

ONLINE DISCUSSION FORUM FOR ACADEMIC INSTITUTIONS

A Project Report

Submitted in partial fulfilment of the requirement for the degree of

BACHELOR OF TECHNOLOGY

in

Computer Engineering

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**Submitted to the department of Computer Engineering
in partial fulfilment of the requirements
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Bachelor of Technology
in
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DECLARATION

We hereby declare that this submission is our own work that, to the best of our knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgement has been made in the text.

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This is to certify that the project report entitled "**Online discussion forum for academic institutions**" which is submitted by **Satyanshu Singh, Aditya Ojha, and Sakshi Singh** in partial fulfilment of the requirement for the award of degree B.Tech. in Department of Computer Engineering of Dr. A.P.J. Abdul Kalam, Technical University, is a record of the candidates' own work carried out by them under my supervision. The matter embodied in this thesis is original and has not been submitted for the award of any other degree.

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We also do not like to miss the opportunity to acknowledge the contribution of all faculty members of the department for their kind assistance and cooperation during the development of our project. Last but not the least, we acknowledge our friends for their contribution in the completion of the project.

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ABSTRACT

This abstract introduces the development of an open forum platform for students in a specific college, incorporating a separate dashboard for a recommender system. The platform aims to facilitate communication, knowledge sharing, and support among students, faculty, alumni, and colleagues. The primary problem addressed by this project is the lack of personalized and efficient post navigation within traditional forums. To overcome this challenge, a recommender system is integrated into the platform, analyzing user behaviour, preferences, and post content to provide personalized recommendations. The procedure involves the creation of a user-friendly website where students can register using their institution's email address. Once registered, users gain access to various functionalities, including posting queries and engaging in discussions. The recommender system utilizes machine learning algorithms to suggest relevant posts based on user preferences and the content they post on the forum. Results will be evaluated through user feedback, engagement metrics, and the effectiveness of the recommender system in delivering valuable recommendations. The success of the platform will be measured by user satisfaction, increased engagement, and improved knowledge sharing among participants. In conclusion, the development of this open forum platform with a separate recommender system dashboard enhances communication, knowledge sharing, and support within the college community. By providing personalized recommendations, the platform creates a tailored experience for users, enabling them to discover relevant posts and engage in meaningful discussions. This integrated system has the potential to transform student interactions, collaboration, and learning.

Keywords: open forum, students, college, recommender system, communication, knowledge sharing, personalized recommendation

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LIST OF SYMBOLS

(s) Plural

LIST OF ABBREVIATIONS

Admin	Administrator
HTML	Hyper Text Markup Language
CSS	Cascading Style Sheets
PHP	Hypertext Preprocessor
UI	User Interface
GUI	Graphical User Interface

CHAPTER 1

INTRODUCTION

This report presents a comprehensive study on the development of an online discussion forum tailored specifically for academic institutions, with a separate dashboard featuring a recommender system. The aim of this project is to address the existing limitations in traditional online forums and provide a more efficient and personalized platform for students, faculty, and researchers to engage in academic discussions and knowledge sharing.

In today's digital age, online forums play a crucial role in facilitating communication and collaboration among individuals with shared interests. However, the vast amount of information available on these platforms often leads to information overload, making it challenging for users to find relevant discussions. This creates a need for a more effective approach that enables users to navigate through the vast sea of information and discover content aligned with their academic interests.

To overcome these challenges, a recommender system is integrated as a separate dashboard within the online discussion forum. Leveraging advanced machine learning algorithms, the recommender system analyzes user behaviour, preferences, and the content of their posts. By understanding the individual user's needs and interests, the system provides personalized recommendations, ensuring that users are presented with relevant discussions and enhancing their overall experience on the platform.

The development of this online discussion forum with a recommender system holds immense potential in revolutionizing academic discourse within institutions. By providing a platform that fosters meaningful discussions and knowledge sharing, students, faculty, and researchers can collaborate more effectively and make valuable contributions to their respective fields. The recommender system further enhances the user experience by delivering tailored content recommendations, promoting engagement, and creating a sense of community within the academic institution.

Throughout this report, we will explore the problem statement, outline the procedures undertaken in developing the online discussion forum, present the results obtained, and conclude with an analysis of the overall effectiveness and potential impact of the platform. By embracing this innovative solution, academic institutions can harness the power of technology to enhance collaboration, knowledge exchange, and foster an environment conducive to learning and academic growth.

1.1 Problem Introduction

1.1.1 Motivation

The motivation behind this project stems from the recognized need for an improved online discussion forum tailored specifically for academic institutions. Traditional forums often lack personalization and struggle to effectively filter and recommend relevant content to users. This can result in information overload, reduced user engagement, and limited knowledge sharing. By integrating a recommender system, we aim to address these shortcomings and provide a more dynamic and personalized platform for students, faculty, and researchers.

1.1.2 Project Objective

The main objective of this project is to develop an online discussion forum with a separate recommender system dashboard that enhances the user experience and promotes effective knowledge sharing within academic institutions. The project aims to create a platform where users can easily connect, engage in meaningful discussions, and receive personalized recommendations based on their preferences and interests. By providing tailored content suggestions, the objective is to facilitate collaboration, promote active participation, and foster a vibrant academic community.

1.1.3 Scope of the Project

The scope of this project encompasses the design, development, and implementation of an online discussion forum with a recommender system. The forum will be specifically tailored for academic institutions, catering to the needs of students, faculty, researchers, and alumni. The recommender system will utilize machine learning algorithms to analyze user behaviour, preferences, and post content to generate personalized recommendations. The project will include creating user-friendly interfaces, integrating the recommender system, and implementing necessary backend functionality.

Furthermore, the project scope encompasses the evaluation of the recommender system's effectiveness in terms of user engagement, satisfaction, and the quality of interactions observed on the forum. It also includes gathering user feedback and conducting performance testing to ensure a seamless and efficient user experience.

1.2 Previous Related Work

Nor Fariza, Nor Mohd, Nor Razak, Norizan, and Jamaluddin Aziz [1] investigates if there is evidence of shared knowledge production among students through collaborative learning behaviors by looking at preliminary data from an online discussion forum in a Masters level (MA) course.

Victor Emmah and Helen Biriayi [2] highlights the elements of an online forum's design and functionality that make it a useful tool for lecturers and students at a university to communicate with one another.

Bute, M.S., Adamu, M.K. Ahmed, and U.M. Abubakar [3] In order to bridge the communication gap between lecturers and students outside of the classroom, tertiary institutions should develop a robust interaction platform for students and lecturers that includes features like instant messaging, file sharing, notifications, asking for and adding friends to one's friends list, and discussion forums.

The authors Anderson, Garrison, and Archer [4]. Assist an educational experience by providing conceptual structure and a tool for the usage of computer-mediated communication (CMC) and computer conferencing.

1.3 Organization of the Report

This report presents a comprehensive study on the development of an online discussion forum tailored specifically for academic institutions, with a separate dashboard featuring a recommender system.

Search Interface: The search interface allows users to search for specific discussions or keywords within the forum.

Web Server: A robust web server software like Apache or Nginx is necessary to host and serve the platform.

User Profile Management: Test updating user profile information, such as name, profile picture, and bio, and ensure the changes are reflected correctly.

These test cases cover various aspects of the online discussion forum platform with a recommender system, ensuring its functionality, security, performance, and user experience are thoroughly tested and validated.

CHAPTER 2

LITERATURE REVIEW

2.1 Existing Systems

The incorporation of a recommendation system in academic institutions' online discussion forums can increase user participation and promote meaningful topics. A recommendation system can propose postings to users based on their own efforts, in addition to recommending pertinent topics. This review of the literature looks at existing systems and research that have used recommendation systems to recommend posts to users based on their own behaviour in an online discussion forum.

2.1.1 Stack Exchange

Stack Exchange is a prominent site for question-and-answer-based debates in a variety of fields, including academics. It employs a reputation-based system in which users earn points for their efforts. The website features a recommendation engine that recommends new questions and answers to users based on their previous activity and reputation rankings. This encourages users to interact with it.

2.1.2 Smart Forum

Smart Forum is an intelligent discussion forum system designed primarily for academic settings. It analyses user interactions, content relevancy, and community preferences using machine learning algorithms and natural language processing techniques. Based on user profiles, historical interactions, and subject modelling, the system makes personalised recommendations for discussions, resources, and collaborators. Smart Forum's mission is to increase information sharing and build a feeling of community in academic institutions.

2.1.3 Quora

Quora is a popular online question-and-answer site. While it is not specific to academic institutions, it is an example of a recommendation system that proposes postings to users based on their previous activity and interests. To create personalised recommendations, Quora's recommendation algorithm analyses user interactions, question themes, and post content. Users are encouraged to investigate relevant topics and participate in conversations based on their own contributions.

2.1.4 ResearchGate

ResearchGate is an academic social networking website for scholars that includes online conversations and resource sharing. While it lacks a standard recommendation system based on user activity, it does offer personalised recommendations via its "Recommended Research" function. To propose related articles, papers, and debates, ResearchGate analyses users' research interests, publishing history, and relationships. This motivates researchers.

2.1.5 Reddit

Reddit is a prominent online discussion site that covers a wide range of topics, including intellectual ones. While not intended for academic institutions, it demonstrates the power of recommendation systems based on user engagement. Based on user subscriptions, upvotes, and interactions, Reddit's recommendation algorithm proposes new subreddits and posts that fit with users' preferences. This increases user involvement and participation in specialised communities.

2.2 Related Work

The authors Anderson, Garrison, and Archer [4]. Assist an educational experience by providing conceptual structure and a tool for the usage of computer-mediated communication (CMC) and computer conferencing.

In order to debate the social, ethical, legal, and managerial concerns related to information technology and biotechnology, Abel, F., Bittencourt, I. I., Costa, E., Henze, N., Krause, D., and Vassileva, J. [5] established an online community. Additionally, by modelling and displaying the asymmetrical relations created while reading, assessing, or commenting on the contributions of other community members, it serves as a tool for encouraging engagement in interest-based online communities. This engages non-contributing members.

Sun et al. [5] remember earlier studies in which the idea of e-learning was unaffected by information technology. But it seems to be the case that it is. Some pupils also mention the sporadic technological issues (connected with MS Teams, lack of Internet, some overloads, problems with turning on camera, etc.). According to the respondents, distant learning makes students tired because they spend too much time in front of computers, which is also linked to worries about eye health. They are generally aware that distant learning and the resulting decline in physical activity may have a

detrimental effect on health. What's crucial is that some students acknowledge how difficult it is to collaborate with other students when learning remotely: "Involvement in group work dropped significantly, the students around me at the university stopped being active, helpful, and everyone prefers to be isolated, putting daily responsibilities over online duties."

Alstete, J. W., & Beutell, N. J. [6] Examines student performance indicators in online distance learning courses offered on the Internet at a mid-sized private college in the USA. A sample of 74 undergraduate and 147 graduate business students in ten courses were selected for statistical analysis of their grade performance and the relationship with various indicators.

According to a survey on student learning experiences with online discussion boards, students acknowledged the contribution that online discussion boards may make to their studies, but they stressed that the medium should be used in conjunction with other teaching and learning methodologies. If appropriately utilised, online discussion forums have a lot of potential to promote the fulfilment of teaching-learning objectives. As a result, it is hoped that the current study will contribute to the expanding understanding of online discussion forums in order to foster engagement and the use of technology in education.

To maximise the benefits of online discussion forums in education, they must be integrated within a holistic educational strategy. To enrich their learning experiences, students stressed the significance of mixing online conversations with face-to-face contacts, lectures, and practical activities. Educators can foster active involvement, critical thinking, and collaborative learning among students by properly utilising online discussion boards.

Furthermore, the purpose of this research is to shed light on best practises for using online discussion forums, taking into account elements such as facilitation approaches, clear guidelines, and quick feedback from instructors. These elements all contribute to the development of a friendly and engaging online learning environment in which students are encouraged to actively engage and exchange ideas.

Overall, educational institutions may create meaningful engagement, student-centered learning, and successful use of technology in education by leveraging the potential of online discussion forums and effectively incorporating them into the teaching-learning process.

A detailed literature survey has been done as well in order to find out the gaps in the online discussion forums. We studied many papers, which covered a number of software. We have tried our best to represent these findings in the form of a tabular representation as shown below:

Table 2.1: Gap Analysis of Various Research Papers Studied

Title	Year of Publication	Technology Used	Gap Identified
E-learning: Analysis of online discussion forums in promoting knowledge construction through collaborative learning [1]	2010	Interaction analysis model	Does not focus on sharing of assignment and tests
Online Discussion Forum: A tool for effective student-Teacher Interaction [2]	2014	SSRN Electronic Journal	Lack of importance and research on student interaction in discussion forums
Online Academic Forum for Tertiary Institutions [3]	2016	HTML, PHP, MySQL, JavaScript	Student sometimes never get the answer of there desired question on time

2.3 Addition of Recommendation System

Online discussion forums are popular tools for exchanging knowledge, collaborating, and engaging communities. Incorporating recommendation algorithms that offer postings to users based on their own contributions can significantly improve user experience and encourage active involvement. This study of the literature examines existing research and experiments concentrating on the incorporation of recommendation systems in discussion forums, specifically targeting post recommendations to users based on their dashboard content.

2.3.1 Collaborative Filtering

Collaborative filtering is one of the most popular [12, 13] types of recommender algorithms. It uses the past behavior of users to predict what they might be interested in now. It looks at the items that users have interacted with in the past, and finds other users with similar preferences. It then suggests items to the user based on the preferences of similar users. The main advantage of collaborative filtering is that it can make personalized recommendations without having to know anything about the user.

2.3.2 Content-Based Filtering

Content-based filtering [14] is another type of recommender algorithm. This type of algorithm uses the characteristics of items to determine what a user might be interested in. For example, if a user has liked books about science fiction, the algorithm can suggest other books about science fiction. The main benefit of content-based filtering is that it can make more accurate recommendations based on the user's preferences.

2.3.3 Hybrid Recommender Systems

A hybrid recommender system [13, 15] is a combination of collaborative filtering and content based filtering. This type of system takes into account both the past behaviour of users and the characteristics of items to make recommendations. The main benefit of a hybrid system is that it can make more accurate and personalized recommendations.

2.3.4 Matrix Factorization

Matrix factorization is an advanced type of recommender algorithm that uses machine learning techniques to make recommendations. It looks at the interactions between users and items to determine what a user might be interested in. The main advantage of matrix

factorization is that it can make more accurate recommendations than traditional methods.

Table 2.2: Comparison of Various Recommender Algorithms

Algorithm	Advantages	Disadvantages
Collaborative Filtering	Personalized recommendations, scalability, can generate recommendations when user data is sparse	Reliance on user data, cannot generate recommendations for new products
Content-based Filtering	Can generate recommendations when user data is sparse, ability to generate recommendations for new products, ability to generate recommendations based on specific user interests	Reliance on item data, cannot capture user preferences
Hybrid Algorithms	Personalized recommendations, can generate recommendations for new products, scalability, ability to capture user preferences	Complexity, reliance on both user and item data

The inclusion of recommendation systems to discussion forums based on a user's dashboard- posted content has the potential to significantly improve user experience and increase engagement. In the literature, content-based filtering, latent semantic analysis, collaborative filtering, social network analysis, and hybrid approaches have all been investigated, each with their own set of benefits and tactics for providing meaningful post recommendations.

CHAPTER 3

SOFTWARE REQUIREMENT SPECIFICATION

Open forum for students in academic institutions can be positioned as a valuable educational resource and a platform for collaborative learning.

3.1 Product Perspective

Here is a product perspective that highlights the key benefits and features:

- 1. Empowering Students:** It provides a platform where students can connect with their peers, ask questions, and find solutions to their academic doubts. It empowers students to take an active role in their learning process by engaging in discussions, sharing knowledge, and seeking help from a supportive community.
- 2. Collaborative Learning:** It fosters a collaborative learning environment where students can learn from each other, exchange ideas, and explore different perspectives. It encourages peer-to-peer knowledge sharing and facilitates collaborative problem-solving, enhancing the overall learning experience.
- 3. Easy Access to Information:** It offers a centralized hub for students to access a wide range of educational resources, including answers to frequently asked questions, study materials, and relevant discussions. It helps students quickly find information and gain insights on various academic topics.
- 4. Efficient Doubt Resolution:** By posting their questions on it, students can receive timely responses from their peers or subject matter experts. This efficient doubt resolution process saves time and reduces the frustration of unanswered queries, enabling students to overcome obstacles and progress in their studies.
- 5. Categorized Topics and Tags:** It organizes discussions into categorized topics and allows users to add relevant tags. This structure makes it easy for students to navigate the forum and find specific discussions related to their subjects or areas of interest.
- 6. User Reputation and Recognition:** It points based on their involvement in discussions, quality of answers, and helpfulness to others. This feature motivates students to actively engage and provides recognition for their contributions.

- 7. Moderation and Quality Control:** It implements moderation tools and guidelines to ensure a positive and respectful community atmosphere. Moderators monitor discussions, flag inappropriate content, and maintain the quality and integrity of the forum. This helps create a safe and constructive space for learning.
- 8. Feedback and User Support:** It values user feedback and provides a dedicated channel for users to share their suggestions, report issues, or seek support. Regular updates and improvements are made based on user input, ensuring that the forum meets the evolving needs of its users.
- 9. Mobile-Friendly and Responsive:** It is designed to be mobile-friendly, allowing students to access the forum on their smartphones or tablets. The responsive layout ensures a seamless user experience across different devices, enabling students to participate in discussions anytime, anywhere.
- 10. Privacy and Security:** It prioritizes the privacy and security of user data. It implements robust security measures, encryption protocols, and regular backups to safeguard personal information and ensure a secure environment for users.

Overall, the forum aims to enhance the educational journey of students by promoting collaboration, knowledge sharing, and efficient doubt resolution within a supportive online community.

3.1.1 System Interfaces

The open forum for students in academic institutions will require various system interfaces to ensure smooth communication and functionality.

3.1.2 Interfaces

User Interface (UI): This interface is the front-end of your forum that users interact with. It includes the design, layout, and user-friendly features such as navigation menus, search bars, posting forms, and notification alerts. The UI should be intuitive, responsive, and visually appealing to provide a seamless user experience.

Registration and Login Interface: This interface allows users to create new accounts and log in to access the forum. It typically includes registration forms with fields for username, email, password, and possibly additional profile information. Users should also be able to recover their passwords if forgotten.

User Profile Interface: This interface allows users to view and update their profiles. It includes features such as profile pictures, bio sections, educational details, and social links. Users can manage their preferences, update account settings, and view their activity history.

Discussion Thread Interface: This interface displays individual discussion threads or topics within the forum. It includes the title, main post, and subsequent replies. Users can read and contribute to the discussion by posting replies, upvoting or downvoting posts, and flagging inappropriate content.

Category and Topic Navigation Interface: This interface enables users to browse and select specific forum categories or topics. It may include a sidebar or dropdown menu displaying different categories, subcategories, or tags. Users can click on a category or topic to view relevant discussions.

Search Interface: The search interface allows users to search for specific discussions or keywords within the forum. It typically includes a search bar where users can enter their query and retrieve relevant results. Advanced search options such as filtering by date, author, or category may also be included.

Moderation Interface: This interface is designed for moderators or administrators to manage the forum. It includes tools for reviewing reported posts, moderating user accounts, editing or deleting content, and applying forum policies. The moderation interface should provide efficient and effective controls to ensure the smooth operation of the forum.

These system interfaces work together to create a cohesive and user-friendly experience for the students and other participants using your open forum.

3.1.3 Hardware Interfaces

The logical characteristics of each interface between the software product and the hardware components of the system.

Web browser: The software product uses a web browser to interact with the user. The web browser provides a graphical user interface (GUI) that allows the user to interact with the software product. The GUI is designed to be user-friendly and easy to use.

Database: The software product uses a database to store data. The database is used to store information such as user profiles, questions, answers, and polls. The database is designed to be secure and to protect user data.

Operating system: The software product runs on a variety of operating systems, including Windows, macOS, and Linux. The software product is designed to be compatible with a wide range of operating systems.

Web server: The software product is hosted on a web server. The web server provides a way for users to access the software product over the internet. The web server is designed to be secure and to protect user data.

Configuration characteristics for the platform described encompass the devices to be supported, how they are supported, and the protocols involved. Here are the key aspects of configuration:

Device Support: The project supports a wide range of devices to cater to the diverse needs of the students. This includes personal computers, laptops, smartphones, tablets, and other internet-enabled devices. The platform's interface responsive and adaptable to different screen sizes and resolutions, ensuring a seamless user experience across devices.

Scalability and Performance: This platform's architecture and configuration should be designed to handle a growing user base and increasing traffic. This may involve load balancing, caching mechanisms, and horizontal scaling to ensure optimal performance and responsiveness as the platform usage expands. RAM needed for this Project is 8 GB or more to run this project smoothly, the Processor used will be intel Pentium 4, AMD Ryzen or above.

3.1.4 Software Interfaces

The software interfaces for your open forum would involve the software components and interactions required for the proper functioning of the forum. Here are some possible software interfaces to consider:

Web Server Software: The forum's software interface will interact with the web server software, hosted by Apache. The web server software handles HTTP requests, serves the forum's webpages, and communicates with other software components to process user interactions.

PHP: Since the forum is developed using PHP, the software interface will involve the interaction between the PHP scripting language and the web server. PHP processes the server-side scripts, interacts with the database, and generates dynamic web content for the users.

Database Management System (DBMS): The forum interacts with the database management system, on MySQL, to store and retrieve data. The software interface involves using appropriate database drivers or libraries in PHP to establish connections, execute queries, and retrieve or modify forum data.

Operating System and System Utilities: The forum's software interface interacts with the underlying operating system and system utilities to manage file permissions, schedule tasks, handle logging, and perform other administrative operations.

3.1.5 Communication Interfaces

This platform should utilize standard internet protocols such as HTTP/HTTPS for secure communication between the user's device and the platform's servers. These protocols ensure reliable data transmission and safeguard sensitive information such as login credentials.

The Apache HTTP Server is used as the web server software to host the platform. Apache HTTP Server, commonly referred to as Apache, is an open-source web server software that is widely used for hosting websites and web applications. It is one of the most popular and enduring web server software options available. Here are some key aspects of Apache HTTP Server:

Functionality: Apache HTTP Server provides a robust set of features and functionality to serve web content efficiently. It supports various protocols such as HTTP, HTTPS, and SSL/TLS, enabling secure communication between clients and the server.

Platform Compatibility: Apache HTTP Server is cross-platform and runs on multiple operating systems, including Windows, macOS, Linux, and more. This allows flexibility in deploying the platform on different server environments.

Performance and Scalability: Apache HTTP Server is known for its performance and scalability. It can handle many concurrent connections and can be configured to optimize resource utilization based on the server's hardware capabilities.

Security: Apache HTTP Server includes various security features and options to enhance the protection of web applications. It supports secure connections through SSL/TLS, provides access control mechanisms, and allows for the configuration of security-related settings to mitigate potential vulnerabilities.

It is worth noting that the specific configuration and customization of the Apache HTTP Server for your project would depend on the specific requirements and needs of the platform. This may include optimizing performance, securing the server, and integrating with other components of the project's infrastructure.

Overall, Apache HTTP Server is a reliable and widely adopted web server software that provides the foundation for hosting the centralized platform and facilitating communication between clients (students) and the server.

3.1.6 Memory Constraints

The memory constraint for the forum depends on various factors, including the scale of application, the expected number of concurrent users, the complexity of the features, and the size of the data being handled. Some aspects to consider regarding memory constraints:

Server Memory: The memory required by our web server depends on the number of concurrent connections it needs to handle and the complexity of the PHP scripts and database queries. As the number of users accessing the forum increases, more memory may be required to handle the simultaneous requests and keep the server responsive.

Database Memory: The memory usage of our database system, such as MySQL, depends on factors like the size of the database, the number of tables, and the complexity of the queries. MySQL utilizes memory for caching query results, indexes, and temporary data, among other purposes. Configuring appropriate memory settings for the database can help optimize its performance.

File Storage: If our forum allows users to upload and share files (such as images, attachments, or documents), we need to consider the memory required for storing these files. The size and number of files can impact the storage requirements and may also affect the memory needed for handling file uploads and downloads.

Scalability and Load Balancing: As your forum grows and attracts more users, you may need to scale your infrastructure horizontally by adding more servers or utilizing cloud-based solutions. Load balancing techniques distribute the incoming traffic across multiple servers, enabling better memory management and improved performance.

3.1.7 Operations

Our open forum for students in academic institutions, here are some possible operations that users and administrators can perform:

User Operations: Register, Login, Create/Reply/Edit/Delete posts, Upvote/Downvote/Follow posts/users, Search/Filter posts, Receive notifications, Report content, Edit profile, Change settings.

Registration: Users can create new accounts by providing necessary information such as username, email, and password.

Login: Users can log in to their accounts using their credentials. **Logout:** Users can log out of their accounts to end their session.

Profile Management: Users can view and update their profile information, including profile picture, bio, educational details, and social links.

Posting Discussions: Users can create new discussion threads on specific topics or subjects to ask questions or initiate conversations.

Replies to Discussions: Users can contribute to existing discussion threads by posting replies, providing answers, or sharing insights.

Recommending Topics: Users will be recommended to specific topics or categories of interest to receive updates about new discussions.

Searching for Discussions: Users can search for specific discussions or keywords within the forum to find relevant information.

3.1.8 Site Adaptation Requirements

The product will require the user to have at least 8 GB ram and intel Pentium 4, AMD Ryzen or above on their system. Aside from these, there are certain software applications that the user must install in order to run the website on their systems:

PHP: The website is coded in PHP so the user must have PHP 8.2 or later versions installed on their system.

XAMPP: The system must be installed with the latest version of XAMPP. XAMPP is an open-source application created by Apache.

3.2 Product Functions

User Registration and Authentication: Allow students and teaching staff to create user accounts and log in securely.

Discussion Thread Creation: Enable students to create new discussion threads on various topics related to college matters. Allow users to provide a title, description, and relevant details for their threads.

Discussion Thread Viewing and Browsing: Provide a user-friendly interface for users to view and browse existing discussion threads. Allow users to filter discussions by categories or search for specific topics.

Replies and Comments: Enable users to post replies and comments on existing discussion threads. Support threaded discussions, allowing users to respond to specific comments within a thread.

Categorization and Tagging: Organize discussions into categories based on subjects, departments, or topics. Implement a tagging system to allow users to assign relevant keywords or tags to discussions.

User Profiles: Allow users to create and manage their profiles. Enable users to provide personal information, such as their name, field of study, and interests. Allow users to customize their profile picture or avatar.

Moderation Tools: Provide teachers and administrators with moderation features to monitor discussions and manage user accounts. Allow moderators to handle reported content, warn or suspend users, and resolve disputes.

Search Functionality: Enable users to search for specific discussions or topics using keywords, categories, or tags. Implement filters and sorting options to refine search results.

Mobile Responsiveness: Ensure that the website is responsive and provides a seamless experience across different devices, including smartphones and tablets.

3.3 User Characteristics

When designing an open forum for students in academic institutions, it is essential to consider the characteristics and needs of the users. Here are some possible user characteristics to consider:

- 1. Students:** The primary users of your forum will be students from academic institutions. They may belong to different educational levels, such as high school, undergraduate, or graduate programs. Consider the diverse backgrounds, interests, and academic disciplines of the student users.
- 2. Teachers and Professors:** In addition to students, teachers and professors may also be users of the forum. They can participate in discussions, provide guidance, and share resources with students. Consider incorporating features that allow educators to contribute effectively to the forum.
- 3. Administrators and Moderators:** Administrators and moderators are responsible for managing and maintaining the forum. They have additional privileges and responsibilities, such as user management, content moderation, and forum administration. Consider providing them with tools and interfaces to fulfill their roles effectively.
- 4. Technological Proficiency:** Users may have varying levels of technological proficiency. Some users may be highly tech-savvy and comfortable navigating online platforms, while others may have limited experience with digital tools. Design the forum's interface and user experience in a way that accommodates users with different levels of technological expertise.
- 5. Motivation and Engagement:** Users may have different motivations for participating in the forum. Some users may seek assistance with specific academic challenges or questions, while others may be interested in sharing knowledge or engaging in academic discussions.
- 6. Time Availability:** Users may have varying schedules and availability to participate in the forum. Some users may be active during regular academic hours, while others may prefer evening or weekend participation. Ensure that the forum remains accessible and provides asynchronous communication options to accommodate users' diverse time availability.

7. Cultural and Linguistic Diversity: Users may come from diverse cultural backgrounds and speak different languages. Consider providing multilingual support or language-specific sections to facilitate communication and inclusivity.

8. Privacy and Security Concerns: Users may have privacy and security concerns regarding their personal information and interactions on the forum. Ensure that the forum incorporates appropriate security measures, such as secure login, and privacy settings, to address these concerns and protect user information.

3.4 Constraints

The website may be subject to certain limitations and considerations that can affect the options available to the developers. Here are some examples:

Regulatory Policies: Compliance with applicable regulations, such as data protection laws (e.g., GDPR, CCPA), privacy policies, and accessibility requirements.

Hardware Limitations: Adherence to hardware limitations or constraints, such as limited processing power, memory, or storage capacity on the hosting server. Integration with existing systems or applications used by the college, such as student information systems, learning management systems, or authentication systems.

Parallel Operation: Ensuring the system can handle concurrent user interactions and perform well under heavy loads during peak usage periods.

Audit Functions: Incorporating audit functions to track user activity, changes to sensitive data, or system operations for accountability and compliance purposes.

Control Functions: Implementing appropriate controls and access management mechanisms to restrict certain actions or privileges based on user roles and permissions.

Higher-Order Language Requirements: Compliance with specific programming language requirements or restrictions imposed by the development environment or development standards of the college.

Signal Handshake Protocols: Incorporating appropriate signal handshake protocols or communication protocols (e.g., XON-XOFF, ACK-NACK) if the system needs to interact with external devices or systems.

Reliability Requirements: Meeting specific reliability requirements, such as ensuring high availability, fault tolerance, and system recovery mechanisms in case of failures or disruptions.

Criticality of the Application: Considering the criticality of the application and its impact on users or the college's operations, which may necessitate additional testing, security measures, or redundancy.

Safety and Security Considerations: Addressing safety and security considerations, such as protecting user data, preventing unauthorized access, and implementing appropriate encryption or authentication mechanisms.

3.5 Assumptions and Dependencies

There are various factors that can affect the requirements stated in the Software Requirements Specification (SRS):

Business or Organizational Changes: Changes in the college's policies, processes, or organizational structure that impact the requirements of the discussion forum.

Technology Changes: Upgrades or changes to the underlying technology stack, programming languages, frameworks, or databases that may necessitate updates to the requirements.

Hardware or Infrastructure Changes: Changes in the hardware or infrastructure environment, such as server upgrades, network configuration, or changes in hosting providers, which may require adjustments to the system requirements.

Integration with External Systems: Changes in external systems or APIs that the discussion forum needs to integrate with, potentially requiring updates to the requirements to accommodate the new interfaces or functionalities.

Stakeholder Feedback or Evolving User Needs: Feedback from stakeholders, including students, teaching staff, or administrators, that reveal new requirements or modifications to existing ones based on evolving user needs or expectations.

Legal and Regulatory Requirements: Changes in laws, regulations, or compliance standards that impact data protection, privacy, accessibility, or other aspects covered by the requirements, necessitating updates to ensure compliance.

Budgetary or Resource Constraints: Changes in budgetary constraints or resource availability that may require adjustments to the requirements, such as prioritizing certain features, scaling back functionalities, or exploring alternative solutions.

Market or Competitive Factors: Changes in the market landscape or competitive offerings that may require adjustments to the requirements to meet user expectations, stay competitive, or differentiate the discussion forum.

User Experience and Usability Considerations: User feedback, usability testing results, or emerging industry best practices that highlight areas for improvement or changes in the user experience, leading to updates in the requirements.

Risk Management and Security Considerations: Changes in security threats, vulnerabilities, or risk assessments that necessitate updates to the requirements to enhance the system's security and mitigate potential risks.

Evolving Technology Standards and Best Practices: Updates or changes in technology standards, industry best practices, or development methodologies that may influence the requirements, such as adopting new security protocols or adhering to accessibility guidelines.

3.8 Apportioning of Requirements

Non-Critical Features: Identify requirements that are deemed non-essential or have lower priority compared to core functionalities. These can be considered for inclusion in future versions of the system.

Advanced or Complex Functionalities: If certain features require significant development effort or complexity, they can be deferred to subsequent versions to ensure a timely release of the initial system.

Nice-to-Have Enhancements: Identify requirements that are considered desirable but not essential for the initial release. These can be postponed to future versions to focus on the core functionalities.

Integration with External Systems: If integrating with specific external systems or APIs is not critical for the initial release, those requirements can be delayed until subsequent versions.

Advanced Reporting or Analytics: Sophisticated reporting or analytics features that require extensive data analysis or complex algorithms can be deferred to future versions.

Secondary User Roles or Administrative Functions: If certain user roles or administrative functions are not critical for the initial release, they can be postponed to subsequent versions.

Additional Platform or Device Support: If supporting multiple platforms (e.g., mobile, desktop) or devices is not a top priority, such support can be delayed until future versions.

Performance Optimization: Certain performance optimization measures, such as caching mechanisms or extensive scalability enhancements, can be deferred to subsequent iterations or versions.

User Interface Refinements: Cosmetic or aesthetic changes to the user interface can be postponed until future versions, focusing on the core functionality and usability in the initial release.

3.7 Use Case Diagrams

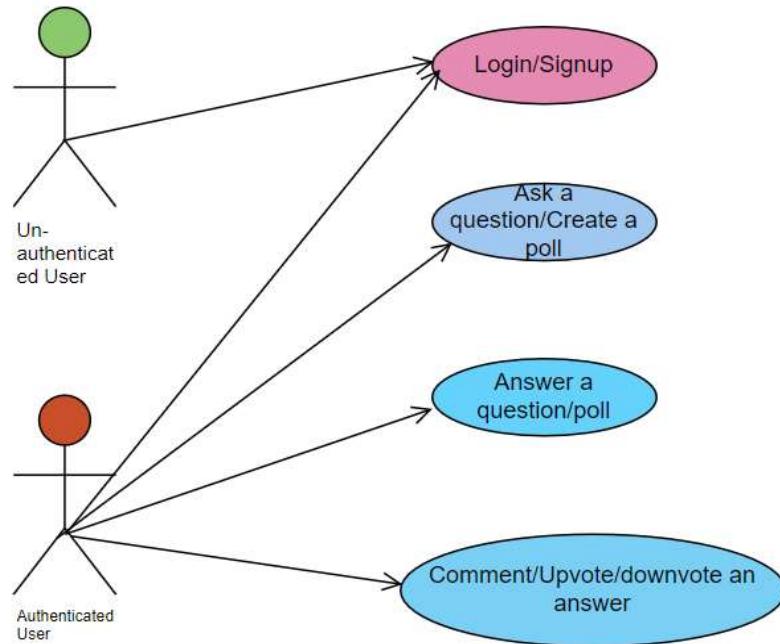


Figure 3.1: Use Case Diagram for User

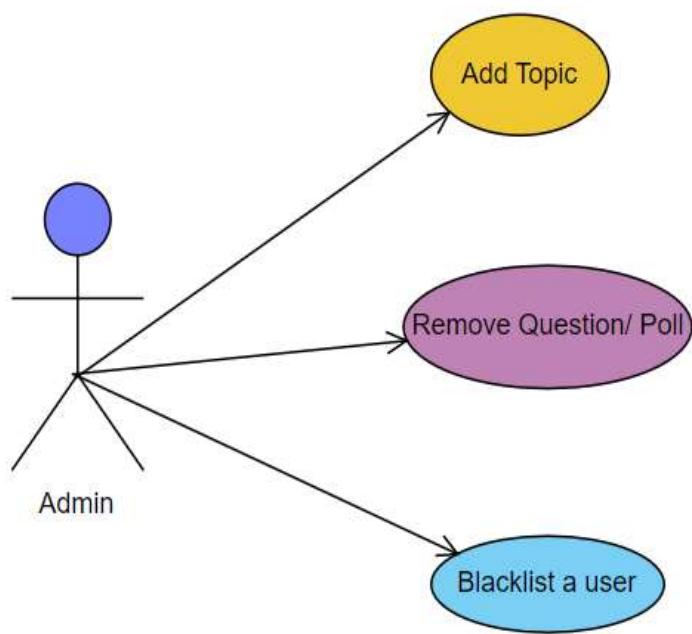


Figure 3.2: Use Case Diagram for Admin

3.7 Sequence Diagrams

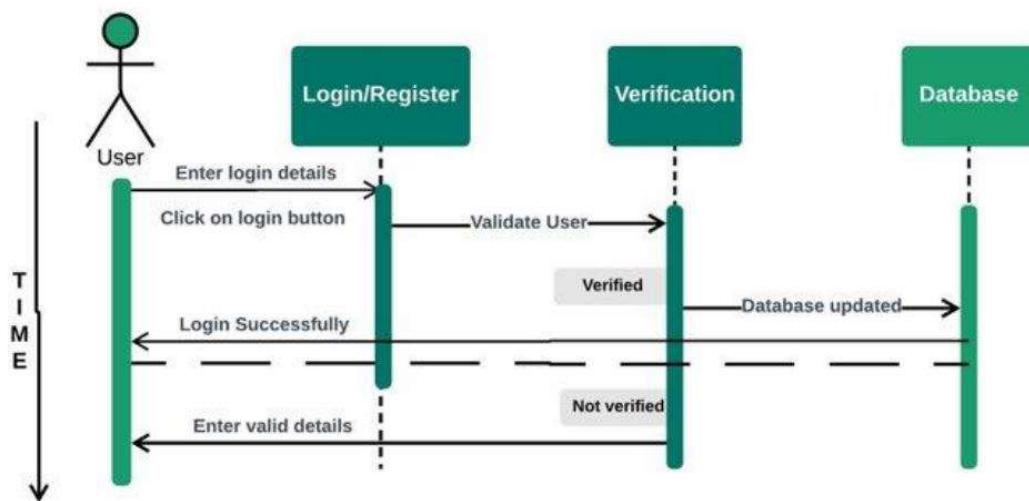


Figure 3.3: Login Sequence Diagram

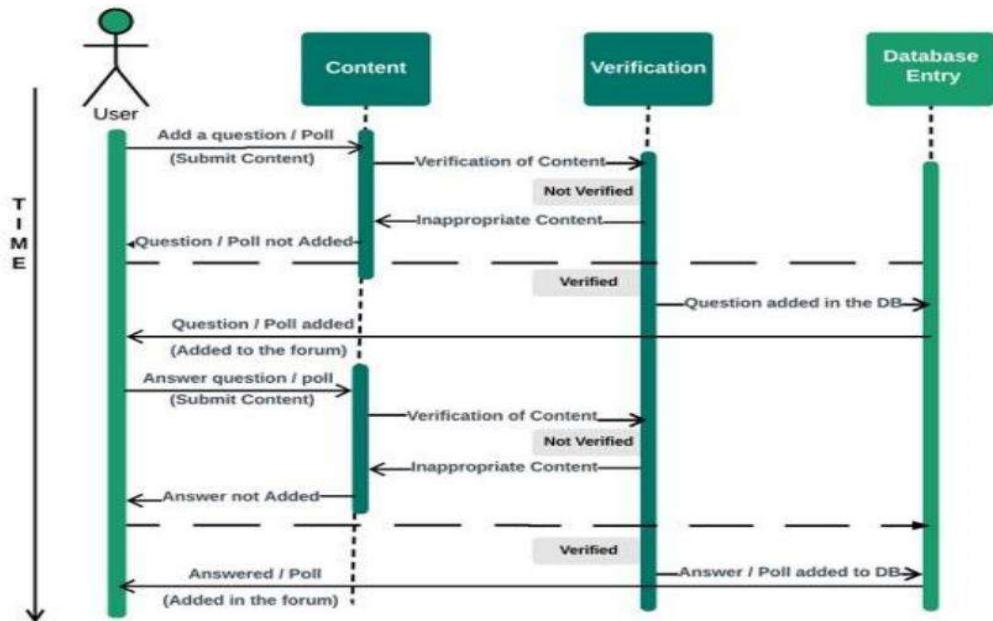


Figure 3.4: User Sequence Diagram I

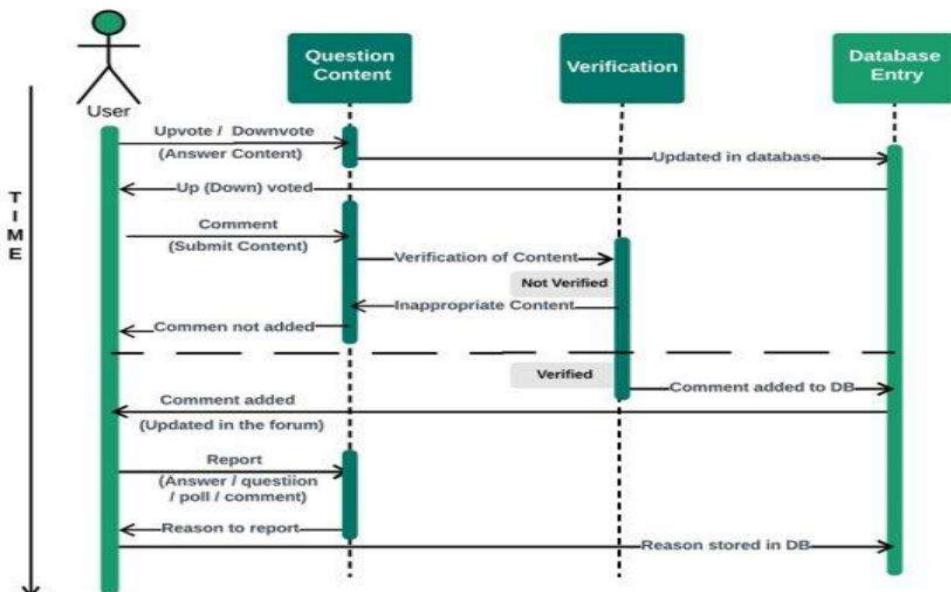


Figure 3.5: User Sequence Diagram II

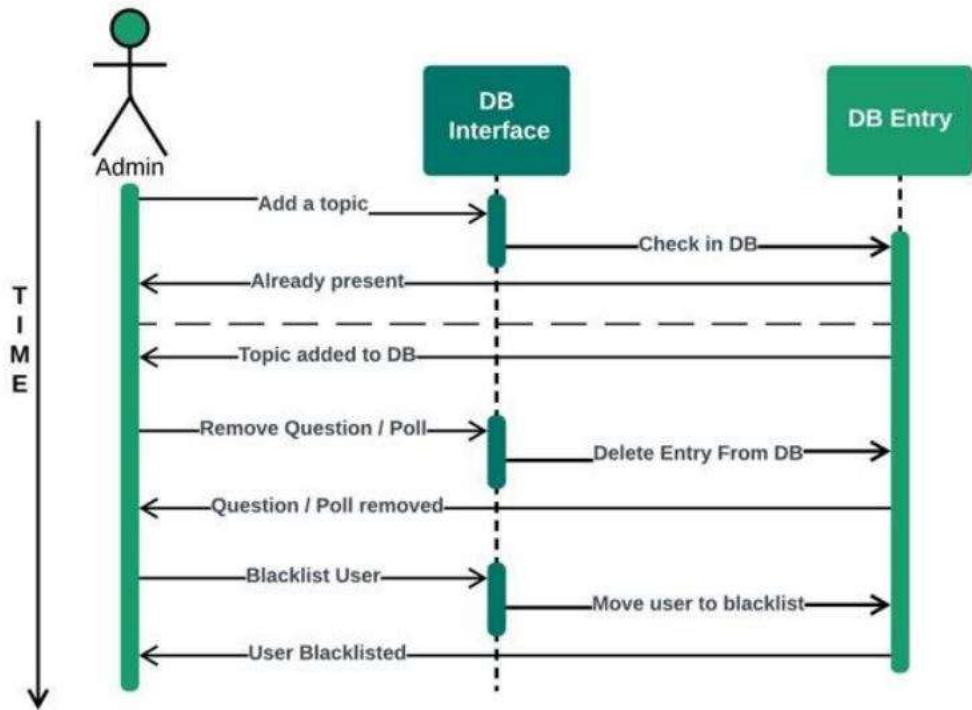


Figure 3.6: Admin Sequence Diagram

CHAPTER 4

SYSTEM DESIGN

4.1 System Activities

4.1.1 User Registration and Login

To use the forum, users must register using their college email address. They can access the system after registering by entering their email address and password. Registration may involve additional details such as name, profile picture, and optional fields to personalize their user profile.

4.1.2 Posting and Viewing Questions

Users can see questions asked by others and post their own inquiries about a specific subject. They can provide a clear title and description for their question, categorize it under relevant topics or tags, and include any supporting information to provide context for other users.

4.1.3 Posting and Viewing Answers

Users can post responses to queries and read those posted by others. They have the option to provide detailed and informative answers, including explanations, references, and supporting materials. They can also engage in discussions within the comment section of each answer, allowing for further clarification or different perspectives.

4.1.4 Recommendation Engine

Based on a user's interests and prior behaviour, the system employs a recommendation engine to present pertinent queries and answers. The recommendation system analyzes user activity, such as the questions they have asked, the answers they have provided, and the topics they have shown interest in, to suggest relevant content. This enhances user engagement by providing personalized and tailored recommendations for their specific interests.

4.1.5 User Profile Management

Users have control over their profiles and can manage various aspects of their information and settings. They can update their personal details, such as their bio, profile picture, and contact information. They can also modify their notification preferences, choose their preferred privacy settings, and review their activity history, which includes a record of their questions, answers, upvotes, and other contributions to the forum.

4.2 Architecture Diagram



Figure 4.1: 3-Tier Architecture Diagram

Client:

Users who access the online discussion forum via a web browser or a specific application are represented by the client. To communicate with the forum, they submit HTTP requests to the web server.

Server Web:

The web server is in charge of receiving and processing client requests. It acts as a bridge between the client and the database. It accepts HTTP requests from clients, executes required operations, and generates appropriate answers.

The web server administers the online discussion forum's business logic, such as user authentication, handling forum posts, comments, user profiles, and other features. It communicates with the database in order to retrieve or save information needed to handle client requests.

Database:

The database stores and controls the online discussion forum's permanent data. Tables are included to hold user information, forum posts, comments, and other pertinent data.

The web server communicates with the database to conduct tasks like saving new posts, retrieving posts and comments, updating user profiles, and assisting with user authentication. The database receives and processes web server queries before returning query results to the web server.

4.3 Class Diagram

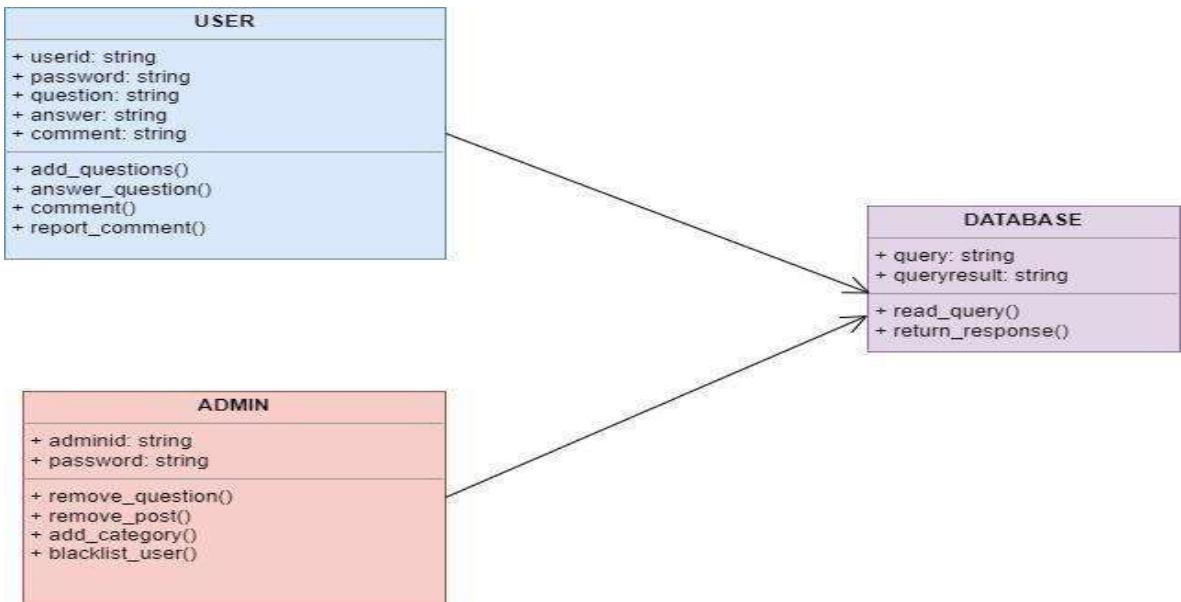


Figure 4.2: Class Diagram

A class diagram is a type of UML diagram that shows the structure of a software system. It consists of classes, which represent objects in the system, and their relationships. In the class diagram, there are three classes: User, Admin, and Database.

The User class has the following attributes:

userid: A unique identifier for the user.

password: The user's password.

question: A question that the user has asked. **answer:** The answer to the user's question.

comment: A comment that the user has made. The Admin class has the following attributes:

adminid: A unique identifier for the admin.

password: The admin's password.

The Database class has the following attributes:

query: A query that can be executed against the database.

Query result: The result of executing the query.

The User and Admin classes have an association relationship with the Database class. This means that a User or Admin can access the Database to execute queries and retrieve results. The association relationship is represented by a line between the two classes. The line has an arrow head at the end that points to the Database class. This indicates that the association is one-way. In other words, a User or Admin can access the Database, but the Database cannot access the User or Admin.

4.4 ER Diagram

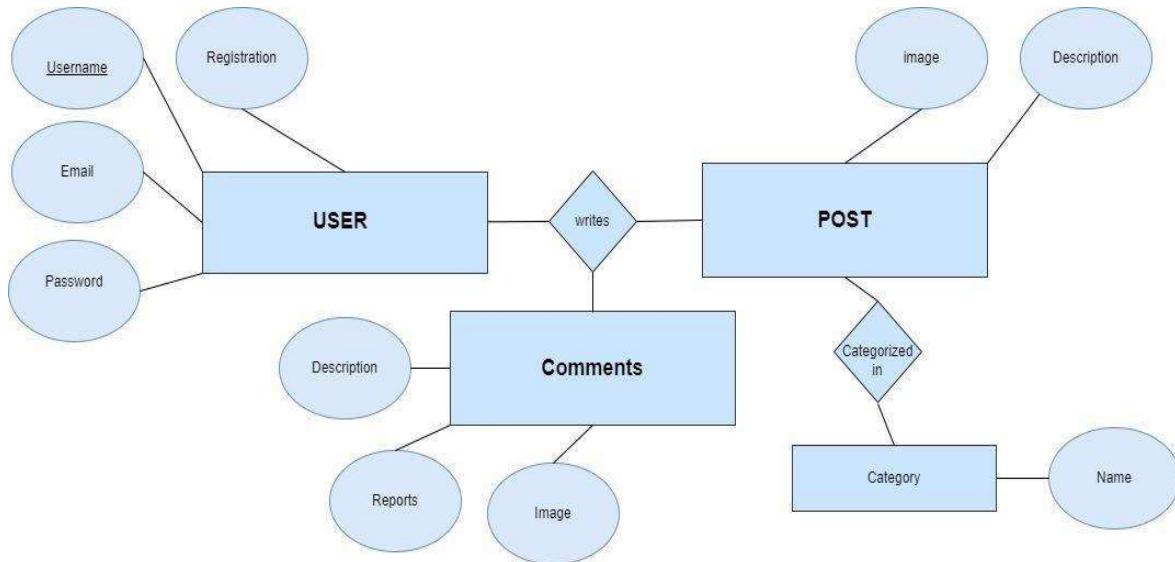


Figure 4.3: ER Diagram

The user entity is a user with a unique username, password, and email address. The post entity is a post with a title, content, date, and author. The comment entity is a comment with a content, date, author, and post. The write relationship is the fact that a user can write a post and a post can have many comments. The 1 on the Post side indicates that a post can have one or more

comments, and the N on the Comment side indicates that a comment can be associated with one or more posts.

4.5 Database Schema Diagram

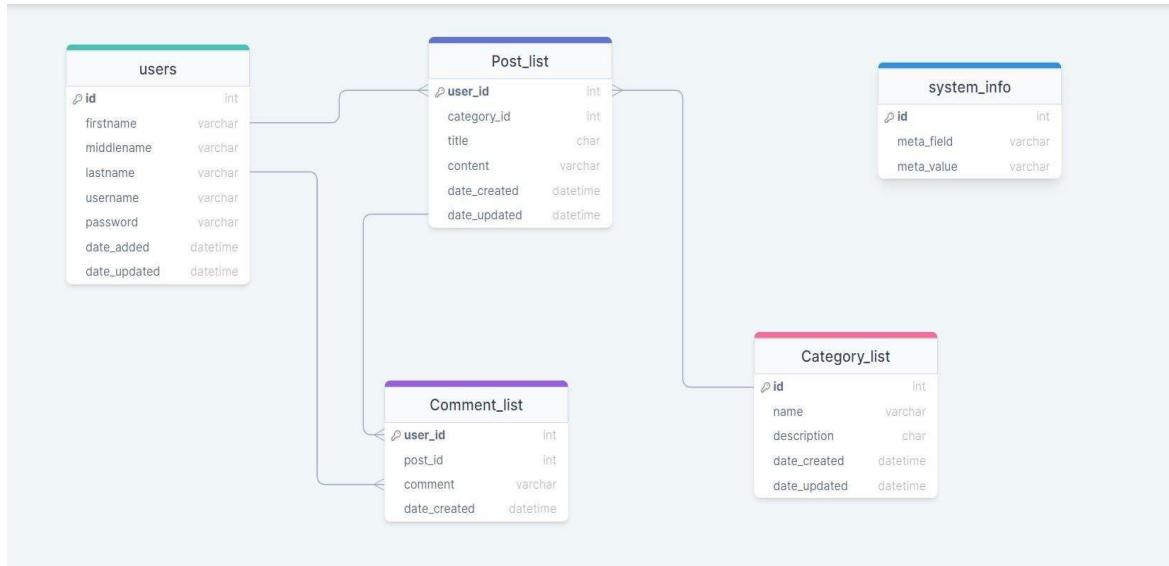


Figure 4.4: Database Schema Diagram

This schema defines five tables: users, posts, categories, comments, and system info. Users include username, password, email address, and ID. Posts include title, content, date, author ID, and category ID. Categories include name, comment, and version number. Comments include content, date, author ID, and post ID. System Info includes version number etc.

4.6 Test Cases

1. User Registration:

- a) Verify that users can successfully register with valid information.
- b) Test registration with invalid or incomplete information and ensure appropriate error handling.

2. User Login:

- a) Validate that registered users can log in with their credentials. Test login with incorrect credentials and verify error messages.
- b) Create a post and verify that it appears correctly in the forum. Test commenting on a post and Test commenting on a post and ensure the comment is displayed accurately.

3. Content Recommendation:

- a) Validate that the recommender system provides personalized recommendations based on user behaviour and preferences.
- b) Test recommendation accuracy by comparing recommended content with user interests and engagement history

4. Search Functionality:

- a) Test the search feature to ensure it returns relevant results based on keywords or tags.
- b) Verify that search results are displayed in a user-friendly and intuitive manner.

5. User Profile Management:

- a) Test updating user profile information, such as name, profile picture, and bio, and ensure the changes are reflected correctly.
- b) Validate that users can manage their notification preferences and privacy settings.

6. Security Testing:

- a) Test for vulnerabilities such as SQL injection, cross-site scripting (XSS), and cross-site request forgery (CSRF) to ensure robust security measures are in place.
- b) Validate the implementation of proper authentication and authorization mechanisms to protect user data and prevent unauthorized access.

7. Performance and Scalability:

- a) Conduct stress testing to determine the platform's performance under heavy user load and ensure it remains responsive and stable.
- b) Measure the platform's scalability by simulating a growing user base and verifying that it can handle increased traffic and data storage requirements.

8. Compatibility:

- a) Test the platform on different web browsers (Chrome, Firefox, Safari, etc.) and verify consistent functionality and display.
- b) Validate responsiveness and compatibility across various devices (desktops, tablets, mobile devices) and different screen resolutions.

9. Usability and User Experience:

- a) Conduct user testing sessions to gather feedback on the platform's usability, intuitiveness, and overall user experience.

- b) Make necessary improvements based on user feedback to enhance the platform's usability and user satisfaction.

These test cases cover various aspects of the online discussion forum platform with a recommender system, ensuring its functionality, security, performance, and user experience are thoroughly tested and validated.

4.7 System Implementation

The general specification of the online discussion forum site (ODFS)

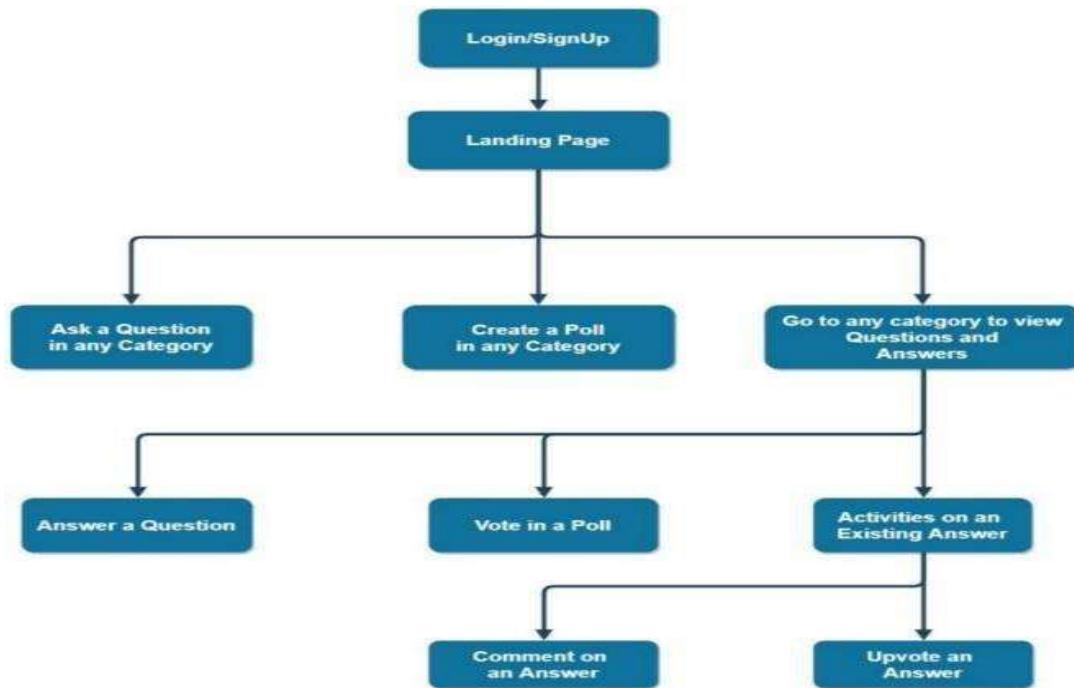


Figure 4.5: Flow Diagram

CHAPTER 5

RESULT AND IMPLEMENTATION

5.1 Tables

Table 5.1: User Feed Data

Field	Data Type	Description
User ID	Integer	Unique identifier for each user
First Name	String	User's first name
Last Name	String	User's last name
Email	String	User's email address
Password	String	Encrypted password for user authentication
Avatar	String	URL or file path to the user's profile picture

Table 5.2: User Data

Field	Data Type	Description
Post ID	Integer	Unique identifier for each post
User ID	Integer	Unique identifier for each user
Title	String	Title of the post
Content	Text	The actual content of the post
Timestamp	Date Time	The date and time when the post was created
Comments	String	Comments on the post

5.2 Technology Used

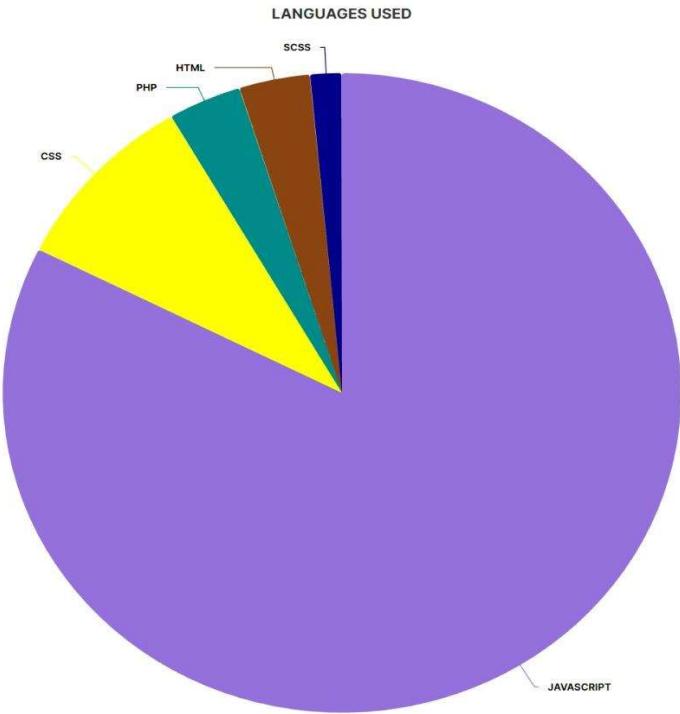


Figure 5.1: Languages Used

XAMPP v3.3.0: XAMPP is a popular open-source web server solution that provides an environment for developing and testing web applications. It includes Apache, MySQL, PHP, and Perl, making it convenient for setting up a local development server.

PHP: PHP is a server-side scripting language used for developing dynamic web applications. It enables the execution of server-side code to generate dynamic web pages, interact with databases, handle form submissions, and perform various server-side tasks.

MySQL Database: MySQL is a widely-used relational database management system (RDBMS) known for its scalability, performance, and ease of use. It is commonly used in web applications to store and manage structured data efficiently.

HTML: HTML (Hypertext Markup Language) is the standard markup language for creating web pages. It provides the structure and content of a web page, defining elements such as headings, paragraphs, images, links, and more.

CSS: CSS (Cascading Style Sheets) is a stylesheet language used to describe the presentation and styling of HTML documents. It allows developers to control the layout, colors, fonts, and other visual aspects of web pages.

JavaScript: JavaScript is a versatile programming language that runs in the browser and enables dynamic interaction and behaviour on web pages. It is used to create interactive elements, handle user events, validate form inputs, and perform client-side data manipulation.

Ajax: Ajax (Asynchronous JavaScript and XML) is a web development technique that allows for asynchronous communication between the browser and the server. It enables data to be exchanged with the server without reloading the entire page, resulting in a more seamless and responsive user experience.

jQuery: jQuery is a popular JavaScript library that simplifies HTML document traversal, event handling, and animation. It provides a concise and efficient way to write JavaScript code and perform common tasks in web development.

Bootstrap: Bootstrap is a widely-used CSS framework that provides a set of pre-designed components and styles to build responsive and mobile-friendly web interfaces. It helps developers create consistent and visually appealing layouts quickly.

Font Awesome: Font Awesome is a library of scalable vector icons that can be easily customized and integrated into web projects. It offers a wide range of icons for various purposes, enhancing the visual appeal and usability of web applications.

AdminLTE: AdminLTE is a popular open-source admin dashboard template built with Bootstrap. It provides a responsive and customizable user interface for managing the backend of web applications. AdminLTE offers a variety of components, styles, and plugins for creating a feature-rich admin panel.

By utilizing these technologies and tools, the project benefits from a robust development environment, efficient server-side processing, structured data storage, flexible styling options, dynamic client-side interactions, responsive design, and a comprehensive admin dashboard for efficient management.

5.3 Major Functions

5.3.1 User-Side Functions

Login and Registration: Users can log in using their credentials or register for a new account.

Home Page: The home page displays featured content and announcements.

Topic Listing: Users can browse through a list of published topics and use a search feature to find specific ones.

Topic Categories Page: This page lists all active topic categories, allows for category search, and displays category descriptions.

Add Post Page: Users can create new posts by filling out a form with a title, description, category selection, and additional details.

My Post Page: Users can view a list of topics they have created, with the ability to search for specific ones.

Edit or Update Posted Topic: Users can edit or update their posted topics, including modifying the title, description, and category.

Comment Section: Users can engage in discussions by posting comments on topics.

Account Management: Users can update their account details and credentials, and log out of the system.

5.3.2 Admin Side Functions

Home Page: The admin home page displays a summary and relevant image.

Category Management: Admins can add, list, view, edit, and delete topic categories.

Post Management: Admins can create, list, view, edit, and delete posts.

Comment Section: Admins have the ability to delete comments posted by users.

User Management: Admins can add new users, list all users, view user details, edit user information, and delete user accounts.

System Information Update: Admins can update system-related information, such as forum settings or announcements.

Account Management: Admins can update their account details and credentials, and log in and out of the system.

5.4 Results

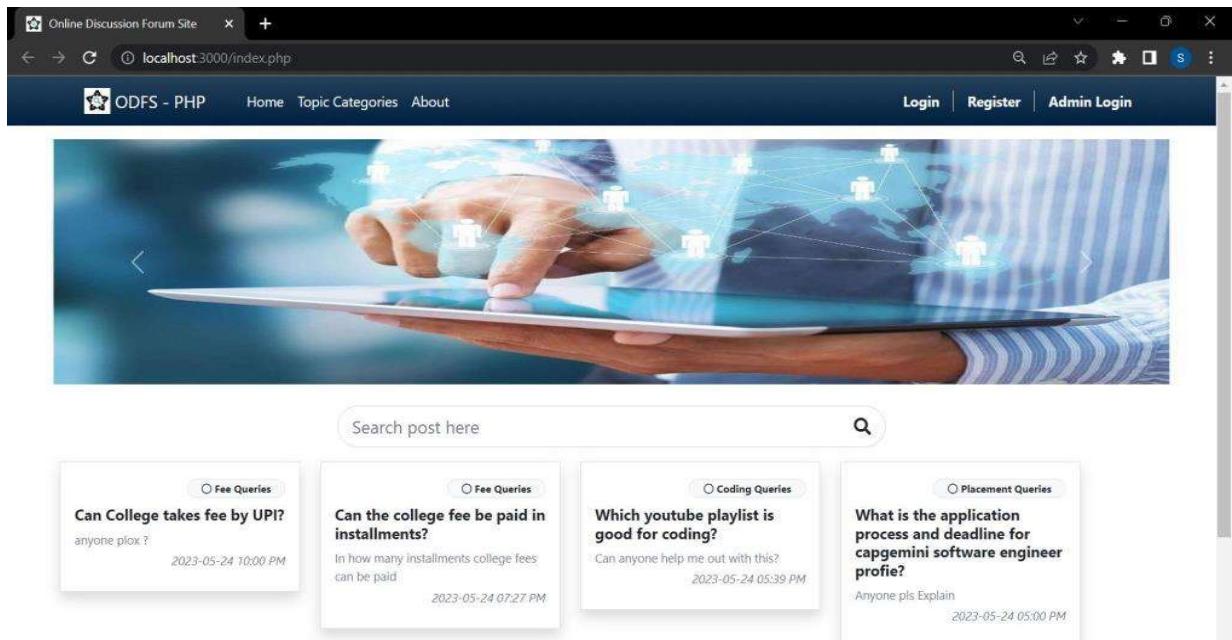


Figure 5.2: Home Page

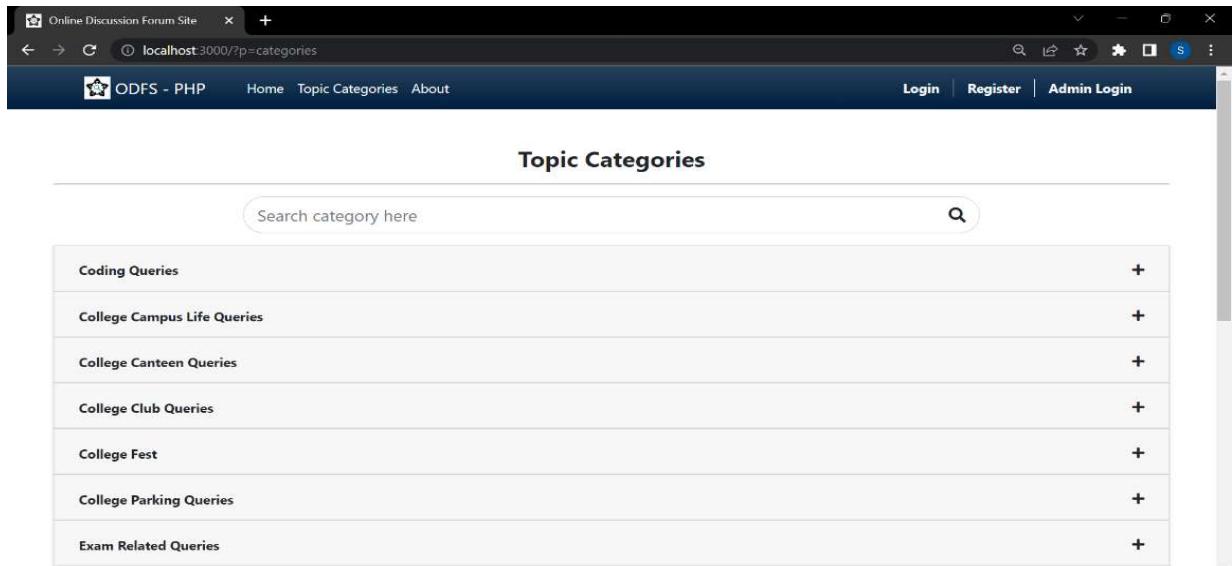


Figure 5.3: Topic Categories

The screenshot shows a web browser window titled "Online Discussion Forum Site" with the URL "localhost/odfs/?p=about". The page has a dark header bar with the logo "ODFS - PHP", navigation links "Home", "Topic Categories", and "About", and user links "Login", "Register", and "Admin Login". The main content area has a white background and features a large title "About Us". Below the title is a paragraph of text describing the forum's purpose and features. Another paragraph highlights the integration with an educational institute's email system. At the bottom, there is a brief summary of the forum's overall purpose and value.

The online forum is a comprehensive platform designed to facilitate effective interaction, exposure, and communication for its users. It serves as a one-stop destination for individuals to engage in discussions, share knowledge, and seek guidance from a community of users. The primary goal of the forum is to offer users an opportunity to enhance their knowledge and broaden their perspectives by actively participating in various activities. The platform fosters a collaborative environment where individuals can exchange ideas and learn from one another by providing a space for users to answer questions, vote in polls, and engage in discussions.

One notable feature of the forum is its integration with an educational institute's email system. This integration enables students of the institute to sign up using their official email IDs, ensuring that the platform remains exclusive to the institute's community. Users can access the website's features and resources by utilizing their institute's email ID for authentication, creating a sense of belonging and a secure environment. Authorized users on the platform enjoy additional privileges and facilities. For instance, they can initiate discussions by asking questions on any of the pre-defined topics, allowing them to seek answers and opinions from the community. Additionally, users can provide answers to questions posed by others, sharing their expertise and contributing to the community's collective knowledge. The forum also allows users to request polls, providing an interactive way to gather opinions and insights from the community. This feature promotes engagement and encourages users to actively participate in shaping the discussions and decision-making processes.

Overall, the online forum serves as a hub for knowledge sharing, discussions, and communication. It aims to empower users to enhance their understanding, gain exposure to diverse perspectives, and find the right direction for their queries. By offering a platform that combines user-generated content, interactive polls, and a secure login system, the forum promotes meaningful interactions and provides a valuable resource for the institute's community.

Figure 5.4: About Us

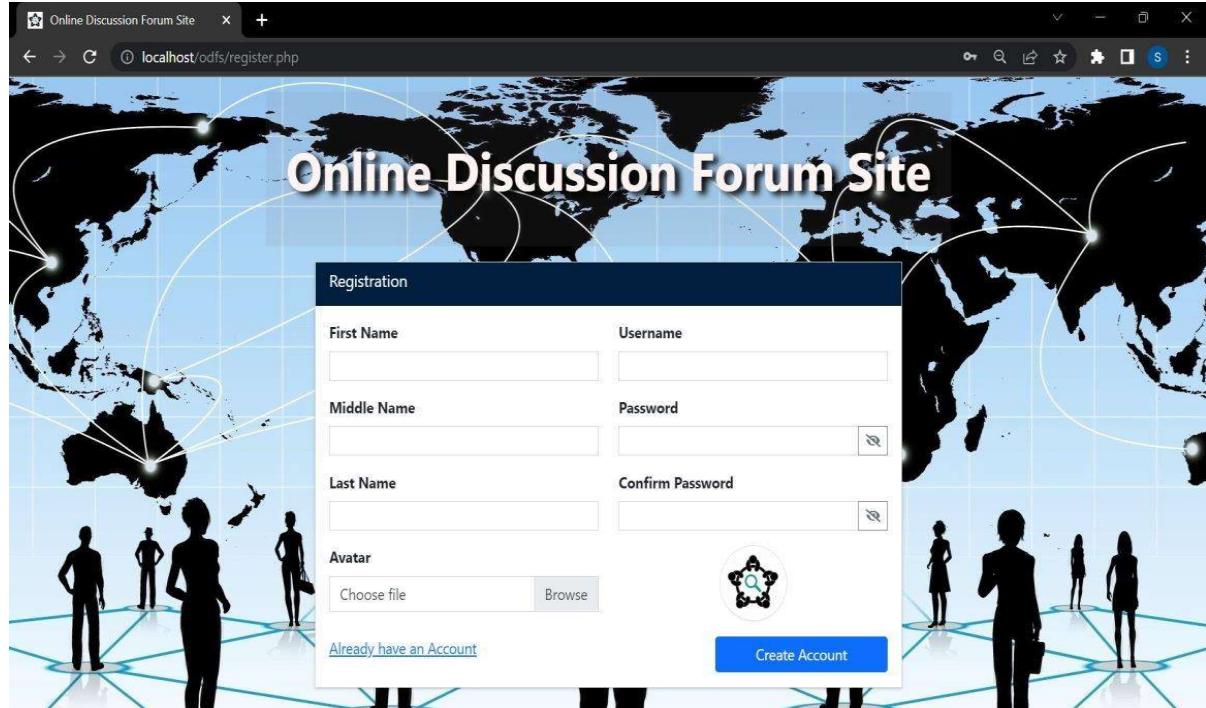


Figure 5.5: Registration Page

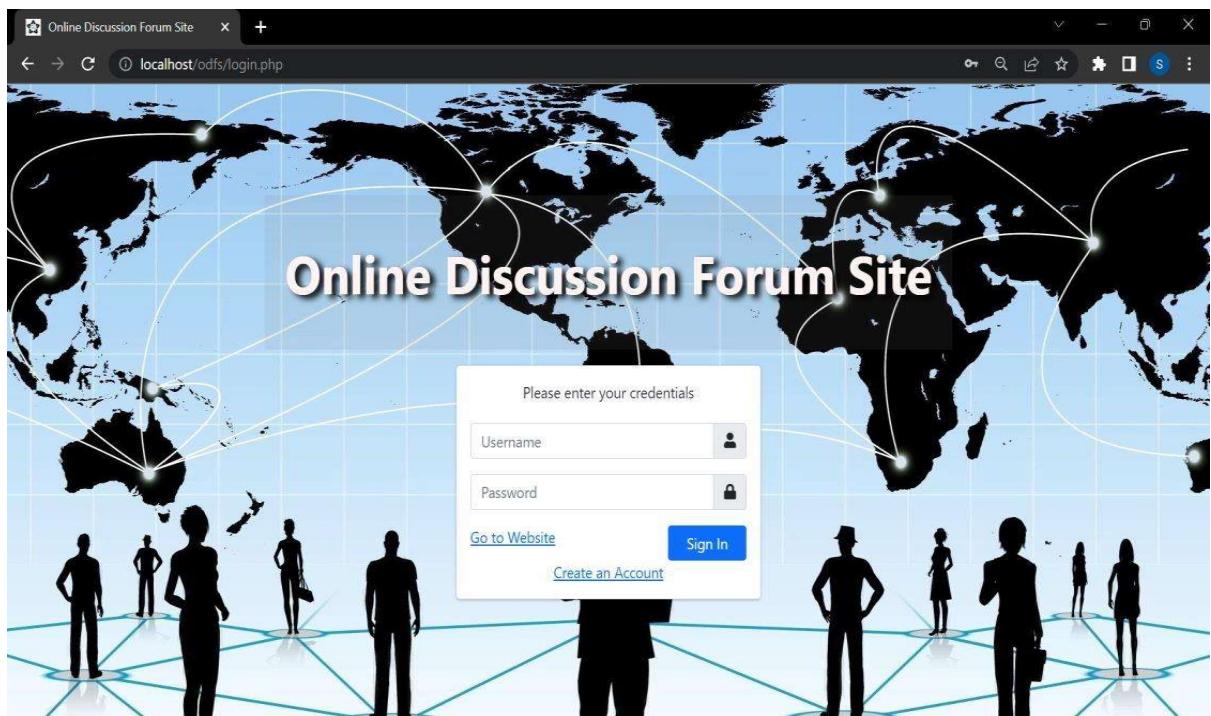


Figure 5.6: Login Page

A screenshot of a web browser showing the "Add New Topic" page of the Online Discussion Forum Site. The URL in the address bar is "localhost/odfs/?p=posts/manage_post". The top navigation bar includes links for Home, Topic Categories, About, Recommended, Add Post (with two sub-options), My Posts, and Aastha Gupta's profile. The main form has a title "Add New Topic" and a "Title" input field. Below it is a "Category" dropdown menu with the placeholder "Please Select Category Here". The "Content" section features a rich text editor toolbar with various icons for bold, italic, underline, etc., followed by a text area with the placeholder "Write your content here".

Figure 5.7: Add Post

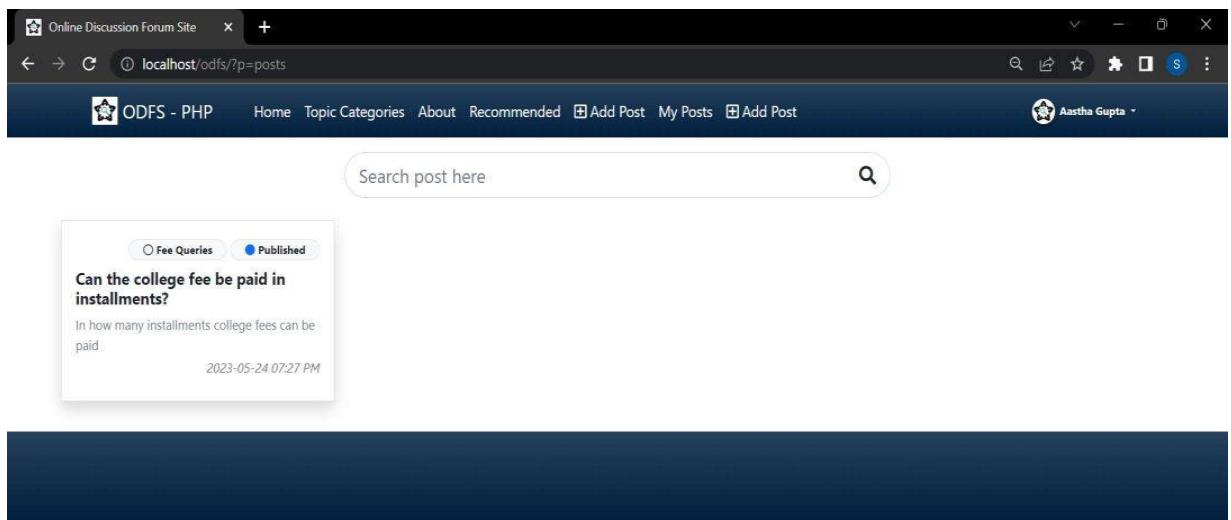


Figure 5.8: Recommended Post

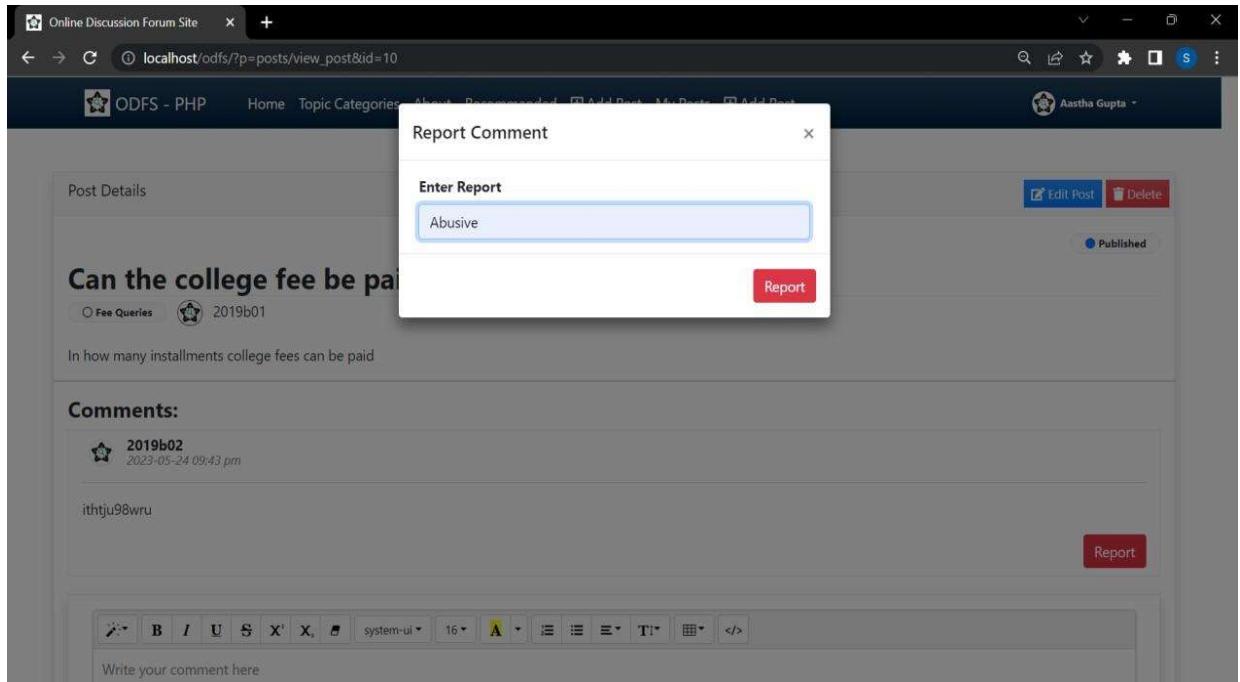


Figure 5.9: Report Comment

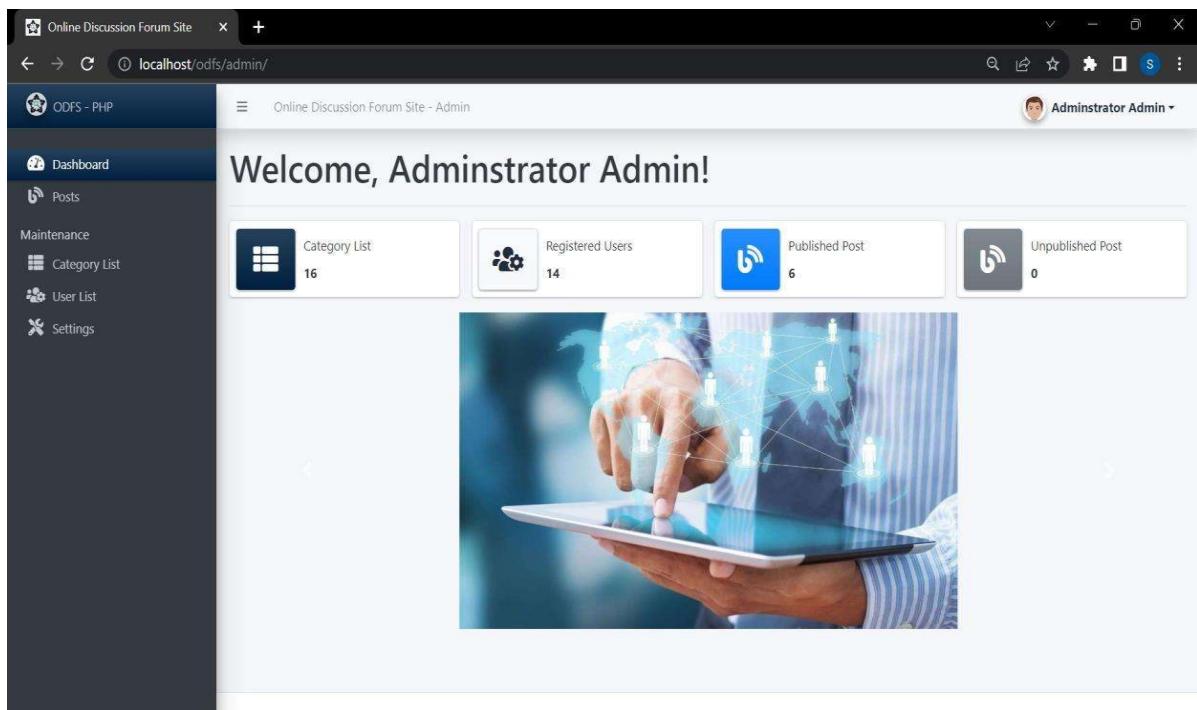


Figure 5.10: Admin Dashboard

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

In conclusion, this project has successfully developed an online discussion forum with a separate recommender system dashboard, tailored specifically for academic institutions. The integration of the recommender system has significantly enhanced the user experience by providing personalized content recommendations, promoting engagement, and facilitating effective knowledge sharing among students, faculty, and researchers.

6.1 Performance Evaluation

Performance evaluation of the platform has demonstrated positive results. User feedback indicates increased satisfaction with the personalized recommendations, as it enables users to discover relevant discussions more efficiently. The system's ability to analyze user behaviour and post content has contributed to a more tailored and engaging experience for users, leading to improved participation and collaboration within the academic community.

6.2 Comparison with existing state-of-the-art technologies

Comparison with existing state-of-the-art technologies reveals the advantages of the developed platform. Traditional online forums often lack the personalized and targeted approach that the recommender system offers. By leveraging machine learning algorithms, the system surpasses existing technologies by delivering accurate and relevant recommendations based on individual user preferences and interests. This enhances the overall effectiveness of the platform and sets it apart from other generic online forum platforms.

6.3 Future Scope

Looking towards future directions, there are several areas for potential expansion and improvement. Firstly, the inclusion of advanced natural language processing techniques and sentiment analysis could further enhance the recommendation engine, allowing for more nuanced content suggestions. Additionally, incorporating social interaction features, such as user ratings and comments, could foster a more interactive and engaging environment for users. Furthermore, the platform could be expanded to include collaborative features, such as group discussions and project collaboration spaces, enabling students and researchers to work together on academic projects. Integration with external data sources, such as research databases or academic journals, could also enrich the platform's content and provide users with access to a broader range of academic resources.

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APPENDIX

A. RESEARCH PAPER

Online Discussion Forum For Academic Institution

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Abstract. We are building a platform, for college students to converse and exchange ideas. Students can ask questions and get immediate answers from professors, alumni, and colleagues. Students can register using the institution's email and benefit from features like asking questions, responding to them, and making polls. The website intends to offer a centralized venue for efficient interaction and conversation, enabling users to learn more by conversing with other users.

Keywords: Effective Interaction, Alumni, Institution's email

1 Introduction

Discussion forums have been a popular platform for students to communicate and ask questions about a certain subject in recent years. Some educational institutions have acknowledged the necessity for such forums to fill in the gaps left by the lack of social interaction amongst students and give them a direct channel for asking inquiries or discussing tasks. Traditional discussion forums, however, do not provide students with the individualized support and direction they need. Instead, they could have trouble locating pertinent subjects or getting the answers to their questions.

We suggest implementing a recommender system in a forum for academic discussion for a certain college to address this problem in a very less time. Using data analytics techniques, the recommender system would make pertinent suggestions for conversations or topics based on the students' interests, past searches, and activity history. The faculty would be better able to grasp their students' interests and learning objectives thanks to this individualized approach, which would also increase student involvement and forum participation. By requiring students to spend less time and effort looking for pertinent material, the approach may also increase the forum's effectiveness and efficiency.

We hope to show the targeted college how well a recommender system integrated within an academic discussion forum may improve the quality of student involvement and learning outcomes and get resolved their queries in very less time.

2 Literature Survey

In this section all the major's discussion forum work are discussed. Nor Fariza, Nor Mohd, Nor Razak, Norizan, and Jamaluddin Aziz [1] investigates if there is evidence of shared knowledge production among students through collaborative learning behaviors by looking at preliminary data from an online discussion forum in a Masters level (MA) course.

Victor Emmah and Helen Biriyai [2] highlights the elements of an online forum's design and functionality that make it a useful tool for lecturers and students at an university to communicate with one another.

Bute, M.S., Adamu, M.K. Ahmed, and U.M. Abubakar [3] In order to bridge the communication gap between lecturers and students outside of the classroom, tertiary institutions should develop a robust interaction platform for students and lecturers that includes features like instant messaging, file sharing, notifications, asking for and adding friends to one's friends list, and discussion forums.

The authors Anderson, Garrison, and Archer [4]. Assist an educational experience by providing conceptual structure and a tool for the usage of computer-mediated communication (CMC) and computer conferencing.

In order to debate the social, ethical, legal, and managerial concerns related to information technology and biotechnology, Abel, F., Bittencourt, I. I., Costa, E., Henze, N., Krause, D., and Vassileva, J. [5] established an

online community. Additionally, by modelling and displaying the asymmetrical relations created while reading, assessing, or commenting on the contributions of other community members, it serves as a tool for encouraging engagement in interest-based online communities. This engages noncontributing members.

Sun et al. [5] remember earlier studies in which the idea of e-learning was unaffected by information technology. But it seems to be the case that it is. Some pupils also mention the sporadic technological issues (connected with MS Teams, lack of Internet, some overloads, problems with turning on [11] camera, etc.

According to the respondents, distant learning makes students tired because they spend too much time in front of computers, which is also linked to worries about eye health. They are generally aware that distant learning and the resulting decline in physical activity may have a detrimental effect on health. What's crucial is that some students acknowledge how difficult it is to collaborate with other students when learning remotely: "Involvement in group work dropped significantly, the students around me at the university stopped being active, helpful, and everyone prefers to be isolated, putting daily responsibilities over online duties."

According to a survey on student learning experiences with online discussion boards, students acknowledged the contribution that online discussion boards may make to their studies, but they stressed that the medium should be used in conjunction with other teaching and learning methodologies. If appropriately utilised, online discussion forums have a lot of potential to promote the fulfilment of teaching-learning objectives. As a result, it is hoped that the current study will contribute to the expanding understanding of online discussion forums in order to foster engagement and the use of technology in education.

To maximise the benefits of online discussion forums in education, they must be integrated within a holistic educational strategy. To enrich their learning experiences, students stressed the significance of mixing online conversations with face-to-face contacts, lectures, and practical activities. Educators can foster active involvement, critical thinking, and collaborative learning among students by properly utilising online discussion boards.

Furthermore, the purpose of this research is to shed light on best practises for using online discussion forums, taking into account elements such as facilitation approaches, clear guidelines, and quick feedback from instructors. These elements all contribute to the development of a friendly and engaging online learning environment in which students are encouraged to actively engage and exchange ideas.

3 Methodology

We suggest the following approach to create an online discussion forum for academic institutions with a recommender system:

Requirements Gathering: In order to understand the needs and expectations of students, staff, and administrators for the discussion forum, we will conduct surveys and interviews with them. The constraints that the recommender system can address will also be determined by an analysis of the current discussion forums.

System Design: The system architecture and database schema will be created based on the requirements gathered. The design will incorporate the creation of a recommender system that may offer students individualized suggestions based on their interests, activity history, and previous searches.

Implementation: Using web programming tools like HTML, CSS, and JavaScript, we will put the intended system into practice. The recommender system will be implemented using machine learning algorithms, together with PHP and MySQL for the backend development.

Testing: The discussion forum and the recommender system will be tested for usability and functionality. We will evaluate the system's performance, security, and scalability.

Deployment: Students, teachers, and administrators will be able to use the system once it has been deployed on a web server.

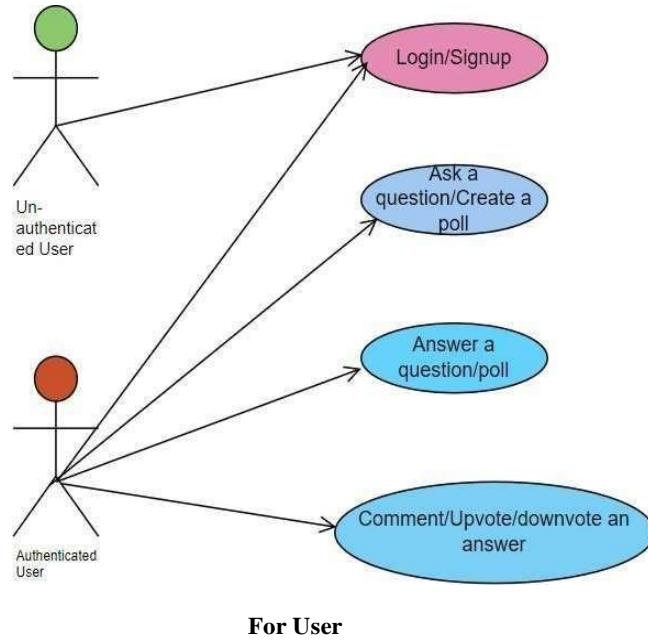
Maintenance and Support: To guarantee the system's continued usability and functionality, we will offer ongoing maintenance and support. In order to further improve the system's capabilities and effectiveness, we will also gather user input.

By using this methodology, we hope to create a recommender system-equipped online discussion forum for academic institutions that will improve user experience all around and student engagement and learning outcomes.

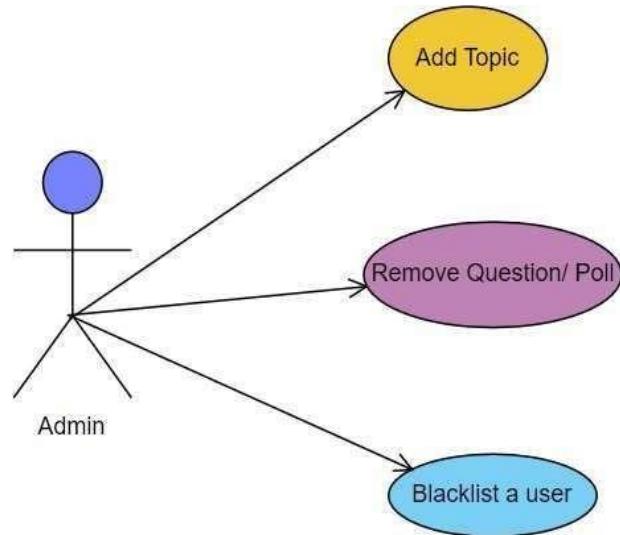
3.1 System Design

An online discussion forum's system design comprises of a back-end server and a user interface on the front end. Users can engage with the system through the front-end interface by publishing , questions, and answers. The back-end server handles user queries, organizes data, and uses a recommendation engine to deliver pertinent recommendations.

The client-server design of the system uses the front end as the client and the back end as the server. Whereas the back-end is created using server-side programming languages like PHP, Python, the front-end is created using web technologies like HTML, CSS, and JavaScript. A database management system is also incorporated into the system design to store and access user data.



For User



For Admin

Fig-1: System Overview

3.2 System Activities

The system activities for an online discussion forum include:

User registration and login: To use the forum, users must register using their college email address. They can access the system after registering by entering their email address and password.

Posting and viewing questions: Users can see questions asked by others and post their own inquiries about a specific subject. Also, they can look for questions using particular keywords.

Posting and viewing answers: Users have the ability to post responses to queries and read those posted by others. Based on how beneficial they think an answer is, they can upvote or downvote it.

Creating and participating in polls: Users can design polls on particular subjects and invite other people to take part in them. People can also take part in polls that other people make.

Recommendation engine: Based on a user's interests and prior behaviour, the system employs a recommendation engine to present pertinent queries and answers.

User profile management: By changing their choices, updating their personal information, and examining their activity history, users may manage their profiles.

Moderation: To make sure that the posted content is appropriate and does not break any rules, the system has moderating features. Those who break the rules can be banned and offensive information can be removed by moderators.

3.3 Database Schema Diagram

Making sure the database is properly designed utilizing MySQL server technology is crucial. The first stage in designing was to choose which tables should be built and what kind of information each one should contain based on the project's requirements and standards.

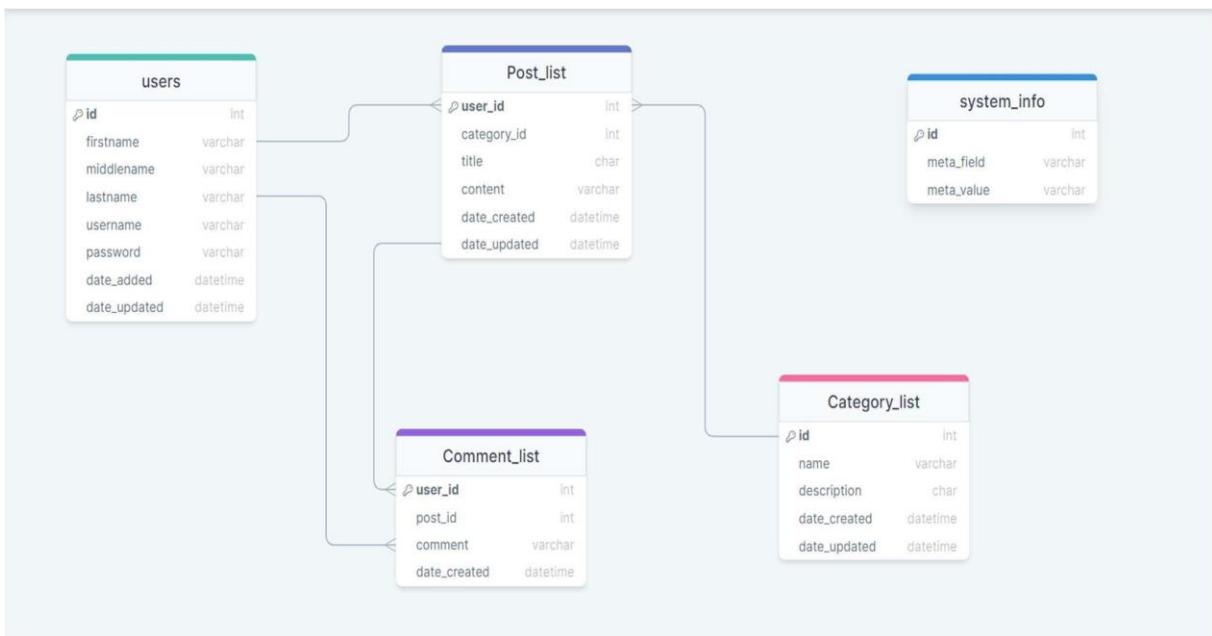


Fig-2: Database Schema Design

3.4 System ER Diagram

Entities such as users, posts, topics, and categories are common in online discussion forums. The ER diagram depicts how these entities are related to one another via various relationships, such as one-to-one, one-to-many, or many-to-many connections.

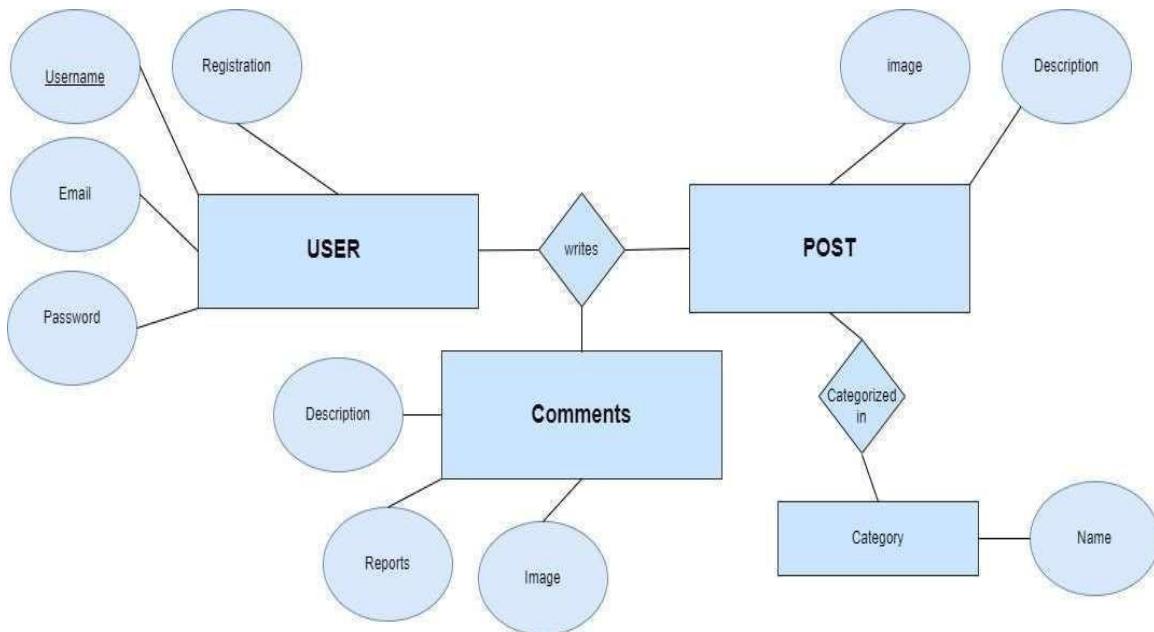


Fig -3: ER Diagram

3.5 System Implementation

The general specification of the online discussion forum site (ODFS).

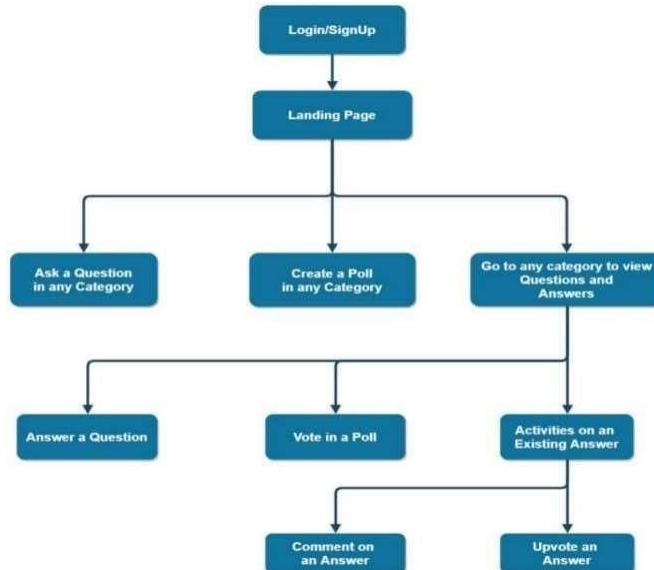


Fig-4: Flow Diagram

3.6 System Interface

Users can engage with the system by logging in in two different ways: as an administrator or a student.



Fig-5: User Interface

The image shows the admin interface of the online discussion forum. On the left is a dark sidebar with the logo "ODFS" and navigation links: "Dashboard", "Posts", "Maintenance" (with "Category List", "User List", and "Settings" sub-links), and "Settings". The main area has a header "Online Discussion Forum Site - Admin" and a welcome message "Welcome, Administrator Admin!". Below this are four stats boxes: "Category List" (10), "Registered Users" (15), "Published Post" (6), and "Unpublished Post" (0). A large image of a hand interacting with a tablet displaying a network of people is centered in the main area.

Fig-6: Admin Interface

3.7 Result

The created platform gave students a centralized location to interact and work together with college colleagues, faculty members, alumni, and classmates. Students could post questions, respond to already asked questions, and design polls using the site. The pupils were able to access the platform by logging in with the email account associated with their school, which allowed them to keep using the service.

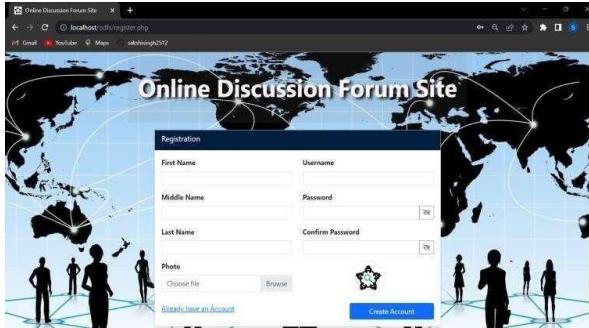


Fig-7: Registration Page

Fig-8: Topic Categories

Fig-9: Update User Details

Fig-10: Admin Dashboard

Fig-11 Recommender System

Fig-12 Report

4 Conclusion

Online discussion forum offer chances for collaborative learning, inquiry-based learning, and the production and creation of new knowledge by students.

With this project, we are developing a solution that will facilitate effective communication between college levels, whether they be teachers, students, or alumni, and will offer a private platform that can be rigorously monitored by the admin or authorities. This platform will bring everyone together under one roof for effective communication, effective exposure, and the appropriate direction.

As a result, there will be more interaction between students and instructors from other sections and departments, which will improve the college's outcomes.

Acknowledgement

We would like to extend our sincere gratitude to everyone who gave us the chance to finish this report. We would especially like to express our gratitude to Ms. Lopamudra Mohanty , who has given her all to help the team complete their final year project.

Also, we would like to express our gratitude for the advice provided by the panels and other supervisors, particularly in regards to our project presentation.

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C. CODE OF THE PROJECT

Index Page-

```
<?php require_once('config.php'); ?>
<!DOCTYPE html>
<html lang="en">
<?php require_once('inc/header.php') ?>
<?php if($_settings->chk_flashdata('success')): ?>
<script>
$(function(){
    alert_toast("<?php echo $_settings->flashdata('success') ?>",'success')
})
</script>
<?php endif;?>
<body>
<?php require_once('inc/topBarNav.php') ?>
<?php $page = isset($_GET['p']) ? $_GET['p'] : 'home'; ?>
<?php
if(!file_exists($page.".php") && !is_dir($page)){
    include '404.html';
} else{
    if(is_dir($page))
        include $page.'/index.php';
    else
        include $page.'.php';
}
?>
<?php require_once('inc/footer.php') ?>

<div class="modal fade" id="uni_modal" role='dialog'>
    <div class="modal-dialog rounded-0 modal-md modal-dialog-centered" role="document">
        <div class="modal-content rounded-0">
            <div class="modal-header">
                <h5 class="modal-title"></h5>
            </div>
            <div class="modal-body">
            </div>
            <div class="modal-footer">
                <button type="button" class="btn btn-primary" id='submit' onclick="#uni_modal
form').submit()">Save</button>
                <button type="button" class="btn btn-secondary" data-dismiss="modal">Cancel</button>
            </div>
        </div>
    </div>
```

Login Page

```
<?php require_once('./config.php') ?>
<?php require_once('inc/sess_auth.php') ?>
<!DOCTYPE html>
<html lang="en" class="" style="height: auto;">
<?php require_once('inc/header.php') ?>
<body class="hold-transition login-page">
<script>
  start_loader()
</script>
<style>
body{
  background-image: url("<?php echo validate_image($_settings->info('cover')) ?>");
  background-size:cover;
  background-repeat:no-repeat;
  backdrop-filter: contrast(1);
}
#page-title{
  text-shadow: 6px 4px 7px black;
  font-size: 3.5em;
  color: #fff4f4 !important;
  background: #8080801c;
}
</style>
<h1 class="text-center text-white px-4 py-5" id="page-title"><b><?php echo $_settings->info('name') ?></b></h1>
<div class="login-box">
<!-- /.login-logo -->
<div class="card card-navy my-2">
<div class="card-body">
  <p class="login-box-msg">Please enter your credentials</p>
  <form id="ulogin-form" action="" method="post">
    <div class="input-group mb-3">
      <input type="text" class="form-control" name="username" autofocus placeholder="Username">
      <div class="input-group-append">
        <div class="input-group-text">
          <span class="fas fa-user"></span>
        </div>
      </div>
    </div>
    <div class="input-group mb-3">
      <input type="password" class="form-control" name="password" placeholder="Password">
      <div class="input-group-append">
        <div class="input-group-text">
```

```

        <span class="fas fa-lock"></span>
    </div>
</div>
</div>
<div class="row">
    <div class="col-8">
        <a href=<?php echo base_url ?>">Go to Website</a>
    </div>
    <!-- /.col -->
    <div class="col-4">
        <button type="submit" class="btn btn-primary btn-block">Sign
        In</button> </div>
    <div class="col-12 text-center">
        <a href=<?php echo base_url ?>register.php">Create an Account</a>
    </div>
    <!-- /.col -->
</div>
</form>
<!-- /.social-auth-links -->

<!-- <p class="mb-1">
    <a href="forgot-password.html">I forgot my password</a>
</p> -->

</div>
<!-- /.card-body -->
</div>
<!-- /.card -->
</div>
<!-- /.login-box -->

<!-- jQuery -->
<script src="plugins/jquery/jquery.min.js"></script>
<!-- Bootstrap 4 -->
<script src="plugins/bootstrap/js/bootstrap.bundle.min.js"></script>
<!-- AdminLTE App -->
<script src="dist/js/adminlte.min.js"></script>

<script>
$(document).ready(function(){
    end_loader();

    $('#ulogin-form').submit(function(e){
        e.preventDefault()
        var _this = $(this)

```

```

var el = $('<div>')
    el.addClass('alert alert-danger err_msg')
    el.hide()
$('.err_msg').remove()
if($('#password').val() != $('#cpassword').val()){
    el.text('Password does not match')
    _this.prepend(el)
    el.show('slow')
    $('html, body').scrollTop(0)
    return false;
}
if(_this[0].checkValidity() == false){
    _this[0].reportValidity();
    return false;
}
start_loader()
$.ajax({
    url:_base_url_+"classes/Login.php?f=login_user",
    method:'POST',
    type:'POST',
    data:new FormData($(this)[0]),
    dataType:'json',
    cache:false,
    processData:false,
    contentType: false,
    error:err=>{
        console.log(err)
        alert('An error occurred')
        end_loader()
    },
    success:function(resp){
        if(resp.status == 'success'){
            location.href = ('.')
        }else if(!resp.msg){
            el.html(resp.msg)
            el.show('slow')
            _this.prepend(el)
            $('html, body').scrollTop(0)
        }else{
            alert('An error occurred')
            console.log(resp)
        }
        end_loader()
    }
})

```

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Paper Title: Online Discussion Forum for Academic Institutions

Abstract:

We are building a platform, for college students to converse and exchange ideas. Students can ask questions and get immediate answers from professors, alumni, and colleagues. Students can register using the institution's email and benefit from features like asking questions, responding to them, and making polls. The website intends to offer a centralized venue for efficient interaction and conversation , enabling user to learn more by conversing with other users.

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