



Social Hive

(An Education Oriented Social Media App)

A Project Report

Submitted in partial fulfilment of the
Requirements for the award of the Degree of

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

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CERTIFICATE

This is to certify that the project entitled, "**SOCIAL HIVE**", is bonafide work of Yog Vasaikar and Preeth Kothari bearing KCTYIT61 and KCTYIT25 respectively submitted in partial fulfilment of the requirements for the award of degree of BACHELOR OF SCIENCE in INFORMATION TECHNOLOGY from HSNCU University.

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We are obliged to staff members of K.C. College for the valuable information provided by them in their respective fields. We are grateful for their cooperation during the period of our project.

Preeth Kothari & Yog Vasaikar

DECLARATION

I hereby declare that the project entitled, “**Social Hive**” done at **K.C. College**, has not been in any case duplicated to submit to any other university for the award of any degree. To the best of my knowledge other than me, no one has submitted to any other university. The project is done in partial fulfillment of the requirements for the award of degree of **BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)** to be submitted as final semester project as part of our curriculum.

Name and Signature of the Student

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ABSTRACT

Education is the cornerstone of personal and professional development, providing individuals with the knowledge and skills necessary to navigate and succeed in the world. Without reliable and comprehensive resources, students often find themselves struggling to grasp complex concepts and prepare effectively for exams.

"Social Hive" is an innovative social media web application designed to revolutionize student education. It features a comprehensive repository of study materials including PDF notes and textbook answers, facilitating easy access and preview. The platform encourages interactive learning through live posts for sharing questions, fostering real-time collaboration among students. Optional educational videos complement learning materials, enhancing understanding of complex topics. Access to previous year question papers aids exam preparation, while curated training questions reinforce learning objectives. This integrated approach harnesses technology to create a dynamic and supportive learning environment.

Keywords:

Social media, study materials, Q&A, educational videos, collaborative communities

CHAPTER 1

Chapter-1

INTRODUCTION

1.1 BACKGROUND

- Traditionally, education has been disseminated through physical classrooms, printed textbooks, and face-to-face interactions between teachers and students, often posed challenges such as limited access to resources, etc.
- With the advent of online education, students can now access pre-recorded lectures, digital textbooks, and online discussion forums from anywhere in the world.
- Online education often lacks real-time interaction, cohesive study materials, making it difficult for students to find reliable resources and engage deeply with their peers.
- Many online education platforms operate independently with different standards for content quality, interaction, and assessment methods. This lack of standardization can create confusion and inconsistency in the learning experience, as students may struggle to adapt to different platforms' formats and requirements.
- As education moves online, there is an increased risk of data privacy breaches and cybersecurity threats. Students and educators alike are often required to share personal information on various platforms, making them vulnerable to data misuse. Ensuring the security and privacy of user data is a significant concern that needs to be addressed to build trust in online education platforms.
- The quality of educational resources available online can vary greatly, with some materials lacking depth, accuracy, or credibility. Students often must sift through a vast amount of content to find high-quality resources, which can be time-consuming and frustrating. Additionally, without proper curation, students may encounter outdated or incorrect information, which can impede their learning process.

1.2 OBJECTIVES

The primary objectives of Social Hive are:

1. **Enhancement of Exam Preparation:** Provide access to previous year question papers and curated training questions to help students effectively prepare for exams. By offering these resources, students familiarize themselves with the exam format, practice problem-solving under time constraints, and identify key areas that require further study, ultimately improving their readiness and confidence.
2. **Creation of Collaborative Communities:** Establish specialized communities where students can share knowledge, discuss topics, and deepen their understanding of subjects. These communities provide a space for peer learning, where students can ask questions, offer explanations, and work together on problems, promoting an inclusive and supportive learning environment.
3. **Facilitation of Discussion Forums:** Develop topic-specific discussion threads for in-depth conversations and provide a platform for peer-to-peer support and knowledge sharing. These forums will enable students to engage in structured conversations about specific subjects, share insights, and seek help from peers and educators.
4. **Implementation of Resource Sharing:** Enable students to upload and share their own study materials, incorporating a community voting and rating system to ensure the quality and relevance of shared resources. This feature ensures that the most helpful and accurate resources are highlighted, providing students with reliable materials to aid in their studies.
5. **Centralization of Study Materials:** Create a platform that consolidates PDF notes, textbook answers, educational videos, and other study resources into one convenient location. By consolidating these resources in a single, easy-to-navigate location, it simplifies the process of finding and using study aids, saving students time and effort while ensuring they have access to high-quality, comprehensive educational content.

1.3 PURPOSE, SCOPE, APPLICABILITY

1.3.1 PURPOSE

The purpose is to create a centralized platform that stores and displays all types of study materials tailored for students, thereby saving their time and effort. By providing easy access to free, curated study resources in one convenient location, the platform aims to enhance the efficiency of learning and support students in achieving their academic goals effectively.

1.3.2 SCOPE

Social Hive encompasses providing a centralized repository of comprehensive study materials, facilitating interactive learning through real-time Q&A and educational videos, and fostering collaborative communities focused on special topics. By integrating technology and social media elements, Social Hive aims to enhance student engagement and streamline access to reliable resources, creating a dynamic and supportive online educational environment.

1.3.3 APPLICABILITY

The project's application applies broadly by centralizing study materials, promoting interactive learning, and fostering collaborative communities. It supports diverse educational contexts, from exam preparation to skill development, enhancing accessibility and engagement in learning. It empowers students worldwide with comprehensive resources and a dynamic learning environment.

1.4 ACHIEVEMENTS

Upon completing the project, the goal is to achieve a transformative impact on education by providing seamless access to comprehensive study materials, enhancing learning efficiency. Fostering dynamic student engagement through interactive tools and collaborative learning communities. Empowering students to excel academically and deepen their subject expertise through effective resource utilization and peer interaction.

1.5 ORGANISATION OF REPORT

- **Chapter 1-Introduction** will summarize background, objectives and scope of the project, giving an idea of the overall problem statement.
- **Chapter 2-Survey of Technologies** will summarize the details of the technologies that are necessary to complete the project.
- In **Chapter 3-Requirement Analysis** problem statement will be defined which will be divided into sub problems. Requirement specifications will describe the things in the system and the actions that can be done on these things. In the planning and scheduling Gantt chart and PERT will be made, also the hardware and software specification will be defined. Conceptual Models will also be made.
- **Chapter 4- System Design** describes desired features and operations in detail including screen layout, business rules, process diagrams and other documentation.
 - Basic Modules: The students should follow the divide and conquer theory, so divide the overall problem into more manageable parts and develop each part or module separately.
 - Data Design: Data design will consist of how data is organized, managed, and manipulated.
 - Logic Diagrams: Define the systematical flow of the procedure that improves its comprehension and helps the programmer during implementation. For example, control flow charts, process diagrams and more.

CHAPTER 2

Chapter 2

SURVEY OF TECHNOLOGIES

2.1 FRONT-END FEATURES

To improve study efficiency and collaboration through Social Hive, several technologies are essential.

1. React.js

- Purpose A JavaScript library for building dynamic, responsive web applications using a component-based architecture.
- Usage: It will allow for easy updates and maintenance of the application's user interface.

2. React Native

- Purpose: provides native modules and components that offer a native-like performance.
- Usage: Utilize components such as FloatingActionButton, BottomNavigationView, and CardView for consistent and attractive interfaces.

3. Bootstrap

- Purpose: has pre-built components and responsive grid layouts for quickly creating visually appealing interfaces.
- Usage: provides a collection of pre-designed UI components such as buttons, forms, and navigation bars, along with responsive grid layouts that adapt to various screen sizes.

4. HTML, CSS, and JavaScript

- Purpose: Bind UI components in layouts to data sources using a declarative format.
- Usage: HTML for creating web pages, providing the basic structure of web content. CSS is used to control the presentation, formatting, and layout of web pages. JavaScript to add interactivity and dynamic features to web pages.

2.2 BACK-END FEATURES

To improve study efficiency and collaboration through Social Hive, several technologies are essential.

1. MongoDB

- **Purpose:** It is designed to handle large volumes of diverse data types and is known for its scalability and high performance.
- **Usage:** will serve as the primary database, storing user data, study materials, and interaction logs.

2. Node.js

- **Purpose:** known for its non-blocking, event-driven architecture, which makes it ideal for handling asynchronous operations and high-concurrency applications.
- **Usage:** used for server-side operations, managing application logic, handling client requests, and performing background tasks.

3. Express.js

- **Purpose:** has a minimal and flexible Node.js web application framework that provides a robust set of features for building web and mobile applications.
- **Usage:** used to create a scalable API layer that facilitates communication between the front end and back end.

4. Firebase Realtime Database

- **Purpose:** known for its ability to provide real-time data updates, making it ideal for applications requiring dynamic data changes and live collaboration.
- **Usage:** enable real-time features such as live chat, real-time updates of study materials, and collaborative tools within study groups, enhancing user engagement and interaction on the platform.

5. Google Cloud

- **Purpose:** leading cloud service provider offering a wide range of scalable infrastructure services, including storage, computing power, and managed databases.
- **Usage:** will ensure secure, efficient data management and support the application's performance and scalability needs as the user base expands.

2.3 Justification

Front-end:

For the front end, React.js is preferred for its component-based architecture, which enables dynamic, responsive web applications with efficient state management. React Native is chosen for mobile app development to allow code reuse across iOS and Android platforms, ensuring a consistent user experience. Bootstrap is utilized for designing responsive and visually appealing interfaces with its pre-built components and styles, speeding up development. Additionally, HTML, CSS, and JavaScript provide the foundational structure, styling, and interactivity essential for building a functional and engaging user interface.

Back-end:

For the back end, MongoDB is preferred for its flexible, document-oriented model, allowing efficient handling and scaling of diverse data types. Node.js is chosen for its non-blocking, event-driven architecture, ideal for managing asynchronous tasks and high-volume interactions. Express.js is selected for its minimalistic framework, simplifying API development and scalability. Firebase Realtime Database is integrated for its real-time data synchronization, enhancing collaborative features. Lastly, Google Cloud is employed for their scalable cloud storage and computing capabilities, ensuring secure and efficient data management and application performance.

CHAPTER 3

Chapter-3

REQUIREMENTS AND ANALYSIS

3.1 PROBLEM DEFINITION

Students often face challenges in accessing reliable and comprehensive educational resources, leading to difficulties in understanding complex concepts and preparing for exams. Traditional educational platforms lack the integration of dynamic, interactive features that support collaborative learning. There is a significant need for a dedicated platform that provides not only access to study materials but also fosters real-time collaboration, ensuring a more engaging and effective learning experience.

3.2 REQUIREMENT SPECIFICATION

Functional Requirements

- **User Account Management**
- **Content Upload and Management**
- **Search and Discovery**
- **Real-Time Communication**
- **Content Sharing and Collaboration**
- **Administrative Controls**

Non-Functional Requirements

- **Performance and Responsiveness**
- **Scalability and Flexibility**
- **Security and Privacy**

3.3 SOFTWARE AND HARDWARE REQUIREMENTS

- **Software Requirements:**

- IDEs i.e. Visual Studio Code
- Node.js for backend, React framework for frontend.
- MongoDB for data storage.

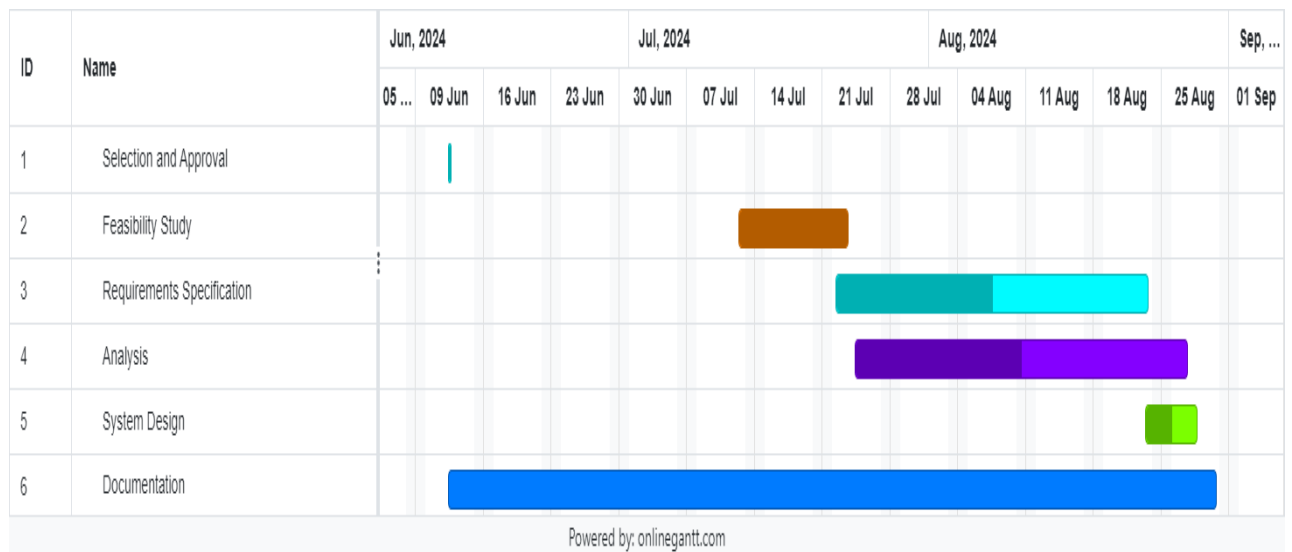
- **Hardware Requirements:**

- a machine with a minimum of 8GB RAM, 500GB HDD/SSD, and a multi-core processor.

Planning and Scheduling

Task	Start Date	End Date	Duration	Signature
Selection and Approval	12 June, 24	12 June, 24	1 day	
Feasibility study	12 July, 24	23 July, 24	10 days	
Requirements Specification	22 July, 24	23 August, 24	25 days	
Analysis	24 July, 24	23 August, 24	23 days	
System Design	23 August, 24	28 August, 24	5 days	
Documentation	12 June, 24	30 August, 24	58 days	

3.4 Gantt Chart



CHAPTER 4

Chapter-4


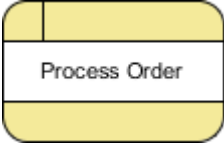

SYSTEM DESIGN


System design refers to the process of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements. It outlines how the various parts of a system will work together to achieve the project's goals, addressing both functional and non-functional requirements.

4.1) DATA FLOW DIAGRAMS.

A Data Flow Diagram (DFD) is a graphical representation that depicts the flow of data within a system, showing how inputs are processed into outputs. It is used in system design to visualize how data moves between processes, entities, and data stores, making it easier to understand how the system functions.

Table 4.1: Symbols of Data Flow Diagram

Symbol	Name	Description
	External entity	External entities are objects outside the system with which system communicates. These are sources and destinations of the system inputs and outputs.
	Process	A process receives input data and process output data with a different form or content. Every process has a name that identifies the function it performs.
	Data flow	Data flow is the path for data to move from one part of the system to another. It may be a single data element or set of data element. The symbol of data flow is the arrow. The arrow shows the flow direction.

	Data Store	It is used to store information that the system needs to retain and can be accessed by different processes for reading or writing data. Data stores help in managing persistent data that isn't directly provided by external entities but is crucial for system operations
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4.1.1) DFD Level 0.

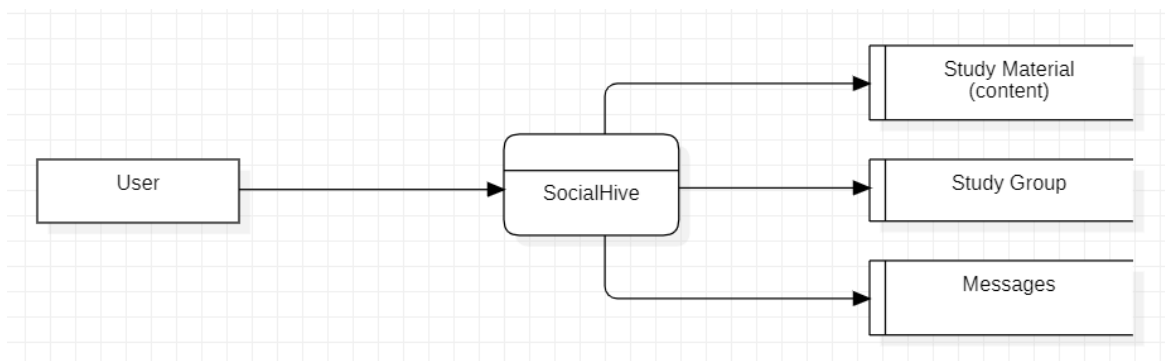


Figure 4.1.1: Data Flow Diagram level 0

Components:

1. External Entity

- **User:** This is the external entity interacting with the system, initiating the process.

2. Process

- **SocialHive:** This is the process or the system that the user interacts with. It processes the user's input to produce different outputs.

3. Data Stores

- Represented by rectangles on the right side.
- **Study Material (content):** Represents data stores where the study material content is stored or accessed.
- **Study Group:** Represents the data store related to study groups, where group-related information is stored or accessed
- **Messages:** Represents the data store where messages are stored or accessed.

Relationships:

• Data Flow:

User → SocialHive: The user sends data to the SocialHive process.

SocialHive → Study Material (content): The process outputs study material, which is stored in or retrieved from the Study Material data store.

SocialHive → Study Group: The process retrieves or stores information related to study groups in the data store.

SocialHive → Messages: The process outputs messages, which are stored in or retrieved from the Messages data store.

4.1.2) DFD Level 1.

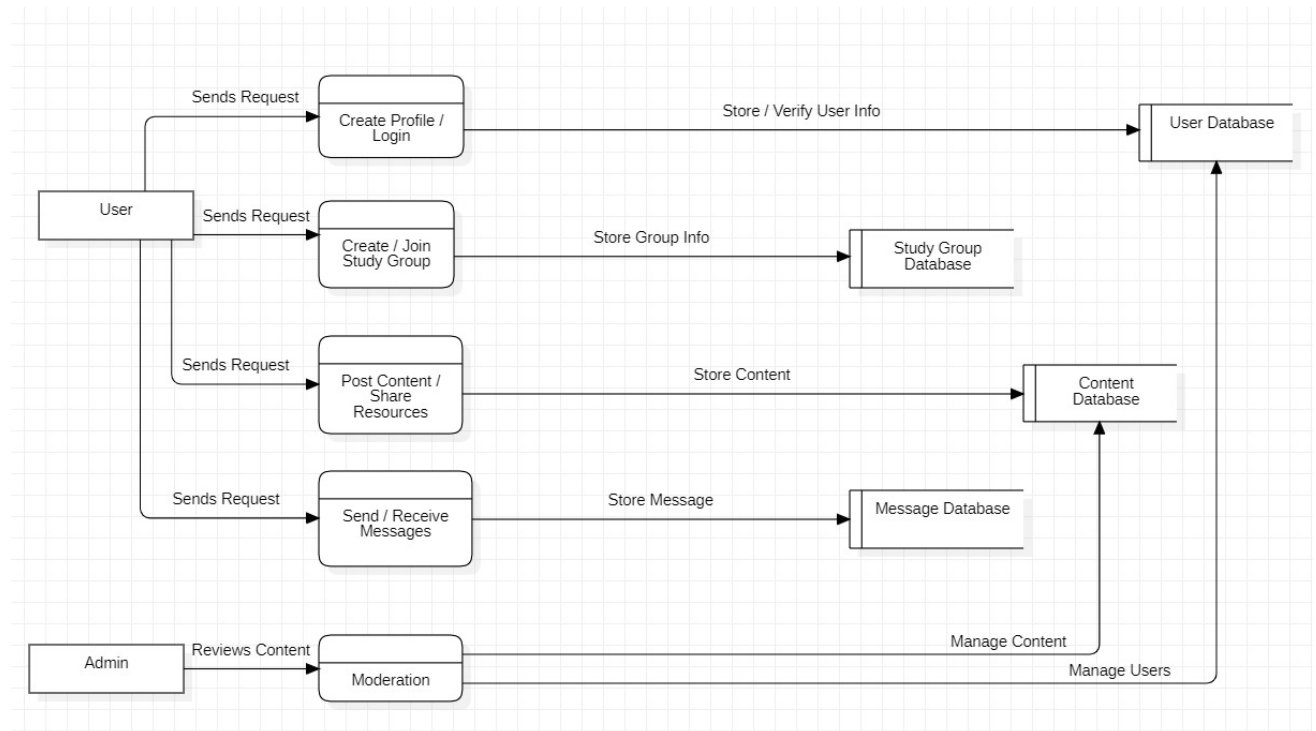


Figure 4.1.2: Data Flow Diagram level 1

Components:

1. External Entity –

- **User:** Interacts with the system by creating profiles, joining study groups, posting content.
- **Admin:** Manages the system, including users and content moderation.

2. Data Stores:

- **User Database:** Stores user profiles, credentials, and preferences.
- **Content Database:** Stores posts, comments, and educational resources.
- **Study Group Database:** Stores information about study groups, including members and activities.
- **Messages Database:** Stores sent and received messages.

3. Processes:

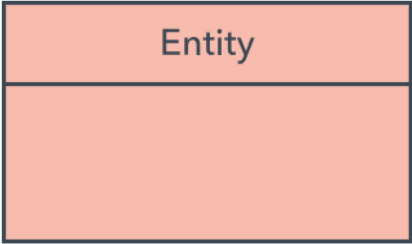
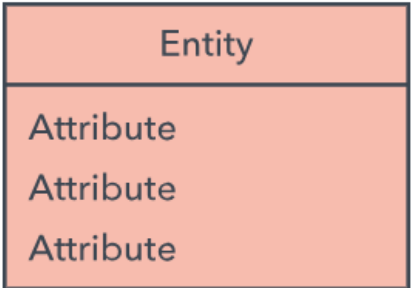

- **User Database:** Stores user profiles, credentials, and preferences.
- **Content Database:** Stores posts, comments, and educational resources.

- **Study Group Database:** Stores information about study groups, including members and activities.
- **Messages Database:** Stores sent and received messages.

4.2) ENTITY RELATIONSHIP DIAGRAM.

An ER diagram is a graphical representation of a conceptual data model. It shows entities (data objects), attributes (properties of entities), and relationships between entities. ER diagrams are commonly used in database design to visualize and understand the structure of a database.

Table 4.2: Symbols of Entity-Relationship Diagram

Symbol	Name	Description
	Rectangle (Entity)	Represents an entity or data object . An entity is a person, place, thing, or event that you want to track in your database.
	Attribute	Represents an attribute of an entity. An attribute is a property or characteristic of an entity.
	Crow's foot notation	Represents the cardinality of a relationship between two entities. Cardinality defines how many instances of one entity can be related to another. It's often depicted using a "crow's foot" symbol.

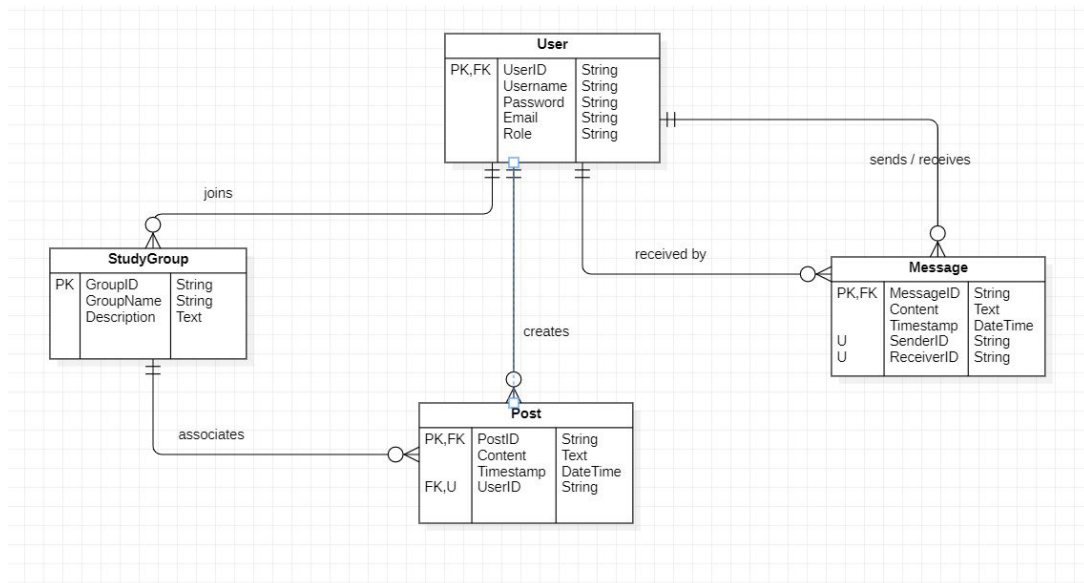


Figure 4.3: ER Diagram

Entities:

- User: Represents individuals who use the system.
- StudyGroup: Represents study groups or communities within the system.
- Post: Represents content posted by users within study groups.
- Message: Represents messages exchanged between users.

Attributes:

- User: UserID (Primary Key), Username, Password, Email, FirstName, LastName, and Role.
- StudyGroup: GroupID (Primary Key), GroupName, and Description
- Post: PostID (Primary Key), Content, Timestamp (Date Time), and UserID (Foreign Key).
- Message: MessageID (Primary Key), Content, Timestamp (Date Time), SenderID (Foreign Key), and ReceiverID (Foreign Key).


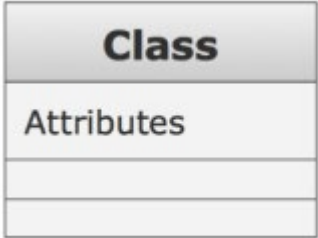
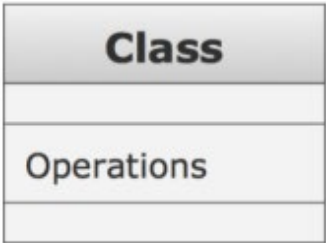
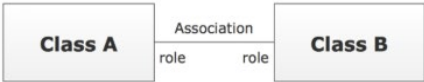
Relationships:

- **User:**
 - A user can create multiple Posts.
 - A user can be a member of multiple StudyGroups.
 - A user can send/receive multiple Messages.
- **Post:**
 - A post belongs to one User.
 - A post can be associated with one StudyGroup.
- **Message:**
 - A message is sent from one User to another User
- **StudyGroup:**
 - A study group can have multiple Users.
 - A study group can have multiple Posts.

4.3) CLASS DIAGRAM.

A **class diagram** is a type of static structure diagram used in software design to represent the structure of a system by showing its classes, attributes, methods, and relationships between objects. It is a key part of UML (Unified Modeling Language) and is used to model the object-oriented design of a system.

Table 4.3: Symbols of Class Diagram

Symbol	Name	Description
	Class	Class represents a set of objects that have the same structure, behavior, and relationships with objects of other classes.
	Attribute	Attribute is a typed value that defines the properties and behavior of the object.
	Operation	Operation is a function that can be applied to the objects of a given class.
	Association	Association is a relationship that connect two classes.

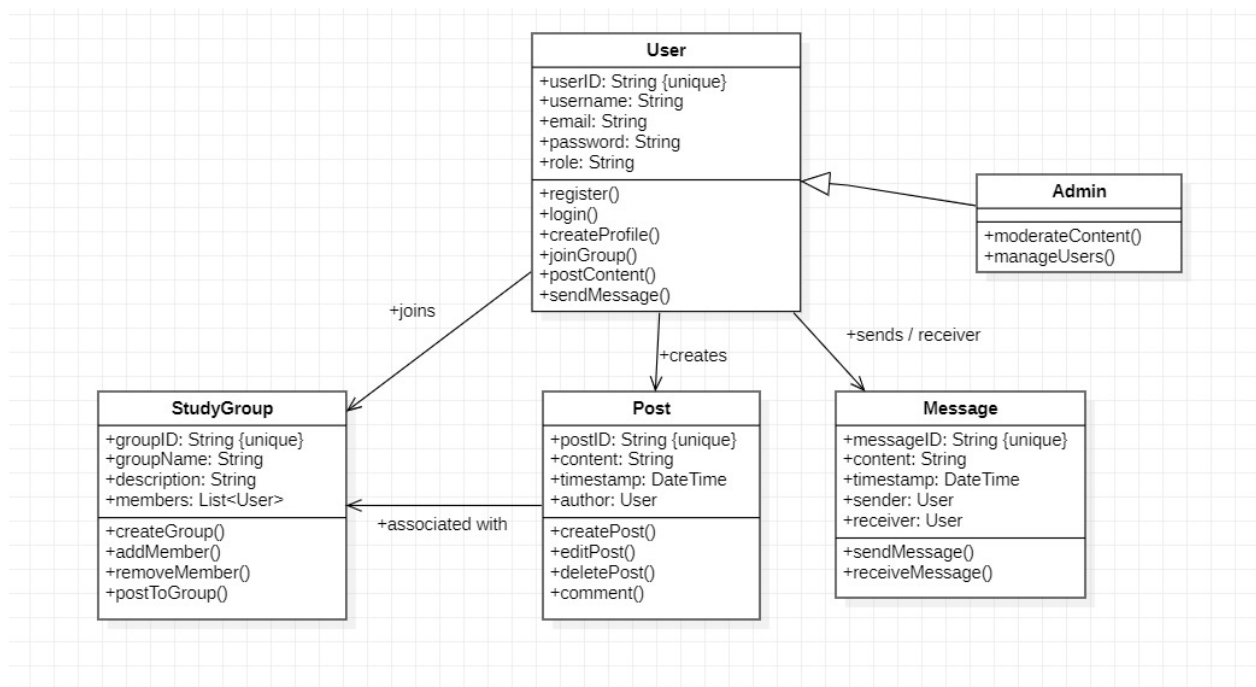


Figure 4.4 : Class Diagram

Entities:

- **User**: Represents a person who uses the system
- **Admin**: A specialized user with additional capabilities to manage content and users.
- **StudyGroup**: Represents a group created by users for collaborative learning
- **Post**: represents content created by users, associated with a study group.
- **Message**: Represents communication between users

Attributes:

- **User**: `userID`, `username`, `email`, `password`, and `role`
- **Admin**: method like `moderateContent()`, `manageUsers()`.
- **StudyGroup**: `groupID`, `groupName`, `description`, and `members`
- **Post**: `postID`, `content`, `timestamp`, and `author`
- **Message**: `messageID`, `content`, `timestamp`, `sender`, and `receiver`.



Relationships:

- **User-Admin**: Admin inherits from User.
- **User-StudyGroup**: User joins StudyGroup.
- **User-Post**: User creates Post.
- **User-Message**: User sends/receives Message.
- **StudyGroup-Post**: StudyGroup is associated with Post..

4.4) USE CASE DIAGRAM.

A **use case diagram** is a type of behavioral diagram defined by the Unified Modeling Language (UML) that represents the interactions between users (actors) and a system. It is used to capture the functional requirements of a system, showing how different types of users interact with various use cases (functionalities or services) provided by the system.

Table 4.4: Symbols of Use-Case Diagram

Symbol	Name	Description
	User	Use cases are used to represent high-level functionalities and how the user will handle the system. A use case represents a distinct functionality of a system, a component, a package, or a class. It is denoted by an oval shape with the name of a use case written inside the oval shape
	Use Case	Use cases are used to represent high-level functionalities and how the user will handle the system. A use case represents a distinct functionality of a system, a component, a package, or a class. It is denoted by an oval shape with the name of a use case written

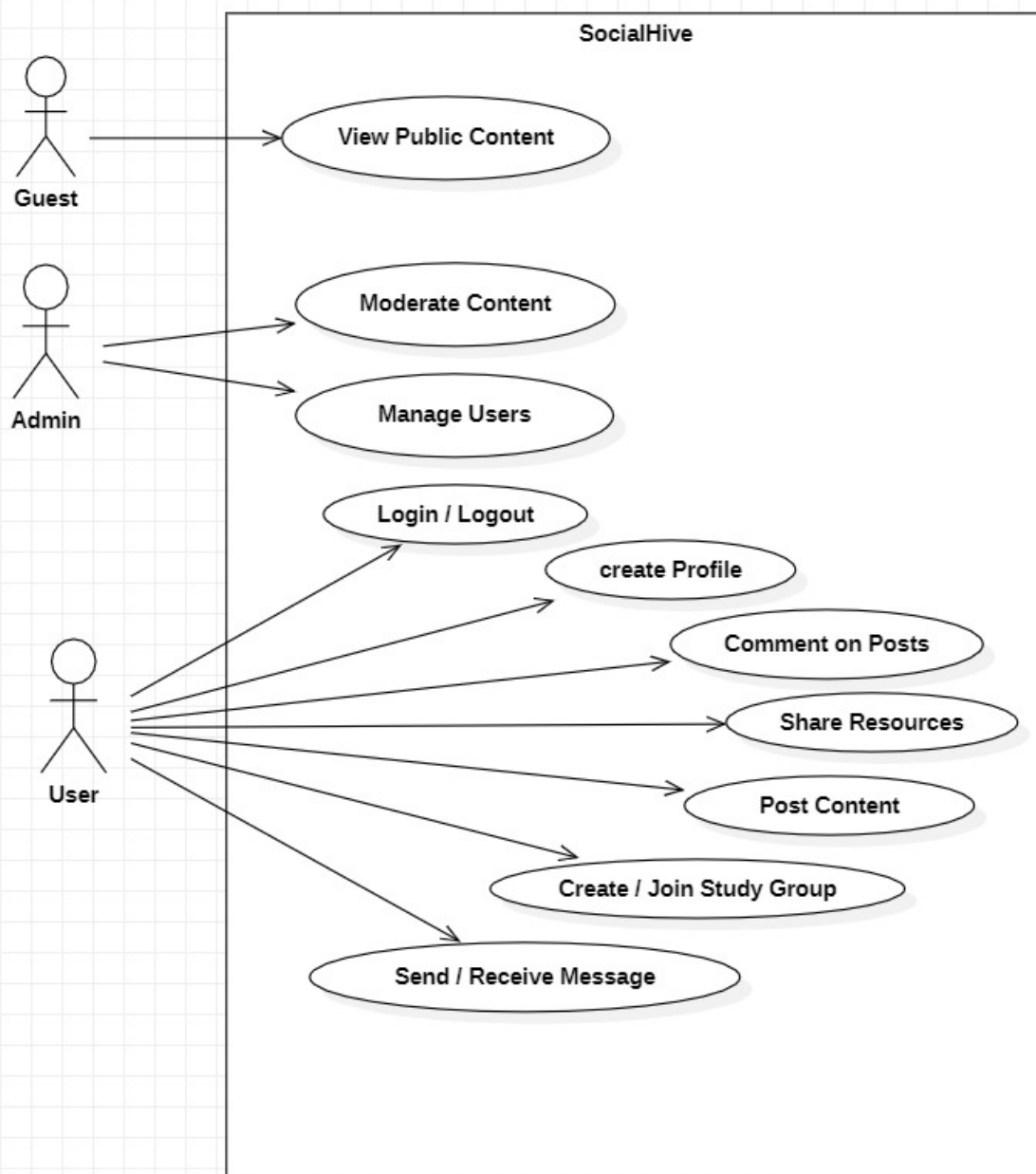


Figure 4.5 : Use Case Diagram

1. Actor:

- **Guest:** A person who interacts with the system without logging in, having limited access to public content.
- **User:** A registered person who interacts with the system after logging in. Users have access to various functionalities such as creating profiles, posting content, joining study groups, and sending messages.
- **Admin:** A specialized type of user with additional privileges to moderate content and manage other users.

2. System Boundary:

- This is the system boundary that encapsulates all the functionalities provided by the system. It defines what is within the scope of the system and what actors interact with it.

3. Use Cases:

1. **View Public Content:** Allows guests to view content that is publicly available without needing to log in.
2. **Login / Logout:** Enables users to access the system by logging in and log out when finished.
3. **Create Profile:** Allows a user to create and update their profile information.
4. **Comment on Posts:** Enables users to comment on posts shared within the platform.
5. **Share Resources:** Allows users to share various resources such as documents, links, or media files.
6. **Post Content:** Users can create and share posts on the platform.
7. **Create / Join Study Group:** Allows users to create new study groups or join existing ones to collaborate with other users.
8. **Send / Receive Message:** Enables users to send messages to other users and receive messages from them.
9. **Moderate Content:** Allows admins to review and manage content posted by users, including deleting inappropriate content.
10. **Manage Users:** Enables admins to manage user accounts, including adding, updating, or removing users.

Relationships:

• Associations:

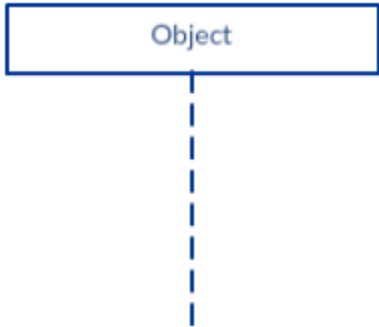
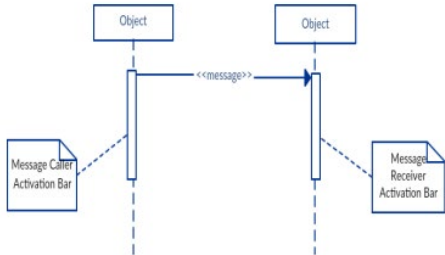

- Guest - View Public Content: An association where a guest can view public content available on the platform without logging in.
- User - Login / Logout: A relationship where users must log in to access additional functionalities and log out when done.
- User - Create Profile: An association where users can create and manage their profiles.
- User - Comment on Posts: A relationship where users can comment on posts shared by others or themselves.
- User - Share Resources: An association where users can share various resources with other users or groups.
- User - Post Content: A relationship where users can create new posts on the platform.
- User - Create / Join Study Group: An association where users can create new study groups or join existing ones to participate in group activities.
- User - Send / Receive Message: A relationship where users can send messages to others and receive messages from them.

- Admin - Moderate Content: An association where admins have the authority to review and manage the content shared by users.
- Admin - Manage Users: A relationship where admins can perform user management tasks, including creating, updating, or removing user accounts.

4.5) SEQUENCE DIAGRAM.

A sequence diagram is a type of interaction diagram that shows the flow of messages between objects in a system over time. It's often used to model the behavior of a system, analyze its interactions, and identify potential issues or bottlenecks.

Table 4.5: Symbols of Sequence Diagram

Symbol	Name	Description
	Lifeline Notation	A sequence diagram is made up of several of these lifeline notations that should be arranged horizontally across the top of the diagram. No two lifeline notations should overlap each other.
	Activation Bars	Activation bar is the box placed on the lifeline. It is used to indicate that an object is active (or instantiated) during an interaction between two objects. The length of the rectangle indicates the duration of the objects staying active. In a sequence diagram, an interaction between two objects occurs when one object sends a message to another.
	Synchronous Message	A synchronous message is used when the sender waits for the receiver to process the message and return before carrying on with another message. The arrowhead used to indicate this type of message is a solid one.

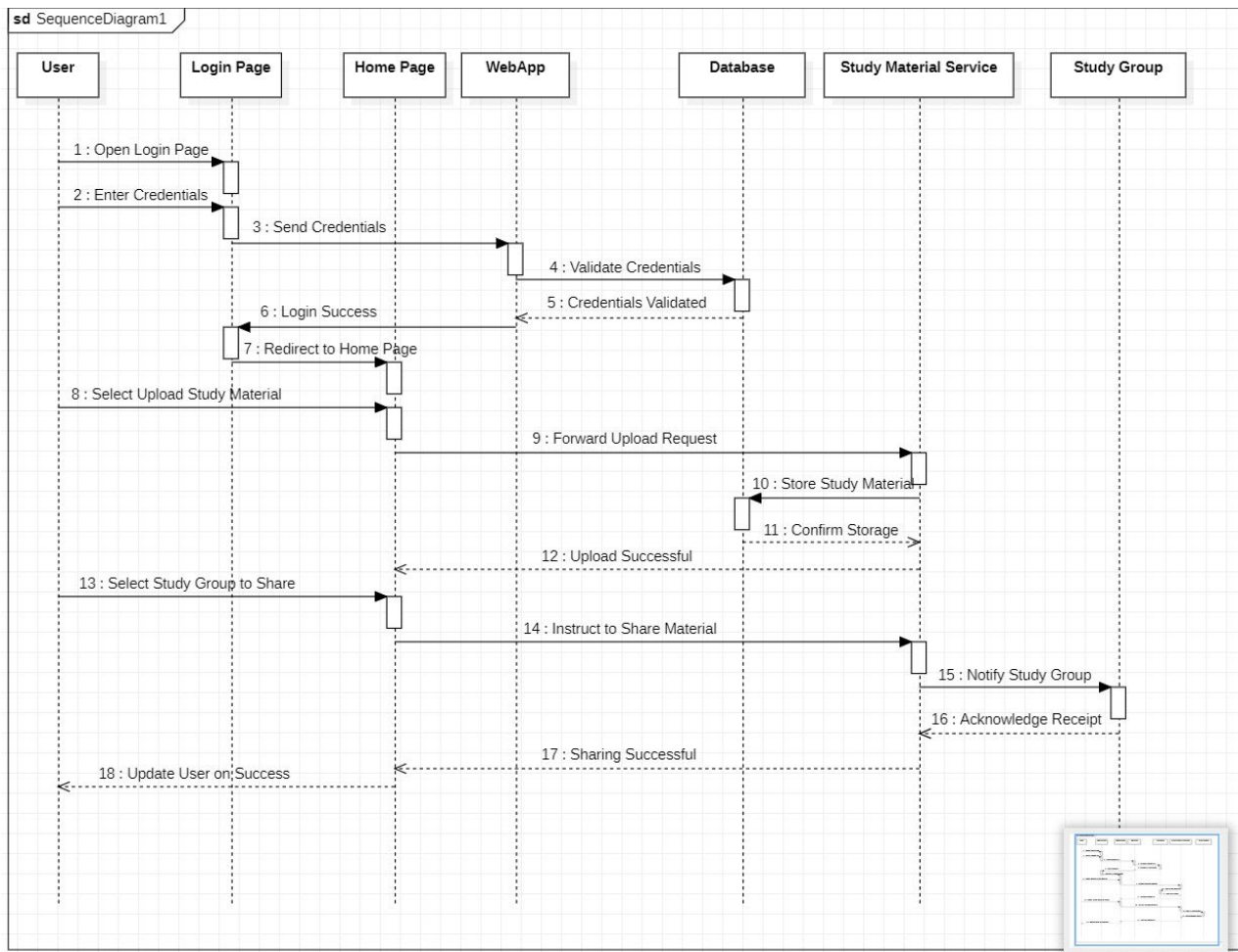


Figure 4.5 : Sequence Diagram

Lifelines

- **Login Page:** Handles user authentication.
- **Home Page:** The main interface post-login.
- **Web App:** Core application logic.
- **Database:** Stores user data, study materials, and group information.
- **Study Material Service:** Manages the uploading and processing of study materials.
- **Study Group:** The group where the study material is shared.

Sequence Diagram Steps:


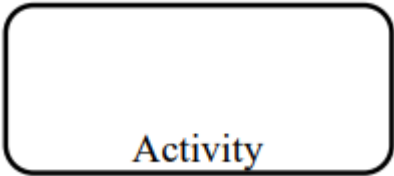

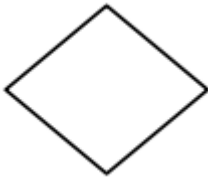

1. User opens the Login Page.
2. User submits credentials to the Login Page.
3. The Login Page sends credentials to the Web App for authentication.
4. The Web App checks credentials with the Database.
5. If the credentials are valid, the Web App redirects the User to the Home Page.
6. User selects the option to upload study material on the Home Page.
7. The Home Page forwards the request to the Study Material Service.

8. The Study Material Service processes the upload and stores it in the Database.
9. The Study Material Service confirms the upload to the Home Page.
10. User selects a study group to share the material in on the Home Page.
11. The Home Page instructs the Study Material Service to share the material.
12. The Study Material Service sends a notification to the Study Group.
13. The Study Group acknowledges the receipt of the material.
14. The Home Page updates the User on the successful sharing.

4.6) ACTIVITY DIAGRAM.

An activity diagram is a type of behavioral diagram that shows the flow of activities in a system. It's often used to model business processes, workflows, and the logic behind a system's operations.

Table 4.6: Symbols of Activity Diagram

Symbol	Name	Description
	Start symbol	Represents the beginning of a process or workflow in an activity diagram. It can be used by itself or with a note symbol that explains the starting point.
	Activity Symbol	Indicates the activities that make up a modeled process. These symbols, which include short descriptions within the shape, are the main building blocks of an activity diagram.
	Connector Symbol	It shows the directional flow, or control flow, of the activity. An incoming arrow starts a step of an activity; once the step is completed, the flow continues with the outgoing arrow.
	Decision Symbol	Represents a decision and always has at least two paths branching out with condition text to allow users to view options. It represents the branching or merging of various flows with the symbol acting as a frame or container.
	End Symbol	Marks the end state of an activity and represents the completion of all flows of a process.

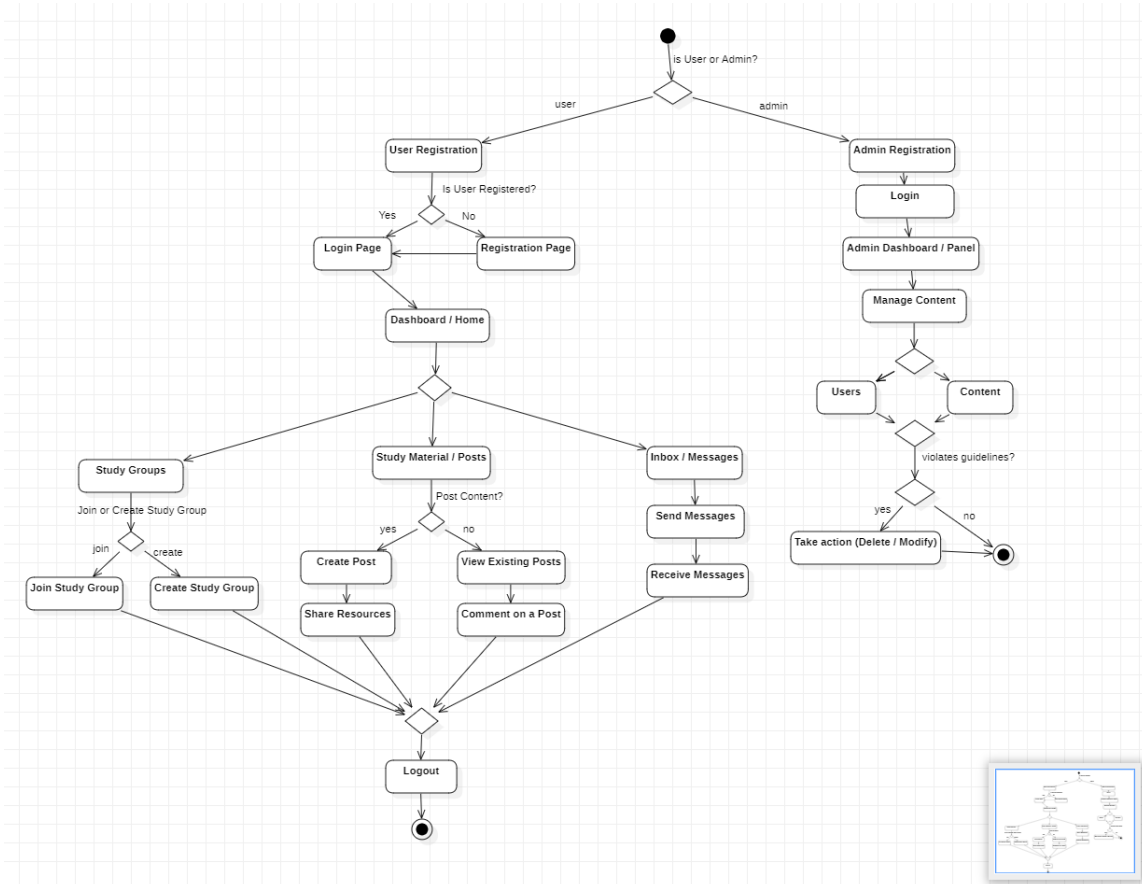


Figure 4.6 : Activity Diagram

The activities used in the provided diagram are:

- **User Login:**
 - User opens the app and navigates to the login page.
 - User enters credentials and attempts to log in.
 - The system validates credentials.
 - If the login is successful, the user is directed to the home page; otherwise, they receive an error message.
- **Home Page Navigation:**
 - User can choose to upload study materials, join a study group, create a new group, or browse existing groups and materials.
- **Upload Study Material:**
 - User selects the upload option.
 - User provides the file and relevant details.
 - The system processes the upload and stores the material in the database.
- **Join/Create Study Group:**
 - User can either join an existing study group or create a new one.

- For joining, the system verifies group membership and adds the user.
- For creating, the user provides group details, and the system creates the group.
- **Share Study Material:**
 - After uploading, the user can share the material in a study group.
 - The system notifies the selected group, and the material becomes available to group members.
- **Logout:**
 - User logs out from the app, ending the session.

CHAPTER 5

IMPLEMENTATION AND TESTING

5.1 Implementation Approaches

A project model is a clear and visual description of how a project should be carried out. A project planning model usually contains a number of stages/steps which a project has to go through to be successful. The model used in this project is RAD Model (Rapid Application Development).

RAD is a linear sequential software development process model that emphasizes a concise development cycle using an element-based construction approach. If the requirements are well understood and described, and the project scope is a constraint, the RAD process enables a development team to create a fully functional system within a concise time period.

RAD (Rapid Application Development) is a concept that products can be developed faster and of higher quality through:

- Gathering requirements using workshops or focus groups
- Prototyping and early, reiterative user testing of designs
- The re-use of software components
- A rigidly paced schedule that refers design improvements to the next product version
- Less formality in reviews and other team communication

The model consists of 4 basic phases:

- Requirements Planning – It involves the use of various techniques used in requirements elicitation like brainstorming, task analysis, form analysis, user scenarios, and FAST (Facilitated Application Development Technique). It also consists of the entire structured plan describing the critical data, methods to obtain it, and then processing it to form a final refined model.
- User Description – This phase consists of taking user feedback and building the prototype using developer tools. In other words, it includes re-examination and validation of the data collected in the first phase. The dataset attributes are also identified and elucidated in this phase.
- Construction – In this phase, refinement of the prototype and delivery takes place. It includes the actual use of powerful automated tools to transform processes and data models into the final working product. All the required modifications and enhancements are too done in this phase.

Cutover – All the interfaces between the independent modules developed by separate teams have to be tested properly. The use of powerfully automated tools and subparts makes testing easier. This is followed by acceptance testing by the user.

5.2 Code Efficiency

Code efficiency is a broad term used to depict the reliability, speed and programming methodology used in developing codes for an application. Code efficiency is directly linked with algorithmic efficiency and the speed of runtime execution for software. It is the key element in ensuring high performance. The goal of code efficiency is to reduce resource consumption and completion time as much as possible with minimum risk to the business or operating environment. The software product quality can be accessed and evaluated with the help of the efficiency of the code used.

Code efficiency plays a significant role in applications in a high-execution-speed environment where performance and scalability are paramount.

One of the recommended best practices in coding is to ensure good code efficiency. Well developed programming codes should be able to handle complex algorithms.

Recommendations for code efficiency include:

- To remove unnecessary code or code that goes to redundant processing
- To make use of optimal memory and non-volatile storage
- To ensure the best speed or run time for completing the algorithm
- To make use of reusable components wherever possible
- To make use of error and exception handling at all layers of software, such as the user interface, logic and data flow
- To create programming code that ensures data integrity and consistency
- To develop programming code that's compliant with the design logic and flow
- To make use of coding practices applicable to the related software
- To optimize the use of data access and data management practices
- To use the best keywords, data types and variables, and other available programming concepts to implement the related algorithm

5.3 Testing Approach

5.3.1 Unit Testing

Unit testing is the basic level of testing. Unit testing focuses separately on the smaller building blocks of a program or system. It is the process of executing each module to confirm that each performs its assigned function. The advantage of unit testing is that it permits the testing and debugging of small units, thereby providing a better way to manage the integration of the units into larger units. In addition, testing a smaller unit of code makes it mathematically possible to fully test the code's logic with fewer tests. Unit testing also facilitates automated testing because the behavior of smaller units can be captured and played back with maximized reusability. A unit can be one of several types of application software. Examples include the module itself as a unit, GUI components such as windows, menus, functions, batch programs, online programs and stored procedures.

There are three types of unit testing approaches, they are as follows:

- **Black Box Testing** – Black box testing is a type of software testing in which the functionality of the software is not known. The testing is done without the internal knowledge of the products. It is also called Functional testing. Blackbox testing focuses on software's external attributes and behavior. This type of testing looks at an application's software expected behavior from the user's point of view.
- **White Box Testing** – White-box testing or glass-box testing is a software testing technique that tests the software by using the knowledge of internal data structures, physical logic flow, and architecture at the level of source code. This testing works by looking at testing from the developer's point of view. This testing is also known as glass box testing, clear box testing, structural testing, or non-functional testing.
- **Grey Box Testing** – Grey Box Testing is a combination of the Black Box Testing technique and the White Box Testing technique in software testing. The grey-box testing involves inputs and outputs of a program for the testing purpose but test design is tested by using the information about the code. Greybox testing is

well suited for web application testing because it factors in a highlevel design environment and the inter-operability conditions.

5.3.2 Integration Testing

After unit testing is completed, all modules must be integration-tested. During integration testing, the system is slowly built up by adding one or more modules at a time to the core of already-integrated modules. Groups of units are fully tested before system testing occurs. Because modules have been unit-tested prior to integration testing, they can be treated as black boxes, allowing integration testing to concentrate on module interfaces. The goals of integration testing are to verify that each module performs correctly within the control structure and that the module interfaces are correct. Incremental testing is performed by combining modules in steps. At each step one module is added to the program structure, and testing concentrates on exercising this newly added module. When it has been demonstrated that a module performs properly with the program structure, another module is added, and testing continues.

This process is repeated until all modules have been integrated and tested.

There are four types of integration testing approaches, they are as follows:

- **Big-Bang Integration Testing** – It is the simplest integration testing approach, where all the modules are combined and the functionality is verified after the completion of individual module testing. In simple words, all the modules of the system are simply put together and tested. This approach is practicable only for very small systems. If an error is found during the integration testing, it is very difficult to localize the error as the error may potentially belong to any of the modules being integrated. So, debugging errors reported during big bang integration testing is very expensive to fix.
- **Bottom-Up Integration Testing** – In bottom-up testing, each module at lower levels is tested with higher modules until all modules are tested. The primary purpose of this integration testing is that each subsystem tests the interfaces among various modules making up the subsystem. This integration testing uses test drivers to drive and pass appropriate data to the lower-level modules.
- **Top-Down Integration Testing** – Top-down integration testing technique is used in order to simulate the behaviour of the lower-level modules that are not yet integrated. In this integration testing, testing takes place from top to bottom. First, high-level modules are tested and then low-level modules and finally integrating the low-level modules to a high level to ensure the system is working as intended.
- **Mixed Integration Testing** – A mixed integration testing is also called sandwiched integration testing. This type of testing follows a combination of top down and bottom-up testing approaches. In top-down approach, testing can start only after the top-level module have been coded and unit tested. In bottomup approach, testing can start only after the bottom level modules are ready. This sandwich or mixed approach overcomes this shortcoming of the top-down and bottom-up approaches. It is also called the hybrid integration testing. also, stubs and drivers are used in mixed integration testing.

5.3.3 Beta Testing

Beta Testing is performed by real users of the software application in a real environment. Beta testing is one of the types of User Acceptance Testing. A Beta version of the software, whose feedback is needed, is released to a limited number of end-users of the product to obtain feedback on the product quality. Beta testing helps in minimization of product failure risks and it provides increased quality of the product through customer validation. It is the last test before shipping a product to the customers. One of the major advantages of beta testing is direct feedback from customers.

There are five types of beta testing approaches, they are as follows:

- Traditional Beta Testing – Product is distributed to the target market and related data is gathered in all aspects. This data can be used for Product improvement.
- Public Beta Testing – Product is released publicly to the world through online channels and data can be collected from anyone. Based on feedback, product improvements can be done. For example, Microsoft conducted the largest of all Beta Tests for its operating system Windows 8 before officially releasing it.
- Technical Beta Testing – Product is released to a group of employees of an organization and collects feedback/data from the employees of the organization.
- Focused Beta Testing – Software product is released to the market for collecting feedback on specific features of the program. For example, important functionality of the software.
- Post-Release Beta Testing – Software product is released to the market and data is collected to make improvements for the future release of the product.

5.4 Modifications and Improvements

The accuracy of the prediction of the signs is 98.50% which is in the higher category of the services present in the market. Only a few services can guarantee this level of accuracy and we have been able to obtain the level of 98.50% accuracy. The user interface (UI) is simple to use without any non-necessary features so that the user does not get confused. The model has been continuously improved during coding to obtain the highest level of accuracy with a short lagging period.

5.5 Test Cases

The user will perform the action in front of the camera and the application will detect the sign and display the interpreted sign in text format.

	TEST CASE	DESCRIPTION	EXPECTED OUTCOME
1	User Registration	A new student registers on the platform.	User is successfully registered and redirected to the home page.
2	Duplicate Registration	A user attempts to register with an already registered email.	Error is displayed: "Email already registered."
3	User Login	A registered user attempts to log in	User is successfully logged in and

		with correct credentials.	redirected to the dashboard.
4	Invalid Login	A user attempts to log in with incorrect credentials.	Error is displayed: "Invalid username or password."
5	Create Post	A user creates a study-related post in a community.	Post is successfully created and displayed in the selected community.
6	Edit Post	A user edits an existing post.	Post content is updated successfully.
7	Delete Post	A user deletes a post they created.	Post is marked as deleted or removed from the community.
8	Join Community	A user attempts to join an existing community.	User is successfully added to the community.
9	Create Community	A user creates a new study community.	Community is successfully created and listed.
10	Start Audio/Video Call	A user initiates a 1v1 audio/video call with another user.	Call is successfully initiated, and the recipient receives a notification.
	Receive Audio/Video Call		
12	End Call	Either user ends the audio/video call.	Call is ended successfully, and both users are notified.
13	Upload Study Material	A user uploads PDF notes to a community.	File is successfully uploaded and available for preview/download.
14	Comment on Post	A user comments on a study-related post.	Comment is successfully posted and displayed under the post.
15	Message User	A user sends a direct message to another user.	Message is delivered and appears in the recipient's chat window.
16	Duplicate Community Name	A user attempts to create a community with an existing name.	Error is displayed: "Community name already exists."
17	Unauthorized Post Edit/Delete	A user attempts to edit or delete another user's post.	Error is displayed: "Unauthorized action."
18	Logout	User logs out from the platform.	User is successfully logged out and redirected to the login page.

CHAPTER 6

RESULTS AND DISCUSSION

Introduction to this chapter

This chapter provides a user guide for the **Social Hive** application. It explains the various features, functions, and components of the system, along with step-by-step instructions and screenshots to help users navigate and effectively use the platform. This manual is designed to be straightforward for all users, regardless of their technical expertise.

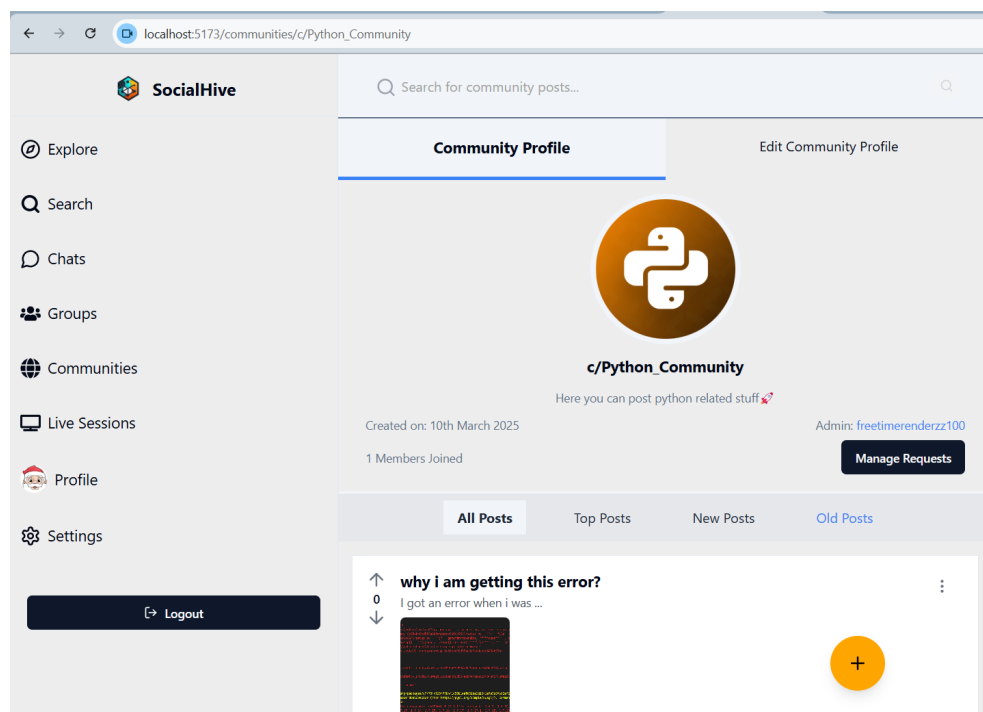
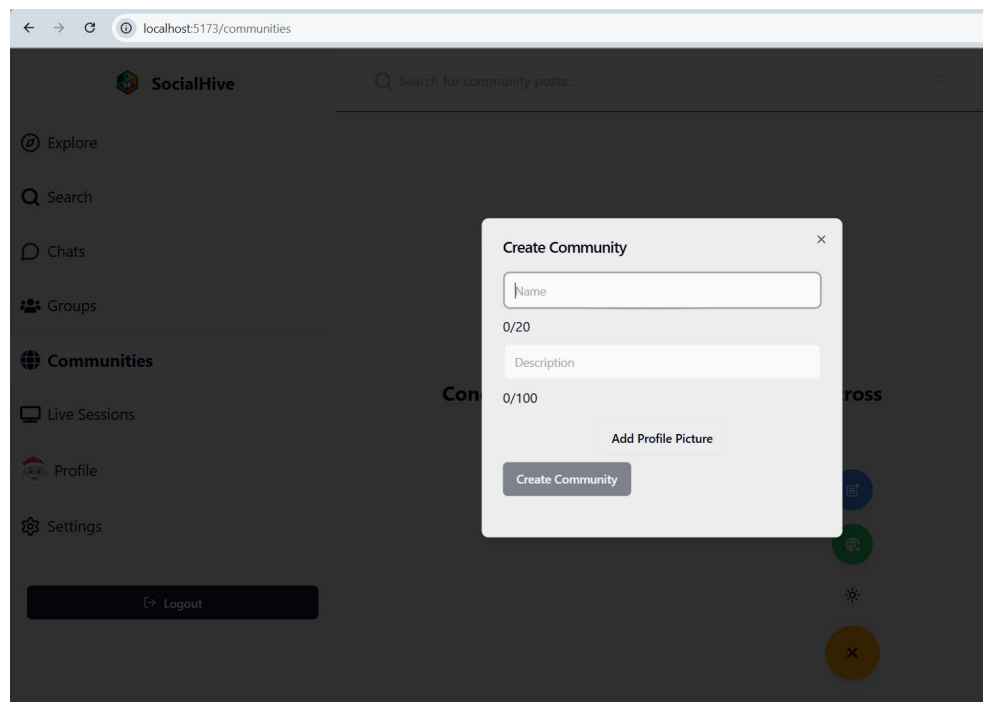
Results:

A. User Registration Page

1. **Access the Platform:** Open your web browser and navigate to the Social Hive website.
2. **Navigate to Registration:** Click on the "Register" button available on the homepage.
3. **Fill in Registration Details:** Provide necessary information like:
 - Full Name
 - Email Address
 - Password
 - Institution Name (Optional)
4. **Submit Registration:** Click the "Register" button after filling in the details.
5. **Confirmation:** A confirmation message will be displayed, and an email will be sent to verify your account.

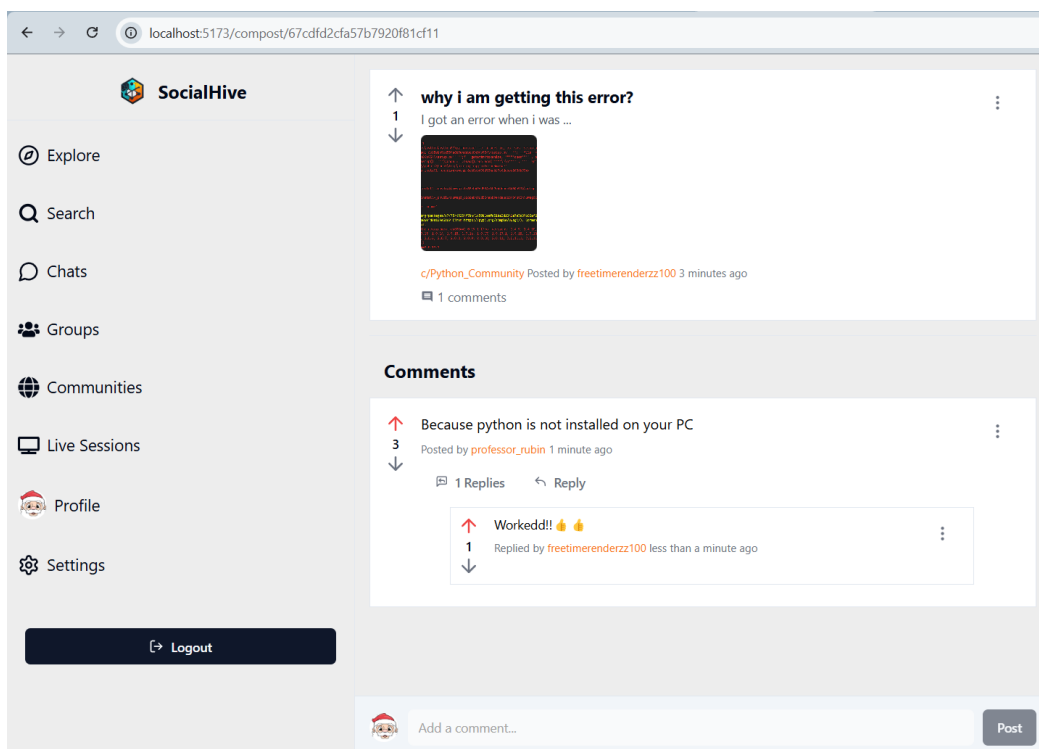
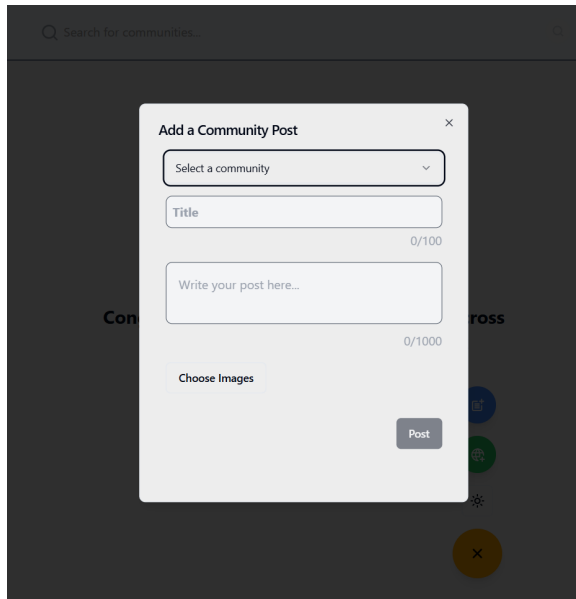
B. Creating a community

1. **Login to the System:** Use your registered email and password to log in.
2. **Navigate to Communities:** Click on the "Communities" section from the dashboard.
3. **Create Community:** Click the "Create Community" button.
4. **Fill Community Details:** Enter community name, description, and select the relevant topic or subject.
5. **Submit:** Click on "Create" to establish the community.
6. **Confirmation:** A message will confirm the successful creation of the community.



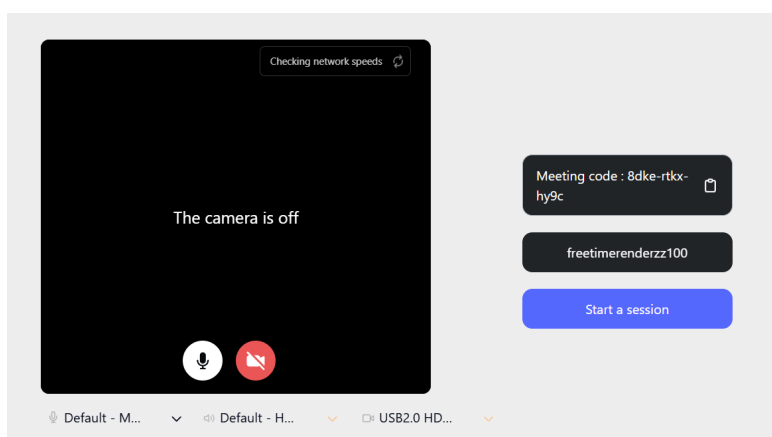
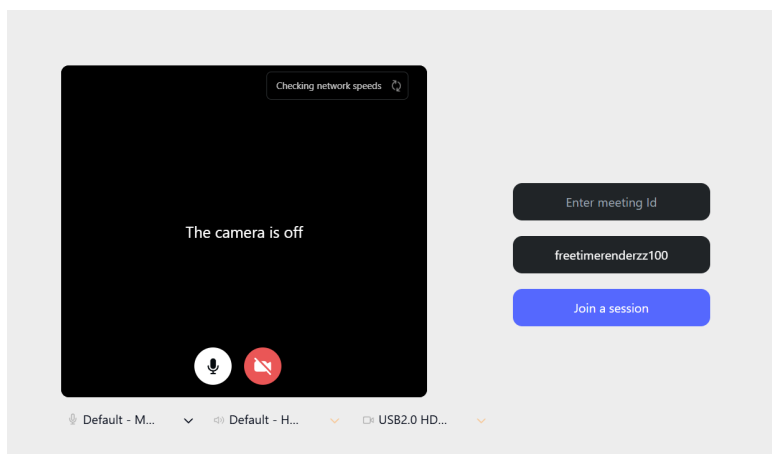
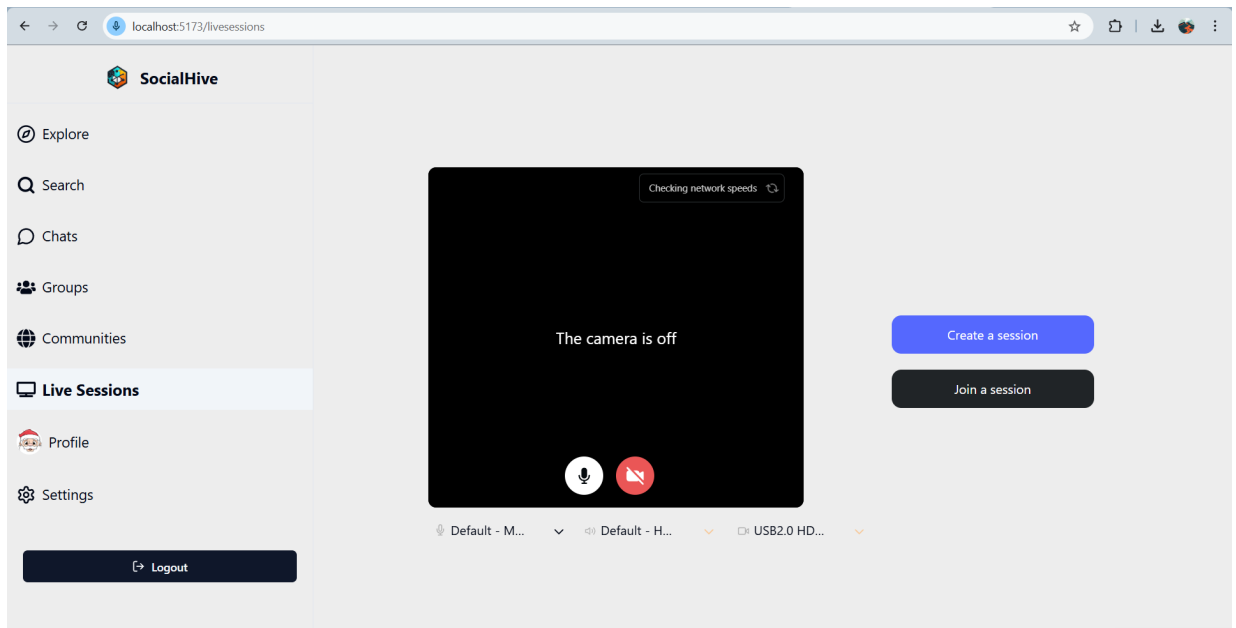
C. Posting content

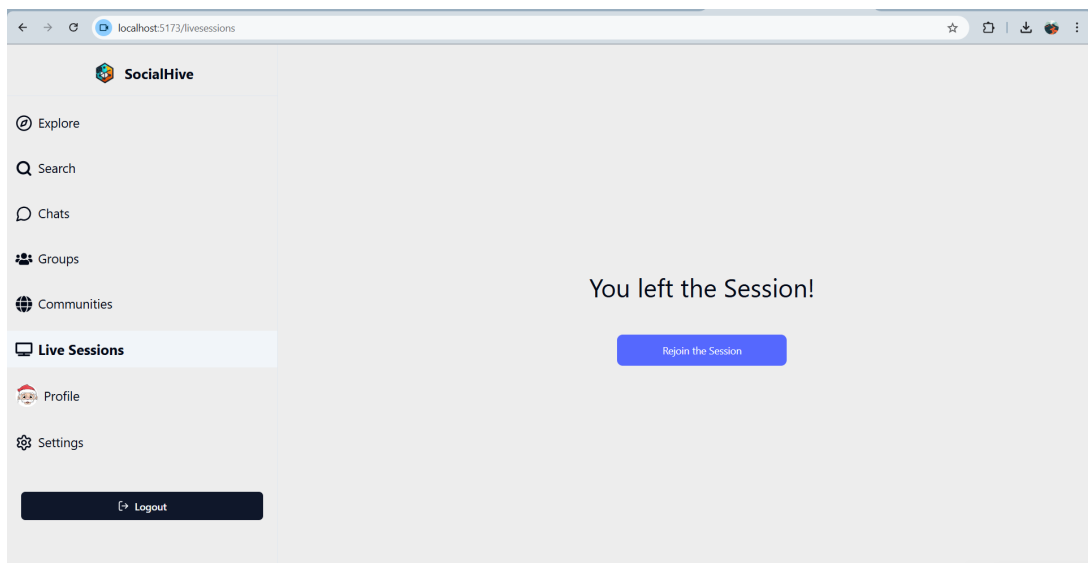
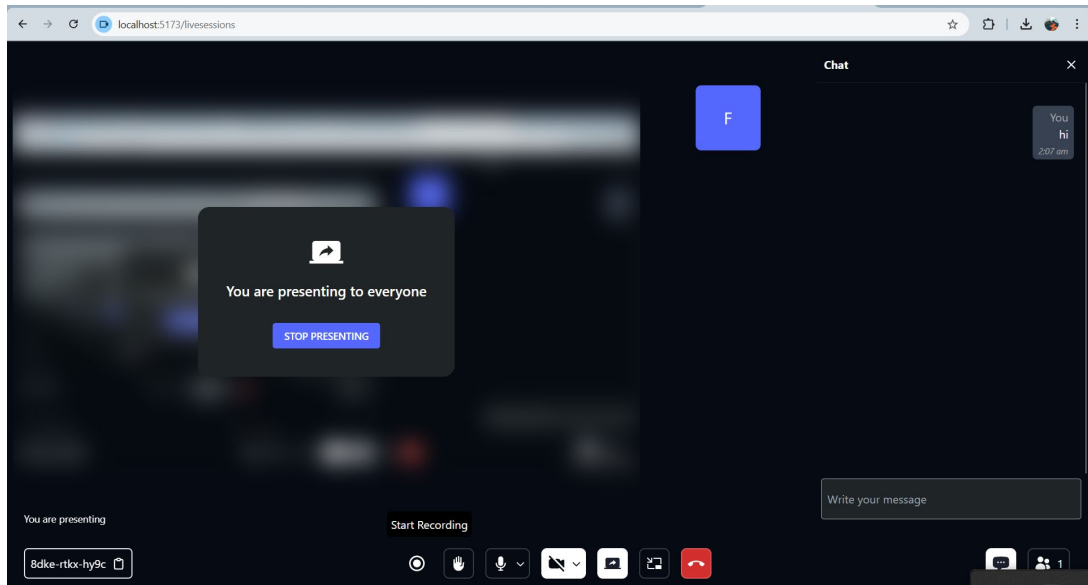
1. **Access Your Community:** Enter the community where you wish to post content.
2. **Create Post:** Click on "Create Post."
3. **Enter Post Details:** Provide a title, description, and attach any files (image only)
4. **Submit Post:** Click on "Post" to share it within the community.
5. **Confirmation:** The post will be published and visible to community members.



D. Initiating Video Sessions

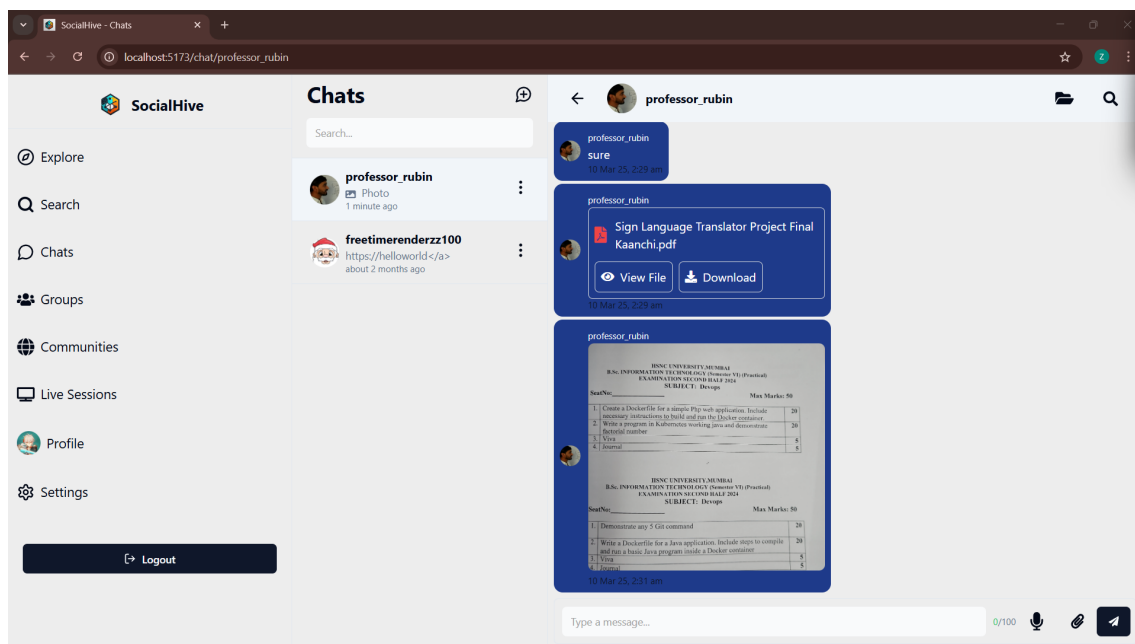
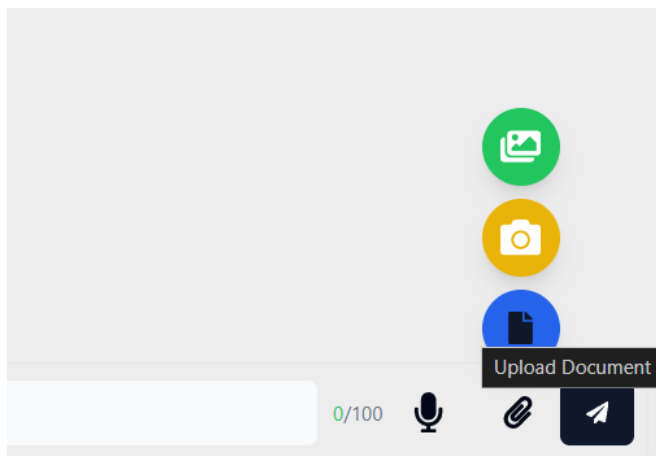
1. **Go to Live sessions:** Navigate to the "Live Sessions" section.
2. **Initiate Session:** Click on the "Start session" or enter other session's id and press "start session" button.
3. **In-Session Features:** Utilize features like mute, end call, or switch to video, present screen, raise hand, in-session chats, pip mode, record session.
4. **End Call:** Click on the "End Call" button to terminate the session.





E. Uploading Study Materials

1. **Navigate to Explore Posts:** Go to the "Study Materials" section.
2. **Upload File:** Click on the "Upload" button and select your file (PDF, notes, etc.).
3. **Add Details:** Provide a brief description and select the relevant subject category.
4. **Submit:** Click "Upload" to add it to the repository.
5. **Confirmation:** A message will confirm that the file is successfully uploaded.



F. Comparison of Social Hive with other social media platforms

Criteria	WhatsApp	Instagram	Google Meet	Reddit	Social-Hive
User can follow another user for content	✗	✓	✗	✗	✓
Individual Chats (with database)	✓	✓	✗	✗	✓
Group Chats	✓	✗	✗	✗	✓
AI for help within chats	✓	✗	✗	✗	✓
Chats (without database/ temporary chats-meet chats)	✗	✗	✓	✗	✓
Document sharing within chats	✓	✗	✗	✗	✓
Voice messages	✓	✓	✗	✗	✓
Media (Images & Videos sharing)	✓	✓	✗	✓	✓
Live sessions collaborative hosting	✗	✗	✓	✗	✓
Meeting recording	✗	✗	✗	✗	✓
Pip meeting window feature	✗	✗	✗	✗	✓
Posting content globally	✗	✓	✗	✗	✓
Creating Communities	✗	✗	✗	✓	✓
Community Posts	✗	✗	✗	✓	✓
Admin monitorization	✗	✗	✗	✓	✓
Saved Posts	✗	✓	✗	✗	✓
Liked Posts	✗	✓	✗	✗	✓
Share Posts (outside of platform)	✗	✓	✗	✗	✓
Share Posts within platform	✗	✓	✗	✗	✓

CHAPTER 7

COST ANALYSIS AND MAINTAINENCE

The term “Cost Benefit Analysis” refers to how the software will prove to be beneficial than the existing system used in the organization implementing it. Cost Benefit Analysis involves the balance of project expenditure and returns from its implementations. It must be noted that any software implementation involves initial investments and benefits are usually long term. System implementation time may vary for different organizations and it may also take some time for the employees of the different organizations to adjust with the system. The main objective behind cost and benefit analysis is to assess the feasibility to determine whether the developed project has a reasonable chance of success. A requirement of the economic feasibility of the project always requires a thorough cost benefit analysis. Developing a cost benefit analysis is a 3 step process.

Step 1: Estimate the anticipated development and operational costs.

DEVELOPMENT COSTS: It is the cost that are incurred during the development of new system, it includes:

- System Analysis Time
- Programming Time
- User Time
- Possible Cloud Purchase Cost
- Possible Software Purchase Cost
- Possible Outside Service Cost (for example System Integration)

OPERATIONAL COSTS: It is the cost that are incurred after the system is put into projection, it includes:

- Computer Cost
- Communication Cost
- Operation Staff Cost
- Incremental User Cost
- Maintenance Cost
 - Server-Side Application Cost

Step 2:

The second step is to estimate the anticipated financial benefits. Financial benefits are the expected annual saving or increase in revenue derived from the installation of new system.

Step 3:

In the third step, the Cost/ Benefit Analysis is calculated based on detailed estimated costs and benefits the most frequent error that happens here is lack of thorough definition of costs and benefits.

A thorough analysis of the system was undertaken by keeping in the cost benefit ratio, details of which are as follows:

COST EVALUATION

1. Software Costs:

- Since Windows, VS Code is freely available. Also for storage we used free version of Amazon s3 bucket, thus there is no direct software costs associated with acquiring these tools.

2. Development Costs:

- No major expenses were involved in developing the web browser.
- However, there were personnel costs associated with development, calculated as follows:

No. of people involved in project = 2

Charges per day = 150

No. of days = 95

Developer cost = No. of people involved in project * Charges per day * No. of days

$$= 2 * 150 * 95$$

$$= \text{Rs. } 28,500$$

3. Testing and Maintenance cost:

Testing and Maintenance Cost = No. of hours * Charges per day * No. of Days

No. of Hours = 2

Charges per day = 50

No. of Days = 20

Testing and Maintenance Cost = 2 * 80 * 20

$$= \text{Rs. } 2,000$$

Overall Cost = Rs. 30,500

CHAPTER 8

CONCLUSION AND FUTURE SCOPE

8.1 Conclusion

The **Social Hive** project marks a significant advancement in the integration of educational support with social networking. By providing a dynamic platform where students can create communities, share study materials, and engage in real-time discussions via audio and video calls, the platform successfully bridges the gap between traditional learning and digital collaboration.

The ability for users to form specialized communities around specific topics fosters targeted learning and peer collaboration. The streamlined sharing of study resources, combined with real-time doubt-solving features, enhances the academic experience, offering a holistic approach to education. The project has demonstrated the feasibility of a centralized platform that encourages interactive, collaborative learning while ensuring a secure and user-friendly experience.

While the current system effectively addresses the core challenges faced by students in accessing and sharing educational resources, ongoing user feedback and technological advancements will be key to refining and expanding the platform's capabilities.

8.2 Significance of System

The significance of Social Hive lies in its transformative potential for the educational landscape. By merging social networking with academic support, the platform not only facilitates peer-to-peer learning but also creates a dynamic environment where students can share knowledge and collaborate effectively. This unique combination can lead to improved academic outcomes, greater student engagement, and ultimately, a more connected and empowered learning community.

8.3 Limitations of System

Despite its innovative design, Social Hive currently faces several limitations. As the platform scales, issues related to server load and network stability may emerge, potentially affecting the performance of real-time features like audio/video calling. Additionally, while basic security measures are in place, there is room for improvement in protecting sensitive user data and ensuring compliance with evolving privacy regulations.

8.4 Future Scope

The future development of **Social Hive** offers numerous opportunities to enhance its functionality, scalability, and global reach. The following areas outline the potential growth and evolution of the platform:

- **Scalable Architecture:** Optimize backend frameworks and database management systems to efficiently handle a growing user base, ensuring high performance and seamless access to resources.
- **Mobile Application Deployment:** Launch cross-platform mobile applications for Android and iOS, ensuring students can access communities, post content, and engage in discussions anytime, anywhere.

- **Advanced Audio/Video Features:** Integrate functionalities like group video calls, screen sharing, session recording, and live annotations to enhance the interactive learning experience.
- **Integration with Educational Platforms:** Facilitate integration with platforms like Google Classroom, Microsoft Teams, and educational content providers to streamline resource sharing and collaboration.
- **Global Community Expansion:** Encourage the formation of diverse, international communities, promoting cross-cultural academic collaboration and broadening students' learning perspectives.
- **Institutional Partnerships:** Collaborate with educational institutions to validate shared content, integrate official academic resources, and provide institutional support for community activities.
- **Continuous Research and Feedback Mechanism:** Establish robust channels for gathering user feedback and conducting research on evolving educational trends to ensure the platform adapts to future academic needs.

By adopting these strategies, **Social Hive** can establish itself as a global leader in educational collaboration, fostering a culture of knowledge sharing, peer learning, and academic excellence.

CHAPTER 9

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RESEARCH PAPER

A Study Oriented Social Media Platform - SocialHive

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Abstract: Education is the cornerstone of personal and professional development, providing individuals with the knowledge and skills necessary to navigate and succeed in the world. Without reliable and comprehensive resources, students often find themselves struggling to grasp complex concepts and prepare effectively for exams. "Social Hive" is an innovative social media web application designed to revolutionize student education. It features a comprehensive repository of study materials including PDF notes and textbook answers, facilitating easy access and preview. The platform encourages interactive learning through live posts for sharing questions, fostering real-time collaboration among students. Optional educational videos complement learning materials, enhancing understanding of complex topics. Access to previous year question papers aids exam preparation, while curated training questions reinforce learning objectives. This integrated approach harnesses technology to create a dynamic and supportive learning environment.

Keywords: social media, study materials, Q&A, educational videos, collaborative communities.

INTRODUCTION

Active learning is an instructional approach that engages students in the learning process through activities that require their participation, collaboration, and critical thinking. Rather than passively receiving information, students actively contribute to discussions, solve problems, and apply concepts. This method aims to enhance comprehension, retention, and the ability to apply knowledge by fostering a more interactive and participatory learning environment.

I. LITERATURE SURVEY

An overview of Khan Academy's new AI for education shows AI's potential to usher in a new age of education and revolutionize the way we learn. By working with AI, humans can more quickly generate ideas to solve problems, brainstorm, create engaging learning experiences, and find exactly what they are looking for on their learning. Duolingo Max, powered by GPT-4, exemplifies AI and education's compatibility by delivering highly personalized language lessons and accessible, affordable English proficiency testing.

Quizlet has unveiled Q-Chat, an AI chatbot offering interactive and conversational solutions. The platform leverages the power of chatbots by incorporating a section where Q-Chat engages students with questions or formulates sets based on specific topics, subsequently assessing their knowledge. Employing techniques such as flashcards and spaced repetitions, Quizlet has transformed a modest venture initiated by Andrew Sutherland in 2005 into a global success, benefitting millions of students worldwide.

II. PROPOSED MODEL

The fundamental ethos of SocialHive revolves around Explore + Fun + Learn—a concept designed to create a space where students can delve into their interests, stay informed about the latest global news and information, and make productive use of their free time. The platform encourages students to engage in real-world knowledge and its practical applications, seamlessly blending educational content with enjoyable learning activities. The aim is to kindle a sustained interest in learning, motivating students to delve deeper into various subjects.

A. Key Characteristics of the Chatbot:

1. **Interactive Conversational Capability:** The chatbot is designed to initiate questions, fostering engaging and interactive conversations.
2. **Contextual Inquiry:** The chatbot adeptly poses context-based questions using diverse formats, including multiple-choice questions, fill-in-the-blanks, short-answer queries, and True/False statements.
3. **Graded Question Sets:** The chatbot offers a range of difficulty levels, categorized as easy, medium, and hard, ensuring a tailored and progressive learning experience.
4. **Comprehensive Assessment:** Beyond posing questions, the chatbot evaluates test performance and provides detailed solutions, ensuring a thorough learning experience for the user.

III. METHODOLOGY

Educational content is curated by experts to ensure accuracy and engagement, then integrated into quizzes, discussions, and problem-solving exercises. The user interface is designed to be intuitive and immersive. Gamification elements, such as points, badges, and leaderboards, motivate students and encourage participation. Interactive features, including forums, chat rooms, and group activities, facilitate collaboration and discussion, promoting a sense of community. The platform tracks student activities and performance data to personalize the learning experience and recommend content based on their interests and needs.

IV. TECHNOLOGY ADOPTED

A. Programming Languages:

1. **HTML:** HTML (HyperText Markup Language) is the standard language for creating web pages. It structures content and defines elements such as text, images, and multimedia, providing a clear and organized presentation of educational content.
2. **JavaScript (React.js):** JavaScript is a versatile programming language essential for interactive web development. React.js, a JavaScript library, is used for building user interfaces, allowing the creation of dynamic and responsive web applications.

3. **Java:** Java is a robust, object-oriented programming language used for developing the Android application of our web app. It provides platform independence, making it ideal for building mobile applications.

B. Backend Development:

1. **Node.js:** Node.js is a runtime environment that allows the execution of JavaScript code server-side. It is highly efficient and suitable for real-time applications.
2. **Express.js:** Express.js is a web application framework for Node.js, designed for building web applications and APIs. It simplifies the development process by providing robust features for web and mobile applications.
3. **Python:** Python is used for backend services due to its simplicity and versatility. It supports various frameworks and libraries, making it suitable for developing complex functionalities.

C. Database Management:

1. **MongoDB:** MongoDB is a NoSQL database known for its scalability and flexibility. It stores data in JSON-like documents, making it easy to manage and query large volumes of data.

D. Cloud Services:

1. **AWS (Amazon Web Services):** AWS offers a comprehensive suite of cloud services, including computing power, storage, and databases, enabling scalable and secure application development.
2. **Google Cloud:** Google Cloud provides a range of cloud services similar to AWS, offering reliable infrastructure, data analytics, and machine learning capabilities.
3. **Azure:** Microsoft Azure is a cloud computing service providing a wide array of cloud services, including those for computing, analytics, storage, and networking.

E. APIs:

1. **Payment Processing (PayPal):** PayPal API enables secure and efficient payment processing, allowing users to make transactions within the application.
2. **Geolocation (Google Maps API):** Google Maps API provides geolocation services,

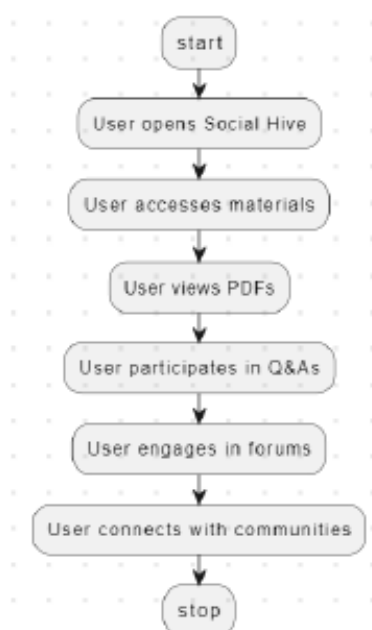
enabling location-based functionalities within the application.

3. **Messaging (Twilio):** Twilio API enables messaging services, allowing users to send and receive SMS, MMS, and other forms of communication.

F. Security:

1. **SSL/TLS:** Secure Sockets Layer (SSL) and Transport Layer Security (TLS) are cryptographic protocols ensuring secure data transmission over the internet. They protect sensitive information such as personal data and payment details.

V. FLOW DIAGRAM



VI. FUTURE SCOPE

The future scope of AI-powered chatbots in education is promising and vast. By continuously integrating the latest advancements in AI and educational technologies, the chatbot can become an indispensable tool for students, facilitating interactive and personalized learning experiences. Personalized learning with the help of a chatbot will surely make the learning experience more effective.

Conclusion

It is crucial to acquaint students with applications that are both productive and intellectually stimulating. In the current era of AI technology, students should leverage tools that enhance their knowledge and contribute to their holistic development. The incorporation of active learning techniques through AI presents students with a novel approach to studying. Access to real-world knowledge and current events will ignite their curiosity and serve as a motivation for innovation.

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