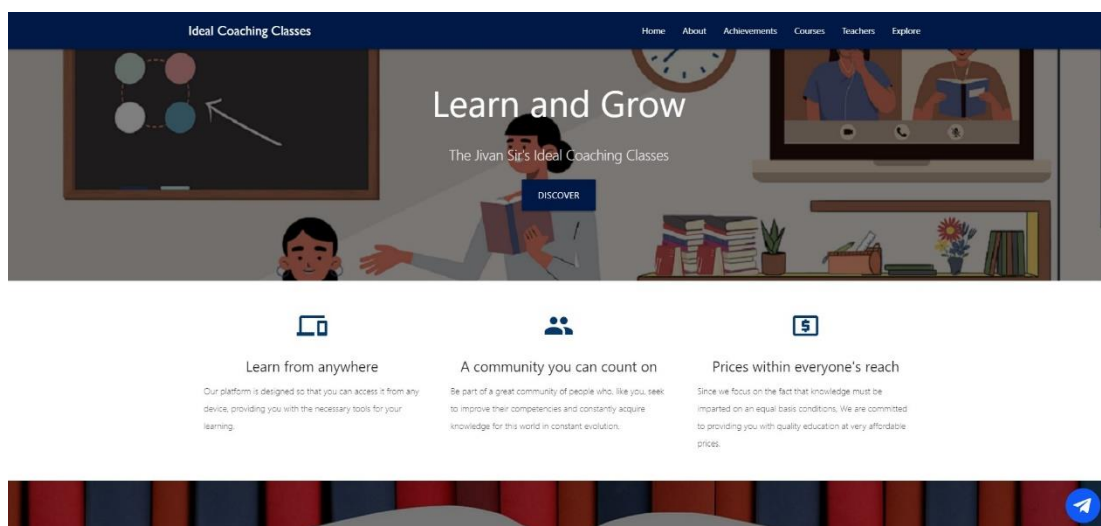


Figure : Home Page

Register Page

Students can create account on educate platform to get permissions for add new assignment, downloading tests or updating his/her own profile

Ideal Coaching Classes Home About Achievements Courses Teachers Explore

New User

Firstname
Lastname
Email
URL Image
Username
Password

REGISTER

Ideal Coaching Classes Contact
Near Milind Gas Agency, Deshmukh Complex, Lakhala, Washim - 444505 Gajanan Jirvankar Sir - 9773724060

Figure : Register Page

In the Figure: in which the Register Page is Shown in Which any student and teacher are firstly register form their name, email, Picture URL, username and password filled carefully and then login with the help of Username and Password.

Login Page

Ideal Coaching Classes Home About Achievements Courses Teachers Explore

Login

Username
Password

LOGIN

Are you not registered yet? Register here

Ideal Coaching Classes Contact
Near Milind Gas Agency, Deshmukh Complex, Lakhala, Washim - 444505 Gajanan Jirvankar Sir - 9773724060

With by ICT

Figure : Login Page

This page can students enter the system by filling the form with correct credentials to access the pages.

In the Figure : in which new student and teacher is login with the help of username and password id they are already registered successfully by their credentials.

Courses Page

In the Figure 5.5.4 in which Courses page is open and in which 5th, 6th, 7th, 8th, 9th,10th,11th 12th NEET, MHT-CET and JEE these classes and competitive exam preparation courses is available helpful for student.



Figure : Courses Page

About Page

In the Website of Virtual Educational System in which different pages is present and in which about page is present in which you can add the details of owner of ideal coaching classes.

And add their education, contact number, email and address and also add which subject he has teaching to students.

Again, their owner details add their others teacher details and their education have their teaching experiences and which subject they are teaching to the students their subject name and subject their education also added to website. Again, about page last section in which add the testimonials for students which are newly visits their website then they can see the results of students in passing years before and they motivate to join their classes and that way they helpful for students and teachers also



Figure : About Page

Achievement Page

In the Project of design and development of efficient virtual educational system in which created a website for the tuition classes in which added different page and then one of the pages is achievement page in Figure : in which are added the pamphlet of that class which in result of their classes and they added many pamphlets by scrolling Features.



Figure: Achievement Page

Teachers Page

In the project of design and development of efficient virtual educational system in which created a online website of the tuition classes which is helpful for the students and teachers in the Figure : Observed Teachers Page in which list of teachers which are teaching to students.

And, any new teachers are adding or join to our class then they can contact with class with online to visiting a website no physical visit in needed to the teacher this way beneficial for the students and teachers and most helpful for new teacher joining.

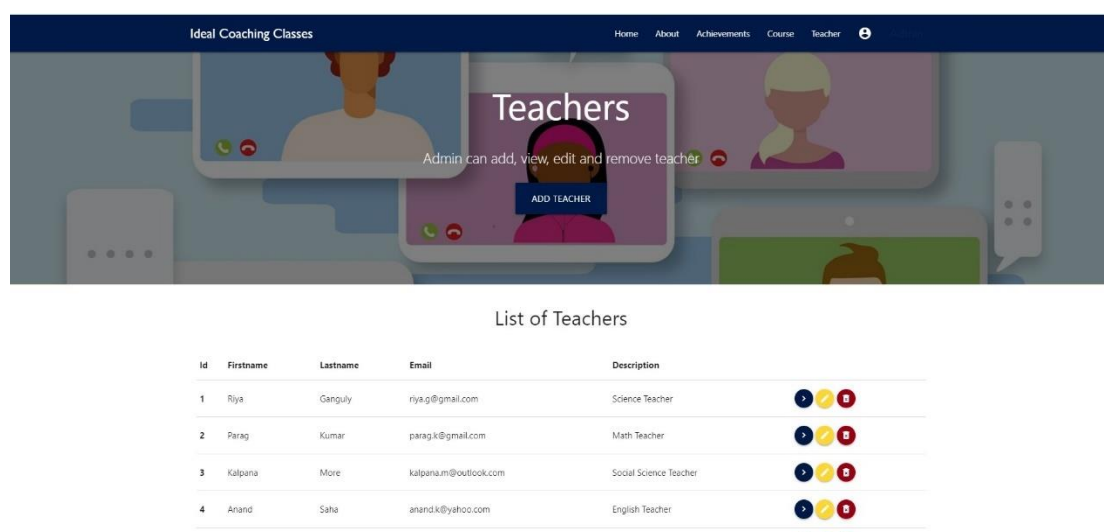


Figure : Teachers Page

Explore Page

In the Project of design and development of efficient virtual educational website In which the Figure : is Explore page in which you can see two options one is login and register is another method or way to teacher and student can register and then login to their account and make an account in virtual educational website an also see the title of see you soon means you successfully logout to the any account this is present the website.

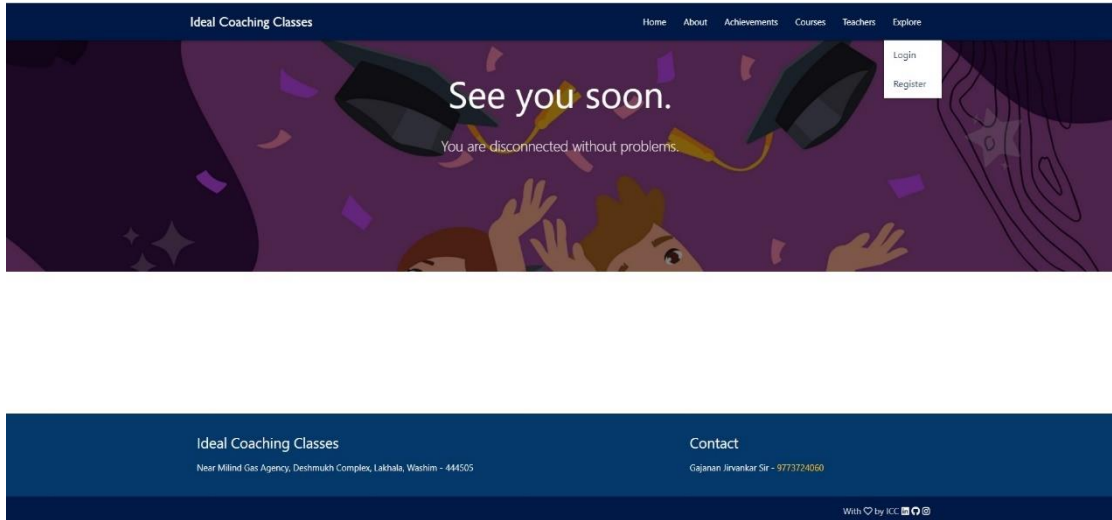


Figure : Explore Page

Profile Page

In the project of design and development of efficient virtual educational website in which any student or teacher firstly register and then login successfully then their account is created and the observe the profile page is observe in Figure : in which you can see your name, email and joining date to the class and observe your profile and

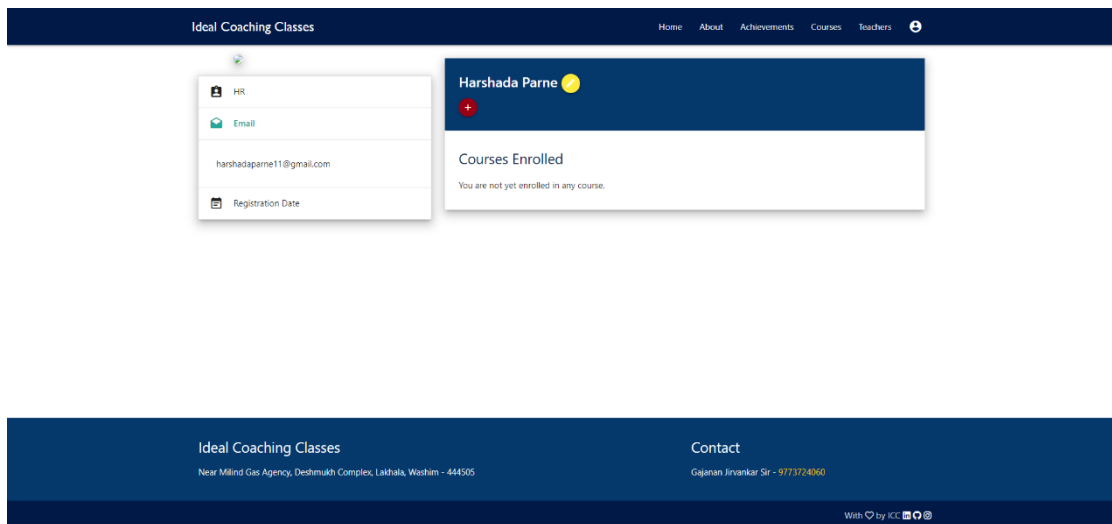


Figure : Profile Page

which courses did you enrolled for the academics' also logout to your account successfully.

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DISSEMINATION OF WORK

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Implementation Paper – International Journal of Scientific Research and Engineering Development

“Implementation on Virtual Educational System”

Authors: Diksha Bhutekar, Harshada Parne, Nikita Patond, Prajesh Peshattiwar

Journal: IJSRED | ISSN 2581-9429 (online), 1-5

Date: 12th May 2023

DOI: 10.48175/IJARSCT-943

SPONSORSHIP LETTER

IDEAL COACHING CLASSES

Deshmukha Complex, Lakhala Road, Washim-444505

To whom it may concern

Student Name :-

- 1) Diksha Bhutekar
- 2) Prajesh Peshattiwar
- 3) Nikita Patond
- 4) Harshada Parne

Of SSGMCE, IT Department

IDEAL COACHING CLASSES agrees to pay all expenses for the above- named student of SSGMCE. The sponsorship includes, but is not limited to, development of project/software and maintenance of software/project services.

Project Name: - Design & Development of Efficient Virtual Educational system

This sponsorship will cover the student beginning on August 2022 to April 2023

Sponsorship Amount: - 10,000/-Rs.

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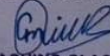
Pincode:- 444505

Email :- gajananjirvankar3@gmail.com

Sincerely,

Name and Sign of Contact Person

Gajanan Jirvankar, Owner



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COMPLETION LETTER

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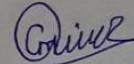
Date: 4th May 2023

This is to certify that Ms. Diksha Bhutekar, Ms. Harshada Parne, Ms. Prajesh Peshattiwar, Ms. Nikita Patond, Students of B.E, Dept. of IT, Shri Sant Gajanan Maharaj College of Engineering, Shegaon has successfully completed project title 'Design and Development of Efficient Virtual Education System(Ideal Coaching Class Website) under the guidance of Prof. A. K. Shahade for our organization, with reference to the partial fulfillment of B.E. degree.

All necessary requirements were provided from our side for the establishment of this project.

We wish all the very best in all future endeavors. Thanking You

Sincerely,



Gajanan Jirvankar, Owner
Name and Sign of Contact Person

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