

# MindMesh

*by Ahmed Talha*

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**Submission date:** 17-Dec-2025 09:20PM (UTC-0800)

**Submission ID:** 2848730576

**File name:** MindMesh\_FYP.docx (2.63M)

**Word count:** 7017

**Character count:** 40482

# **MindMesh: Connecting Minds, Creating Knowledge**

**1 Final Year Project – Mid Report (Phase I)**

**Session 2022-2026**

**A** <sup>2</sup> Final Year Project-I submitted in partial fulfillment  
of the requirements for the Degree  
of  
BS in Computer Science



**Department of Computer Science**  
**University of the Punjab, Lahore**

## Project Details

Project ID (for office use)				
Type of project	<input type="checkbox"/> Traditional	<input checked="" type="checkbox"/> Industrial	<input type="checkbox"/> Continuing	
Nature of project	<input checked="" type="checkbox"/> Development <input type="checkbox"/> Research & Development			
Sustainable Development Goals(SDGs)	<input type="checkbox"/> Good Health and Well-Being <input checked="" type="checkbox"/> Quality Education <input checked="" type="checkbox"/> Industry, Innovation, and Infrastructure <input type="checkbox"/> Gender Equality <input type="checkbox"/> Decent Work and Economic Growth <input type="checkbox"/> Climate Action			
Area of specialization	<input checked="" type="checkbox"/> Artificial Intelligence (AI) <input type="checkbox"/> Blockchain <input type="checkbox"/> Cybersecurity <input type="checkbox"/> Data Science and Analytics <input type="checkbox"/> Game Development <input type="checkbox"/> Internet of Things (IoT) <input type="checkbox"/> Natural Language Processing (NLP) <input type="checkbox"/> Mobile App Development <input checked="" type="checkbox"/> Web Development			
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## ABSTRACT

In recent few years, the boom in digital platforms has changed how people around the globe share knowledge and collaborate with each other. However, students/teachers/researchers usually lack a platform that is academic-oriented and dedicated to peer-to-peer knowledge exchange which results in intellectual isolation and lack of familiarity with ongoing trends in academia. Our project **MindMesh**, focuses on bridging this gap and connecting the verified university/college students/teachers/researchers based on their subdomains/fields.

This platform will let students/teachers/researchers post questions, share thoughts, and involve in threaded discussions over diverse academic topics. Features will include endorse/refute mechanism, defined SOPs to keep this platform relevant, AI-assisted moderation to flag the irrelevant content, categorization<sup>7</sup> based on sub-domains, direct messaging, and user profile with contribution score. A following system will allow the user to follow other peers and based on interests; recommendation engine will suggest related posts for broader engagement.

15  
**MindMesh** - a forum style website to connect intellect, will be developed using web stack, with React.js for frontend, Node.js and Express.js for backend, and PostgreSQL as the primary database. To implement content regularization, under defined SOPs, we will be using the content-filtering APIs of Large Language Models such as (Mistral or Gemini). The solution aims to develop a fully secure and purely academic-oriented community that fosters mutual collaboration, problem-solving, and making the intellectual resources available among students/teachers/researchers.

The outcome is a functional Minimum Viable Product, with the ability to register students/teachers/researchers, create posts, involve in discussions and endorse content. **MindMesh** provides a platform to foster collaborative learning, bridges the intellectual gaps, and promotes the academic excellence in higher education

## Table of Contents

Chapter 1. Introduction .....	<b>Error! Bookmark not defined.</b>
1.1 Introduction .....	5
1.2 Problem Statement .....	5
1.3 Proposed Solution .....	5
1.4 Main Objectives .....	6
1.5 Assumptions & Constraints .....	6
1.6 Project scope .....	6
1.7 Software Development Lifecycle Model .....	7
Chapter 2. Requirement Analysis .....	7
2.1 Literature Review .....	7
2.2 Stakeholders List .....	9
2.3 Requirements Elicitation .....	9
2.3.1 Functional Requirements .....	<b>Error! Bookmark not defined.</b>
2.3.2 Non-functional Requirements .....	<b>Error! Bookmark not defined.</b>
2.3.3 Requirements Traceability Matrix .....	<b>Error! Bookmark not defined.</b>
2.3.4 Use Case Description .....	<b>Error! Bookmark not defined.</b>
Chapter 3. System Design (Main System Flow Diagram can be added) .....	27
3.1 Use Case Design .....	27
3.2 Activity Diagram .....	29
3.3 Sequence Diagram .....	31
3.4 Software Architecture Diagram .....	34
3.5 Class Diagram .....	35
3.6 Database Diagram .....	37
3.7 Collaboration Diagram .....	41
Chapter 4. System Testing (If Required) .....	42
4.1 Test Cases Design .....	43
4.2 Unit / Integration / Acceptance Testing .....	<b>Error! Bookmark not defined.</b>
Chapter 5. Implementation .....	45
5.1 Work Breakdown Structure (WBS) .....	45
5.2 Team Roles and Responsibilities .....	45
5.3 Tools and Technologies .....	46
5.4 Implementation Details .....	46
5.5 Screenshots of Prototype / System .....	48
5.6 Challenges During Implementation .....	<b>Error! Bookmark not defined.</b>
Chapter 6. References .....	52

## 1.1 Introduction

Currently, there **is** no such platform where student/teachers/researches can connect and share their thoughts for mutual learning. Mostly students have to rely on social groups (e.g WhatsApp, Facebook) but they lack the specific structure, categorization, and moderation needed for such platform. So, students face challenges while finding reliable information and connecting with the peers for mutual learning.

Such online forums are viewed positively by 93% of the students as they enhance critical thinking and let students reflect their ideas. Moreover, such a space can help shy students flexibly participate online [1].

Q&A communities have a huge user base, 2024 Stack Overflow survey revealed that around 65,437 respondents were actively involved in discussions from 185 countries [2].

The proposed system, MindMesh, mitigates these fundamental challenges by creating a secure platform where students/teachers/researchers can register, create posts, involve in discussions and endorse content. The project's objective includes:

- Building a forum system with categorization based on sub-domains for structured discussions.
- Allowing students, teachers, and researchers to create and share posts for knowledge exchange.
- Use AI-driven moderation to keep content relevant and aligned with our SOPs.
- Implementing the following and direct messaging systems.
- A scoring module which will rate the user profile on the basis of his contributions.

By focusing on the academic community, this platform will ensure that students will engage only in productive discussions. No irrelevant content(reels or memes etc) like other platforms come in their feed. This will support learning, project collaboration, and knowledge-sharing across diverse domains.

## 1.2 Problem Statement

There is no such platform where student/teachers/researches can connect and share their thoughts for mutual learning. Mostly students have to rely on social groups (e.g WhatsApp, Facebook) but they lack the specific structure, categorization, and moderation needed for such a platform. So, students face challenges while finding reliable information and connecting with peers for mutual learning. As a result, users face issues like distraction due to irrelevant content, misinformation, and low-quality discussions. Current Q&A and social media platforms are just focusing on trends to increase the users for their platform instead of academics. All these platforms are allowing you to post irrelevant, off-topic, non-credible content like viral videos, memes and funny content. We realized that students/scholars are struggling for such communities that engage them in creative tasks. Thus, there is a significant need for a platform that allows users to only register with their institute email. This platform should feature a structured categorization, a reputation system, and AI-assisted moderation to ensure content quality and relevance if the content is irrelevant then it should flag.

## 1.3 Proposed Solution

We are using Agile development methodology with iterative sprints. The following 5 layers are in our [project](#).<sup>12</sup>

**Frontend:** React.js and Tailwind CSS for a responsive user interface.

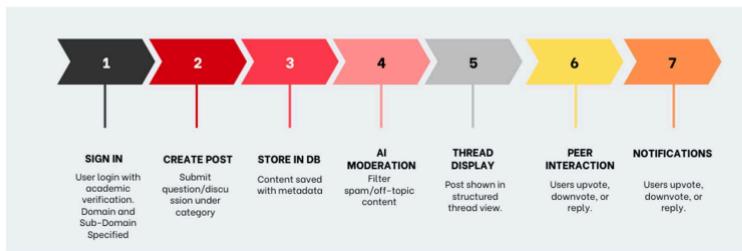
**Backend:** Node.js with Express.js for backend APIs.

**Database:** PostgreSQL for structured data.

**AI Moderation:** Gemini Large Language Model API for AI moderation.

**Notification:** Libraries like WebSockets and Socket.IO for real-time updates.

## Flow



## 1.4 Main Objectives

The aim of this project is to develop an academia-oriented discussion platform that promotes the structured, subject-based knowledge among students/researchers/teachers. The system will support AI based moderation, endorsement/refutation mechanism and direct messaging to ensure safe collaborative environment.

To achieve the above aim, following objectives will be focused:

- Based on subject/domain, show structured relevant discussion threads
- Using AI to flag the irrelevant content
- Implement following systems, endorsement and user reputation.
- Enable direct Messaging for peers

## 1.5 Assumptions & Constraints

### Assumptions

- Users will register with valid university or institution-affiliated email addresses.
- Users will participate in academic and domain-specific discussions following defined SOPs.
- Stable internet access is available to users accessing the platform.
- AI moderation APIs, such as LLM content-filtering services, will work reliably to detect irrelevant or non-academic content.
- Users have basic technical skills to operate a web-based forum platform.

### Constraints

- The system's performance is limited because we are using a free server and hosting for deployment.
- Because we are using a third party API for AI moderation so we cannot achieve 100% accuracy.
- Due to budget restrictions we cannot use premium cloud services or higher-level AI models.
- Our first priority is user security and privacy. We will protect data from any unauthorized access.
- Scalability is initially limited because it is a huge system so we have a lack of resources and budget.

## 1.6 Project scope

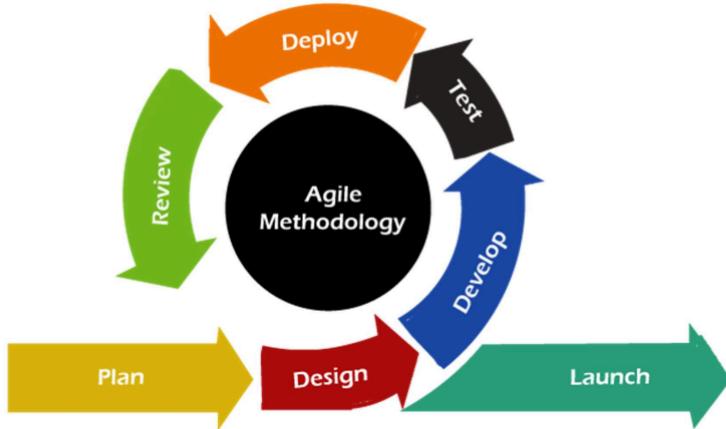
The project scope includes:

1. Core Forum Features: Student registration, post creation, threaded replies, endorsing.
2. Profiles & Reputation: Reputation points based on contributions.

3. AI Moderation: Flagging of irrelevant content.
4. Communication Tools: Direct messaging and notifications.
5. Domain-based Categorization: Ensuring relevant, academic discussions.

## **1.7 Software Development Lifecycle Model**

Our project is developed using specific software development lifecycle. Software development approach is best suited for the project depends on the requirement and other factors. A process model is a development strategy that is used to achieve a goal that satisfies the requirements abiding by the constraints.



## **7 Chapter 2. Requirement Analysis**

### **2.1 Literature Review**

Existing platforms like Stack Overflow and Reddit, with a total monthly user base of 550 million and a total of around 70 million people who are active, offer infrastructure for threaded discussions. However, these forums do not focus on a particular feature of a domain and are not solely dedicated to an academic discourse. Moreover, they do not have any mechanism in place that filters and removes irrelevant content reproduced.

LinkedIn and Facebook allow users to post things, but neither platform establishes any relevance to a user's area of interest. As a result, users are free to spread any content from their personal narratives to their recreational interests. Whilst LinkedIn can be seen as a professional network on a global scale, there are no restrictions on what you can post, or you can use Facebook, where students spend an average of 4.84 hours per week, as a social entertainment medium.

The lack of domain-specific moderation on these platforms often leads to discussion threads becoming flooded with material not specific to the topic and content that is not of a high quality, therefore burying substantive academic or professional content. For example, the wide scope of Reddit sub-reddits can take the form of scholarly discussions, but the discussion is often derailed by memes and unverified statements. This noise makes it difficult for researchers, students and faculty to participate in deep and high quality exchanges.

A dedicated academic platform can solve these flaws by strict content moderation and by following guidelines specific to each domain. Features such as peer-reviewed submissions, verified user credentials and topic-based channels would help in maintaining the relevance and quality. In contrast to the working professional networking orientation of LinkedIn or the entertainment orientation that Facebook creates, such a site would prioritize the scholarly collaboration, creating an atmosphere for academic discussions to thrive without the irrelevant distractions.

Current platforms are also not good with accessibility for specialized academic domains. On such platforms, students and researchers struggle to find a proper channel or community that is relevant to them. This fragmentation makes it difficult to collaborate and to share knowledge because sometimes scholars have to dig through different sources to find relevant discourse.

Furthermore, no strong verification stages applied to these platforms makes it easier to spread misinformation. On Reddit, for instance, anyone can post without iteration of any type of credentials, creating a question in the credibility of discussions. A platform that is focused on academia would benefit from automatic user authentication, such as institutional affiliation or publication records, meaning that exchanges can be built on recognized expertise and therefore raise trust and reliability.

Finally, there are a great deal of existing platforms that value user engagement over content, rewarding posts that generate viral or sensational content rather than substantive knowledge post that would be a scholarly contribution. This gamification tends to inhibit in-depth discussion because people may feel the pressure to create a piece of attention-grabbing content rather than a certain nuanced argument. An individualized academic platform could change this emphasis, giving feedback from peers, citations, or relevance to contributors in order to make a more fruitful setting for scholarly discourse.

## Reddit

### *Limitations*

- Not domain-specific
- Does not flag post that are irrelevant
- Has lack of rigorous moderation of academic content
- Discussions are usually diluted by off-topic or poor quality contributions
- Discussions are often diluted by posts that do not contribute to the original discussion or that are of poor quality

## LinkedIn

### *Limitations*

- Does not flag irrelevant content
- Has no location based features
- Wide-ranging professional approach, not specific for academia
- Few tools for structured threaded discussions
- Content tending towards self - promotion or networking
- The use of contents is often directed to the self-promotion or the networking

## Solution

- **Domain-specific channels:** Narrowcast channels where groups of users interested in a particular field, e.g. theoretical physics or computational biology, can be assured that the conversations will be of a high quality
- **Content moderation and flagging:** Automated and peer-based systems to identify and take down posts that are irrelevant or low USP thereby preserving the integrity of discussions.
- **User verification:** Requirement of institutional affiliations or publication records to increase credibility and minimum the arising misinformation.
- **Location-based features:** Facilitation of connections with the scholars in local and international academic communities or events accordingly solving the inclusive issue of space functionality of LinkedIn.
- **Quality driven engagement:** Contributions based on peer reviews, citations or topics rather than by metric of viral gesture followed by the substantive discussion that fosters it.

## 2.2 Stakeholders List

The users of the system include:

### Admin

- He / She can verify posts which are flagged by AI.
- He / She can remove user.
- He / She can remove a post.
- He / She can verify users.
- He / She can send warning notification to the user.
- He / She can generate analysis report.

### User

- He / She can view profiles of other users.
- He / She can follow user to other users.
- He / She can edit his/her profile.
- He / She can create a post.
- He / She can comment on a post.
- He / She can endorse/refute someone post.

## 2.3 Requirements Elicitation

Requirement Gathering: Data is gathering from different international and national forums which show the intellect disparity around the globe.

### 2.3.1 Functional Requirements

#### FR01: User Registration & Verification

Requirement Number	Functional Requirement
FR01-1	The system shall allow new users to register using a university-affiliated email.
FR01-2	The system shall send a verification link to the user's email to confirm their identity.

#### FR02: Login

Requirement Number	Functional Requirement
FR02-1	The system shall allow registered and verified users to log in with their email and password.
FR02-2	The system shall provide a secure session for the logged-in user.

**FR03: Post Management**

Requirement Number	Functional Requirement
FR03-1	Logged-in user shall be able to create posts (questions, thoughts, solutions or research papers) categorized by sub-domains.
FR03-2	The user will be able to browse posts categorized by sub-domains/fields.
FR03-3	The user shall be able to reply to posts in threaded format.

**FR04: Content Interaction**

Requirement Number	Functional Requirement
FR04-1	<sup>13</sup> A logged-in user shall be able to endorse a post.
FR04-2	<sup>13</sup> A logged-in user shall be able to refute a post.
FR04-3	Endorsements and refutations shall affect the content's visibility and the author's reputation score.

**FR05: Search**

Req. No.	Description
FR05-01	The application should allow users to search for posts, discussions, or other users based on keywords, sub-domains, or usernames.
FR05-02	The users should be able to search profiles based on fields of expertise, contribution scores, or followed users.

**FR06: User Interaction**

Req. No.	Description
FR06-01	A logged-in user shall be able to follow another user. <small>8</small>
FR06-02	A logged-in user shall be able to send a direct message to another user. <small>8</small>
FR06-03	The user shall be able to view other users' profiles. When the user clicks on a specific profile, they shall see contribution scores, activity statistics, followed users, and sub-domains.

**FR07: AI Moderation**

Req. No.	Description
FR07-01	The system shall automatically scan new posts and replies for content that violates SOPs.
FR07-02	The system shall flag violating content and place it in a queue for administrator review.

**FR08: Profile Management**

Req. No.	Description
FR08-01	A logged-in user shall have a profile displaying their posts, replies, and reputation score.

**FR09: Administrator Functions**

Req. No.	Description
FR09-01	An administrator shall be able to view and act upon flagged content (approve/delete).
FR09-2	An administrator shall be able to manage user accounts (verify, suspend, delete).
FR09-3	An administrator shall be able to create, edit, and delete content categories.

28

**2.3.2 Non-functional Requirements**

Requirement Number	Non-functional Requirements
NFR01	Response time for loading posts, profiles, or searches should not exceed 2 seconds.
NFR02	Users should not be able to login with mismatched credentials; multi-factor authentication should be supported for security.
NFR03	Duplicate registrations with the same university email must be prevented.
NFR04	User data (profile <sup>29</sup> s, messages, contributions) must remain protected with encryption and compliance to data privacy standards (e.g., GDPR-like for academic data).
NFR05	The system should handle up to 1,000 concurrent users without performance degradation.
NFR06	The platform should be accessible on web and mobile devices with responsive design.
NFR07	AI moderation should achieve at least 90% accuracy in flagging irrelevant content.
NFR08	The system should maintain 99.9% uptime for real-time features like notifications and messaging.

### 2.3.3 Requirements Traceability Matrix

(missing)

### 2.4 Use Case Description

A set of use cases, actors, and their relationships are shown in use case diagrams. They represent a system's use case perspective. A use case illustrates a certain system capability. The links between the functionality and their internal/external controllers are therefore described using use case diagrams. Actors are the name given to these controllers.

Use Tables

Login and Signup

<b>1</b> Use case ID: 001	
Use case name: LOGIN & SIGN UP	
Priority High	
Actor: User	
<b>Use Case Summary</b>	
<b>Pre-condition</b>	
The users must open the application and provide university-affiliated credentials.	
<b>3</b> <b>Normal Course of Events</b>	<b>Alternate Path</b>
The use case starts when the user opens the application. The users must be able to login by providing correct email and password, or signup with verification.	If credentials are invalid, prompt for retry or password reset.
<b>Post Conditions</b>	
<b>6</b> The user will be able to access the platform's features.	
<b>Use Case Cross References</b>	
<b>Includes</b>	Name, Username, Email, Password, Sub-domains/Fields
<b>Excludes</b>	

### Search Posts/Users

<b>Use case ID:</b> 002
<b>Use case name:</b> SEARCH POSTS/USERS
<b>Priority</b> High

<b>Actor:</b> User	
<b>Use Case Summary</b>	
<b>Pre-condition</b>	
③ The user has logged into the platform.	
<b>Normal Course of Events</b>	<b>Alternate Path</b>
The use case starts when the user clicks on the search bar in the dashboard. The user must enter keywords or filters to view results, including posts or profiles.	If no results, suggest related recommendations.
<b>Post Conditions</b>	
The user can browse search results and navigate to posts/profiles.	
<b>Use Case Cross References</b>	
<b>Includes</b>	Keywords, Sub-domains, Usernames, Contribution Scores
③ <b>Excludes</b>	

## **View Recommendations**

<b>Use case ID:</b> 003	
<b>Use case name:</b> VIEW RECOMMENDATIONS	
<b>Priority</b> High	
<b>Actor:</b> User	
<b>Use Case Summary</b>	
<b>Pre-condition</b>	
The user must have followed other users or specified sub-domains.	
<b>Normal Course of Events</b>	<b>Alternate Path</b>
This use case starts when the user accesses the dashboard or recommendations feed. The user shall see suggested posts and users based on algorithms.	

<b>Post Conditions</b>	
The user can engage with recommended content.	
<b>Use Case Cross References</b>	
<b>Includes</b>	Followed Users, Sub-domains, Post Relevance
<b>Excludes</b>	

## Direct Messaging

3 Use case ID: 004	
<b>Use case name:</b> DIRECT MESSAGING	
<b>Priority</b> High	
<b>Actor:</b> User	
<b>Use Case Summary</b>	
<b>Pre-condition</b>	
The user must select another user's profile and click on message.	
<b>Normal Course of Events</b>	<b>Alternate Path</b>
The user clicks on the message button in the profile. If offline, queue messages for delivery. The user must be able to send/receive messages in real-time.	
<b>Post Conditions</b>	
The users can continue conversations via notifications.	
<b>Use Case Cross References</b>	
<b>Includes</b>	Username, Message Timestamp, Notifications
<b>Excludes</b>	

## Create Posts

1	Use case ID: 005
	Use case name: CREATE POSTS
	Priority High
	Actor: User
Use Case Summary	
Pre-condition	
The user is logged in and selects a sub-domain.	
3	Normal Course of Events
	Alternate Path
This use case starts when the user clicks on the create post option. The user shall categorize and submit the post (question/thought).	AI moderates for relevance before posting.
Post Conditions	
The post is visible in threaded discussions.	
Use Case Cross References	
Includes	Title, Content, Sub-domain, Tags
Excludes	

1  
Reply To Posts

<b>Use case ID:</b> 006	
<b>Use case name:</b> REPLY TO POSTS	
<b>Priority</b> High	
<b>Actor:</b> User	
<b>Use Case Summary</b>	
<b>Pre-condition</b>	
The user views an existing post.	

<span style="color: red;">1</span> <b>Normal Course of Events</b>	<b>Alternate Path</b>
This use case starts when the user clicks on reply in a post. The user shall submit a reply.	
<b>Post Conditions</b>	
The reply appears in the thread.	
<b>Use Case Cross References</b>	
<b>Includes</b>	Reply Content, Parent Post ID
<b>Excludes</b>	

**Endorse / Refute**

<b>1</b> <b>Use case ID:</b> 007	
<b>Use case name:</b> ENDORSE / REFUTE	
<b>Priority</b> High	
<b>Actor:</b> User	
<b>Use Case Summary</b>	
<b>Pre-condition</b>	
The user views a post or reply.	
<b>6</b> <b>Normal Course of Events</b>	<b>Alternate Path</b>
This use case starts when the user clicks endorse/refute. The action updates visibility and scores.	
<b>Post Conditions</b>	
Contribution scores are updated.	
<b>Use Case Cross References</b>	

<b>Includes</b>	Endorsement Type, Content ID
<b>3</b> <b>Excludes</b>	

### View Profile

<b>Use case ID:</b> 008	
<b>Use case name:</b> VIEW PROFILE	
<b>Priority</b> High	
<b>Actor:</b> User	
<b>Use Case Summary</b>	
<b>Pre-condition</b>	
The user searches or clicks on a username.	
<b>1 Normal Course of Events</b>	<b>Alternate Path</b>
This use case starts when the user selects a profile. The user shall see scores, activities, and follows.	
<b>Post Conditions</b>	
The user can follow or message from the profile.	
<b>Use Case Cross References</b>	
<b>Includes</b>	Contribution Score, Sub-domains, Activity Stats
<b>Excludes</b>	

## Manage Moderation

1	Use case ID: 009
Use case name:	MANAGE MODERATION
Priority	High
Actor:	Admin
Use Case Summary	
1	Pre-condition
Admin is logged in.	
Normal Course of Events	Alternate Path
This use case starts when admin accesses the moderation dashboard. Admin reviews and approves/removes flagged items.	
Post Conditions	
1	Content is updated accordingly.
Use Case Cross References	
Includes	Flagged Content, AI Reports
Excludes	

## Verify users

1	<b>Use case ID:</b> 010
	<b>Use case name:</b> VERIFY USERS
	<b>Priority</b> High
	<b>Actor:</b> Admin
	<b>Use Case Summary</b>
	<b>Pre-condition</b>
	Admin views pending verifications.
1	<b>Normal Course of Events</b>
	<b>Alternate Path</b>
	This use case starts when admin checks pending users. Admin approves based on credentials.
Reject if invalid.	

<b>Post Conditions</b>	
Verified users gain access.	
3	<b>Use Case Cross References</b>
<b>Includes</b>	Email, University Proof
<b>Excludes</b>	

## [View Reports](#)

<b>Use case ID:</b> 011	
<b>Use case name:</b> VIEW REPORTS	
<b>Priority</b> High	
<b>Actor:</b> Admin	
<b>Use Case Summary</b>	
1 <b>Pre-condition</b>	
Admin is logged in.	
<b>Normal Course of Events</b>	<b>Alternate Path</b>
This use case starts when admin selects reports. Admin views usage stats and feedback.	
<b>Post Conditions</b>	
Admin can take actions based on insights.	
<b>Use Case Cross References</b>	
<b>Includes</b>	Usage Stats, New Registrations, Flagged Items
<b>Excludes</b>	

## Follow Users

1	Use case ID: 012
Use case name:	FOLLOW USERS
Priority	High
Actor:	User
Use Case Summary	
Pre-condition	
User	views a profile.
1	Normal Course of Events
	Alternate Path
This use case starts when user clicks follow. The follow is added, enabling updates.	
Post Conditions	
Recommendations are updated.	
Use Case Cross References	
Includes	User ID, Follow Status

**1**  
View Notifications

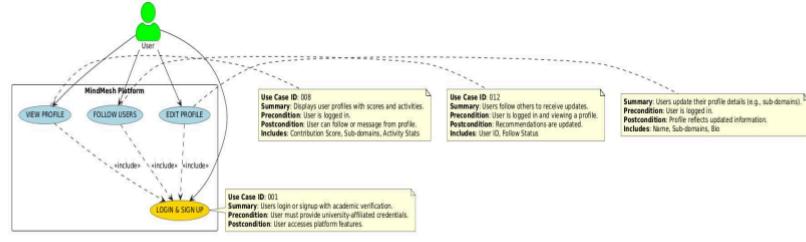
<b>Use case ID:</b> 013	
<b>Use case name:</b> VIEW NOTIFICATIONS	
<b>Priority</b> High	
<b>Actor:</b> User	
<b>Use Case Summary</b>  1 <b>Pre-condition</b>  User is logged in.	
<b>Normal Course of Events</b>  This use case starts when user accesses notifications. User views alerts for messages, replies, endorsements.	<b>Alternate Path</b>

<b>Post Conditions</b>  User can navigate to related content.	
<b>Use Case Cross References</b>	
<b>Includes</b>	Notification Type, Timestamp

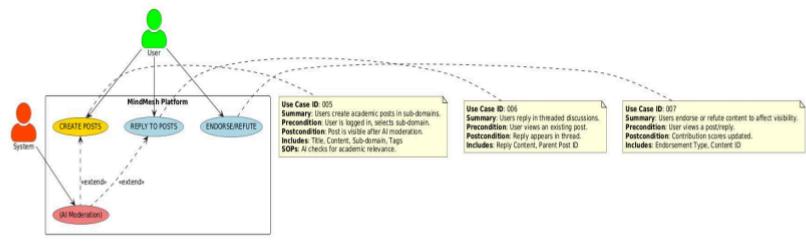
## 1 Chapter 3. System Design

This section should have the following subsections providing details of your project. Description to every diagram **MUST** be added.

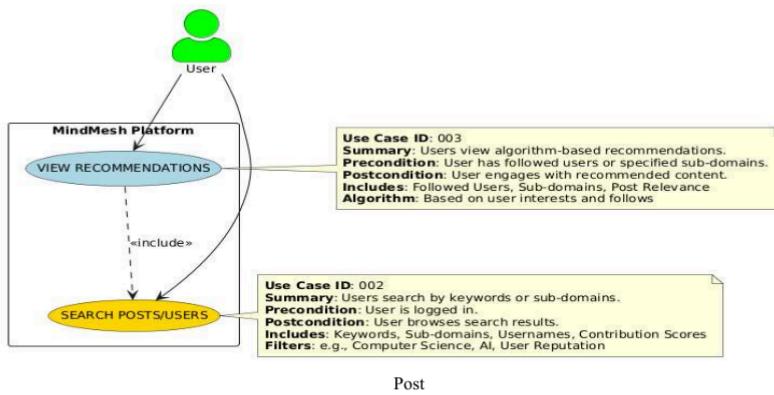
### 3.1 Use Case Design



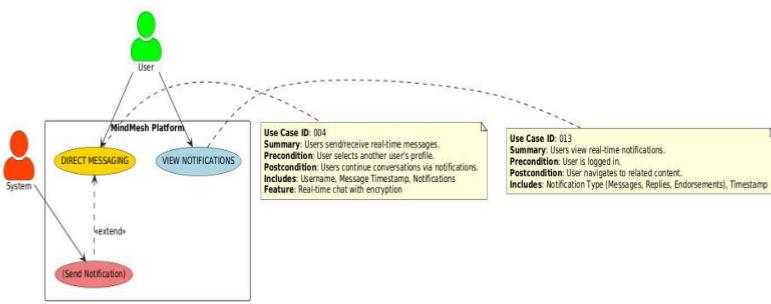
User



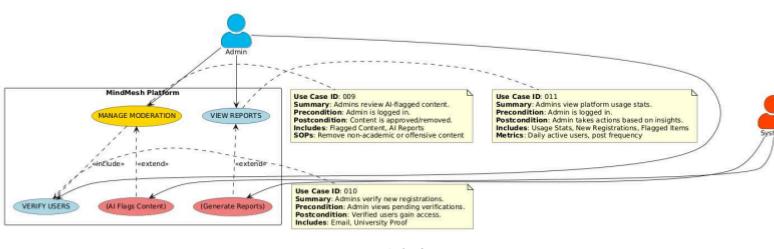
User Interaction



Post

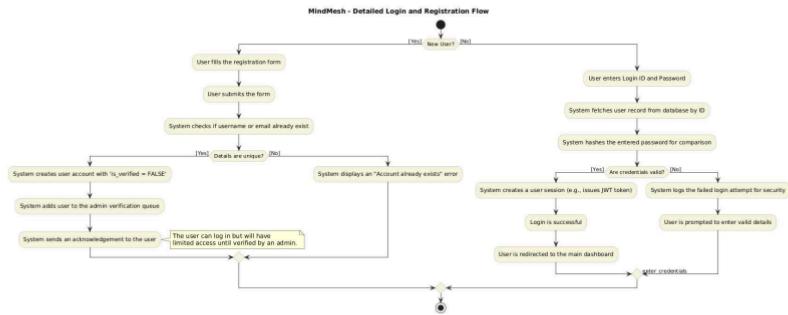


Messaging and Notify

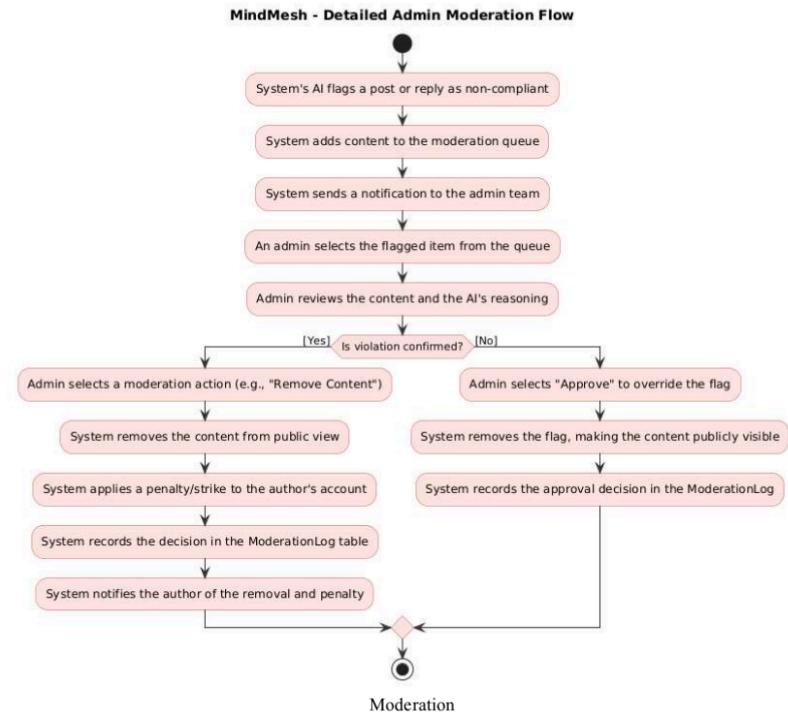


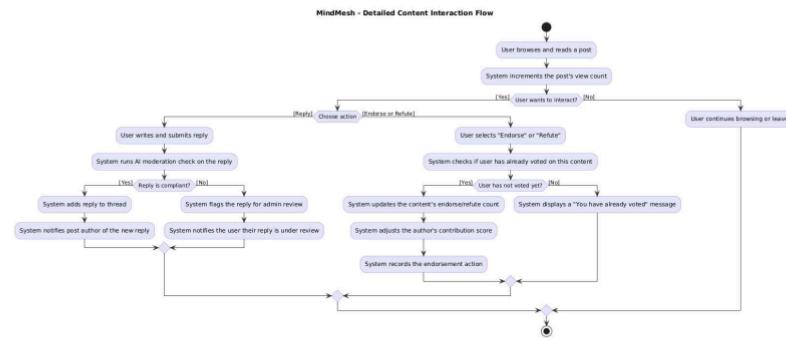
Admin

### 3.2 Activity Diagram

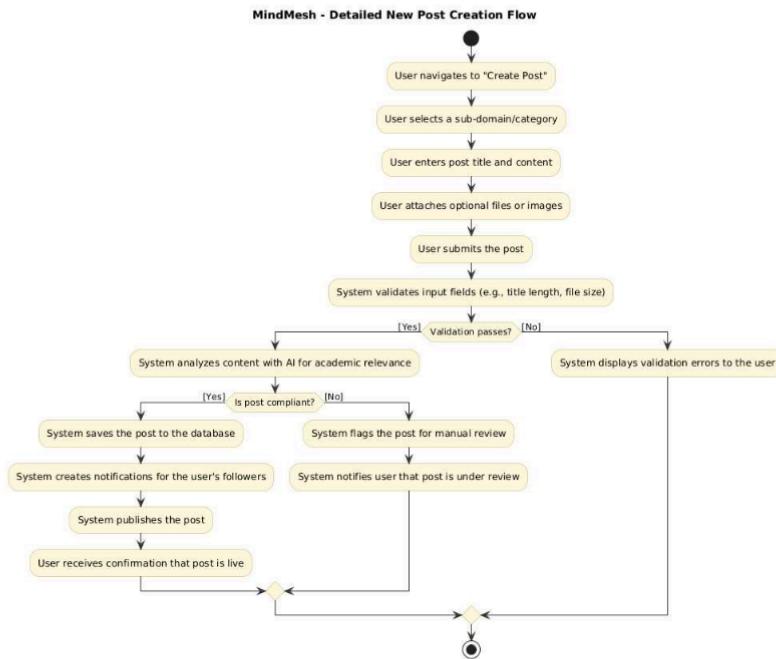


Login & Registration



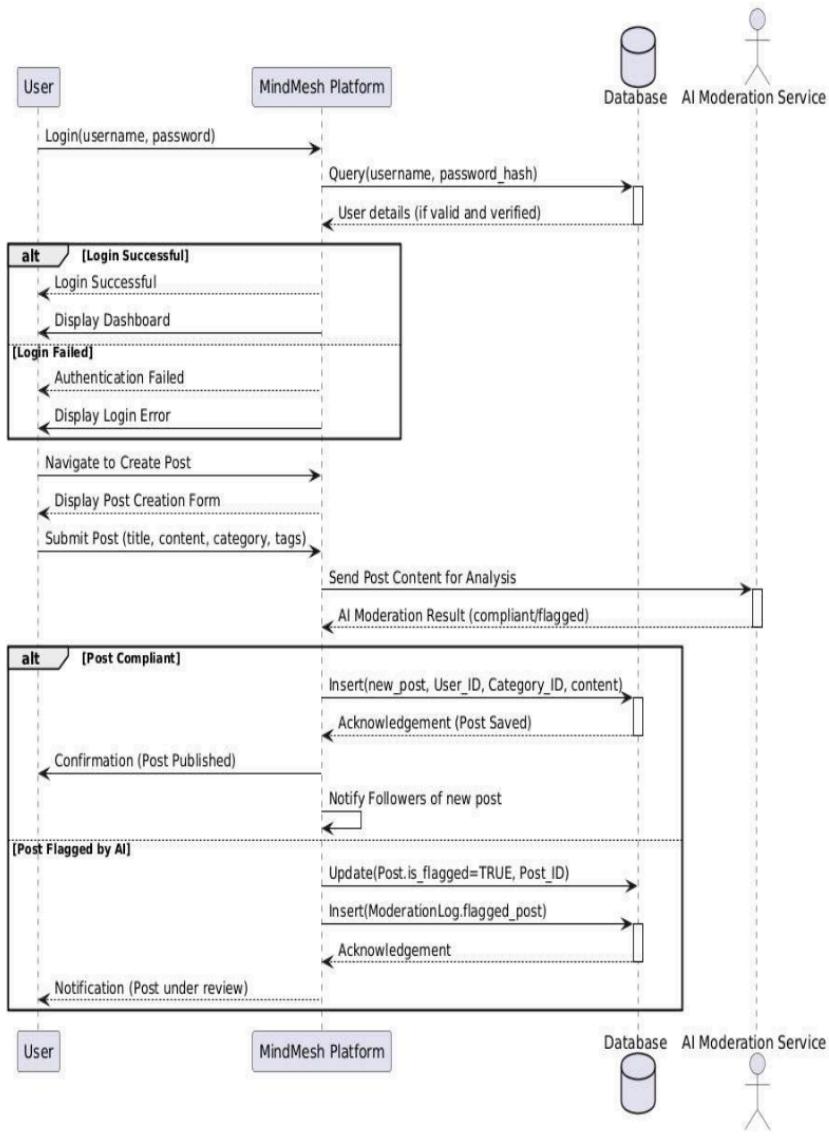


Content Interaction

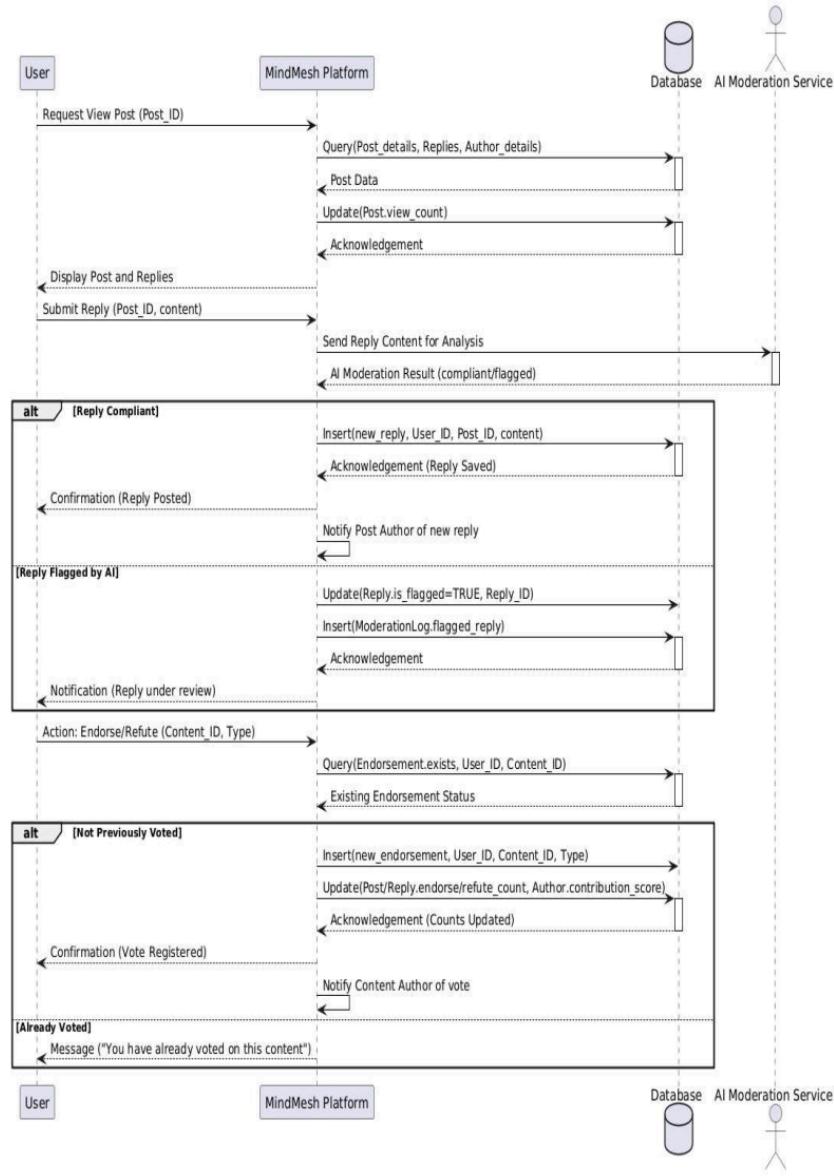


Post Creation

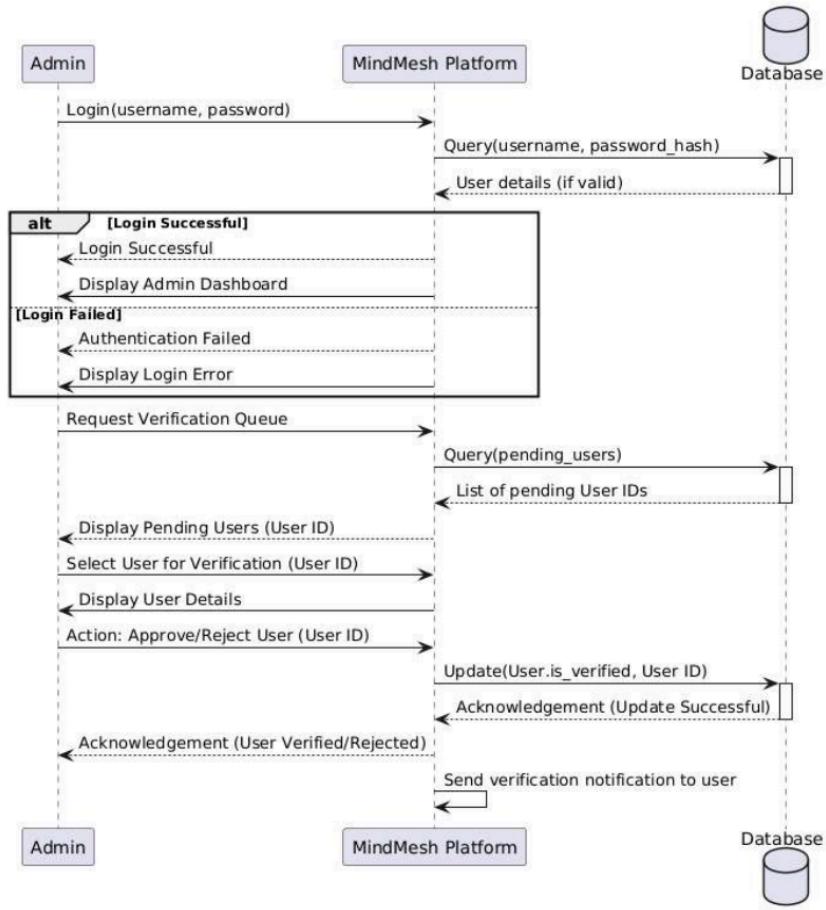
### 3.3 Sequence Diagram

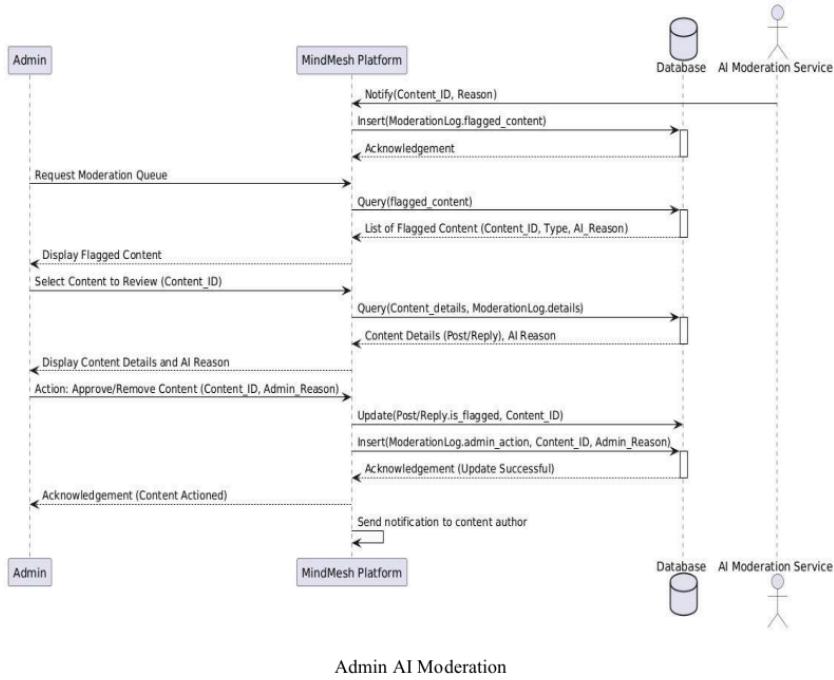


User login & Post creation



User Interaction





### 3.4 Software Architecture Diagram

The Software Architecture Diagram follows the approach of a multi-layered architecture. This model clearly separates the client interface, the application logic (API), the data storage and external services ensuring modularity, scalability and making it easier to maintain.

- Client Layer: The User Interface with the system is using the Client Interface (Web) / React.js.
- Application Layer (API): The Node.js / Express API is used to administer all business logic, routing, and communication between the frontend, the database, and external services.
- Data Layer: PostgreSQL Database is used to store the structured data (users, posts, messages etc) in a persistent manner.
- External Service: The External AI Service (Gemini / Mistral) is used in content moderation including API calls.

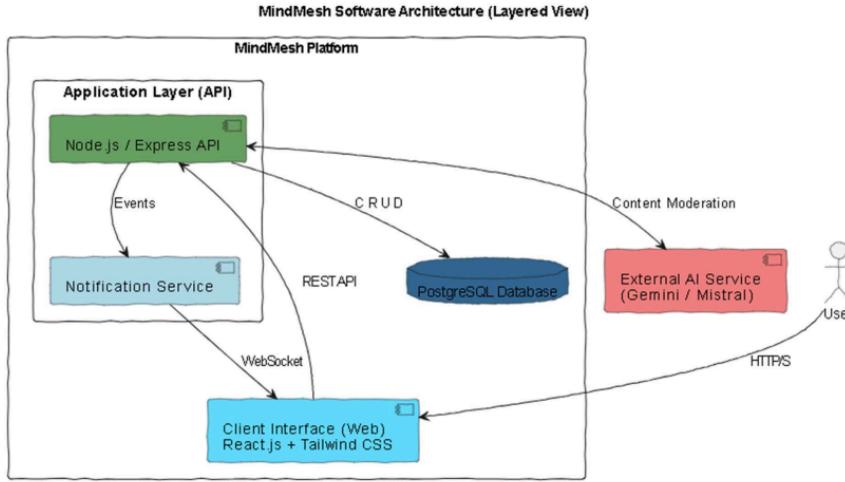


Figure 3.1. MindMesh Software Architecture (Layered View)

### 3.5 Class Diagram

The class diagram is a comprehensive blueprint that defines the static structure of the database in MindMesh and is a schema that has been directly derived from the Entity-Relationship Diagram (ERD). It systematically lists all the key entities, attributes such as primary key, foreign key etc and interrelationship that collectively maintain data integrity.

- **Core Entities:** The basic entities like User, Post, Reply, and Category represent the key objects that form the foundation of a forum.
- **Relationships:** The linkage of the associative links between objects is defined within the diagram with examples being the one-to-many connection between User and Post (i.e. authorship) and the self-referencing relationships in Category (i.e. demarcating sub-domains) and Reply (i.e. enabling threading).
- **Association Classes:** Constructed constructs, such as Follow and Endorsement, explicitly model many-to-many associations, including attributes used to characterize the relationship itself (the type of endorsement, for example).

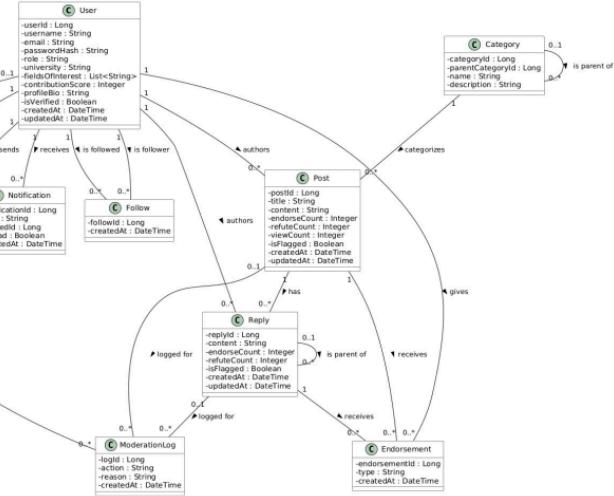


Figure 3.2. MindMesh Class Diagram

### 3.6 Database Diagram

#### Users Table

- **user\_id (PK)**: Primary that uniquely identifies the users.

user_id (PK)	username	email	role	is_verified	contribution_score
1	ali_khan	ali@uni.edu	student	TRUE	85
2	dr_sara	sara@uni.edu	teacher	TRUE	250
3	hassan_r	hassan@uni.edu	researcher	TRUE	175

#### Categories Table

- **category\_id (PK)**: Primary Key for categories.
- **parent\_category\_id (FK)**: Foreign Key that joins to same table, purpose is to create sub-categories.

category_id (PK)	name	parent_category_id (FK)
101	Computer Science	NULL
102	Artificial Intelligence	101
103	Physics	NULL

### Post Table

- **post\_id (PK)**: Primary Key for Posts.
- **user\_id (FK)**: Foreign Key for `users.user_id` which tells us who created the post.
- **category\_id [26]**: Foreign Key for `categories.category_id` which tells us about the category of post.

<b>post_id (PK)</b>	<b>user_id (FK)</b>	<b>category_id (FK)</b>	<b>title</b>	<b>endorse_count</b>
1001	1	102	Question about Neural Networks	15
1002	2	102	New Paper on Reinforcement Learning	42

### Replies Table

- **reply\_id (PK)**: Primary Key for replies.
- **user\_id (FK)**: References `users.user_id` and tell who wrote the reply.
- **post\_id (FK)**: References `posts.post_id` to link the reply to its main post.
- **parent\_reply\_id (FK)**: References another `reply_id` in this same table to create threaded discussions.

<b>reply_id 11 (PK)</b>	<b>user_id (FK)</b>	<b>post_id (FK)</b>	<b>parent_reply_id (FK)</b>	<b>content</b>
5001	3	1001	NULL	A good place to start is the original...
5002	2	1001	NULL	Great question, Ali. Also, consider...

reply_id <small>(PK)</small>	user_id <small>(FK)</small>	post_id <small>(FK)</small>	parent_reply_id <small>(FK)</small>	content
5003	1	1001	5001	Thank you, Hassan! That's very helpful.

### Follows Table

- This table has a **Composite Primary Key**. It is the combination of following two keys of our table:  
21
- follower\_id (PK, FK)**: References `users.user_id`.
- followed\_id (PK, FK)**: References `users.user_id`.

follower_id (PK, FK)	followed_id (PK, FK)
1	2

### Message Table

- **message\_id (PK)**: The Primary Key for each message. 10
- **sender\_id (FK)**: References users.user\_id and show who sent the message.
- **receiver\_id (FK)**: References users.user\_id and show who received the message.

message_id (PK) <span style="background-color: #e0f2e0; border: 1px solid black; padding: 2px;">10</span>	sender_id (FK)	receiver_id (FK)	content	is_read
9001	1	2	Hello Dr. Sara, I had a question about your post.	TRUE
9002	2	1	Of course, Ali. I'm happy to help. What is it?	TRUE
9003	1	2	It was about the activation function you mentioned...	FALSE

### 3.7 Collaboration Diagram

The **Collaboration Diagram** is also called a **Communication Diagram** or **Sequence Diagram** that represents the dynamic behavior of the system by showing the time or order of messages that are sent among objects to accomplish a given use case. Two main critical flows are simulated to cover both the content management and real time functionalities.

#### 3.7.1 Post submission with Artificial Intelligence Moderations

This flow provides a demonstration of the needed collaboration process when creating content in order to ensure compliance with content standards before its persistence is made in the database.

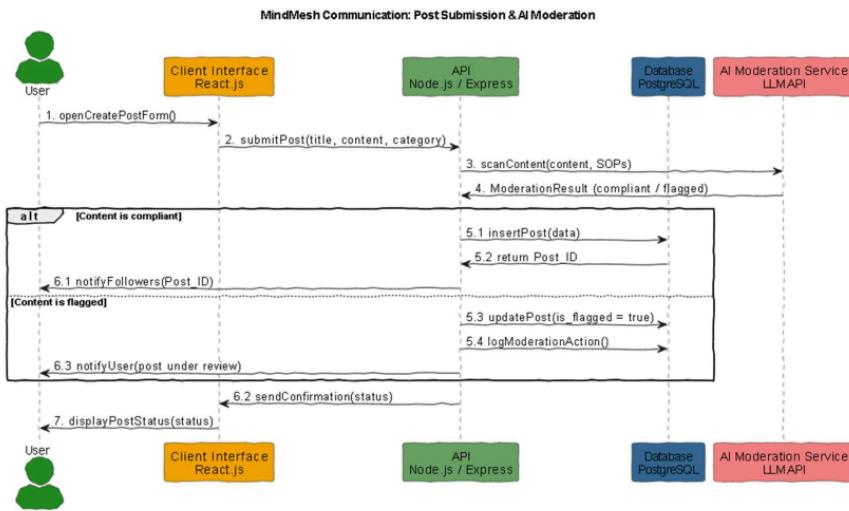


Figure 3.3. MindMesh Communication: Post Submission & AI Moderation

- The sequence clearly emphasizes the required verification step, where the API leaves it up to the AI Moderation Service to determine whether to allow the post to be committed to the database (step 3).
- The alternative is a fragment that models a conditional outcome uncertain outcome of successful insertion on compliance to either flagging and logging of actions that contravene standard operating procedures (SOPs).

#### 3.7.2 Real-Time Direct Messaging

This flow describes the mechanism of one-to-one communication and outlines the collaboration by the dedicated real-time layer.

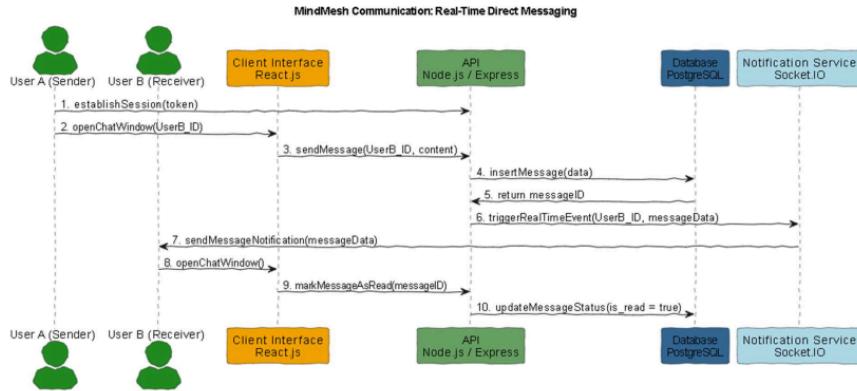


Figure 3.4. MindMesh Communication: Real Spring Time Direct Messaging

- The sequence makes the Notification Service (Socket.IO) a major actor (step 6), and hence it shows how the API triggers the event for real time delivery to the receiving user (User B).
- The persistence layer (database) is only used here to log the message and update the read status for the message but the Notification Service portion is responsible here for the instant transfer.

## Chapter 4. System Testing (If Applied as per project type)

To ensure the quality and reliability of our PERN-based website, various testing tools are used to test different parts of the system effectively. For frontend, backend, API, and database testing, industry-standard tools are selected to cover both functional and non-functional requirements.

**Jest** is used as the primary testing framework for writing and running unit and integration tests for both the React frontend and the Node.js backend. It helps in validating individual components and overall system behavior through automated test cases.

**React Testing Library** is used to test React components from the user's perspective. It ensures that UI elements render correctly, user interactions function as expected, and the frontend integrates properly with backend services.

**Postman** is used for API testing to verify RESTful endpoints developed using Express.js. It allows us to test HTTP requests, validate responses, check status codes, and ensure proper data flow between the frontend and backend.

**pgAdmin** is used to manage and inspect the PostgreSQL database during testing. It helps verify database queries, constraints, transactions, and data integrity.

**Chrome DevTools** is used to test performance, debug issues, and inspect network requests. It helps analyze load times, API calls, and frontend performance under different conditions.

## 4.1 Test Cases Design

Test Case ID	Test Scenario	Pre-Conditions	Test Steps	Expected Post Conditions
TC-M01	Institutional Verification	User registers with a university-affiliated email, and the registration is pending admin review.	<ol style="list-style-type: none"> <li>Admin logs into the moderation dashboard.</li> <li>Admin views the pending verification queue.</li> <li>Admin selects the new user and approves the credentials.</li> </ol>	The user's account is marked as verified, and the user gains full access to the platform's features.
TC-M02	Create Academic Post	User is logged in and has selected a sub-domain (e.g., "Computer Science")	<p><sup>14</sup></p> <ol style="list-style-type: none"> <li>User navigates to the "Create Post" option</li> <li>User enters a title and content relevant to the selected sub-domain.</li> <li>User submits the post.</li> </ol>	The system runs AI moderation for relevance. If compliant, the post is saved, published, and visible in the threaded discussions.
TC-M03	AI Moderation & Flagging	User is logged in. Content in the post violates defined SOPs (e.g., non-academic or offensive content)	<ol style="list-style-type: none"> <li>User attempts to create and submit the non-compliant post.</li> <li>System analyzes the content with the AI Moderation service.</li> </ol>	The system flags the content and places it in a queue for administrator review. The user is notified that the post is under review.
TC-M04	Endorse Post/Reply	User is logged in and views a post <sup>15</sup> . The user has not previously voted on this content.	<ol style="list-style-type: none"> <li>User clicks the "Endorse" button on the post.</li> <li>System checks if a vote already exists.</li> </ol>	The endorsement is recorded, the content's visibility is updated, and the author's contribution score/reputation is adjusted (increased).
TC-M05	Direct Message a Peer	User A is logged in and views User B's profile.	<ol style="list-style-type: none"> <li>User A clicks on the "Message" button on User B's profile.</li> <li>User A types and sends a message in the chat interface.</li> </ol>	User B receives the message in real-time and a corresponding notification. Users can continue the conversation.

Test Case ID	Test Scenario	Case	Pre-Conditions	Test Steps	Expected Post Conditions
TC-M06	Search by Sub-domain/Score		User is logged in. Many posts and users exist.	<ol style="list-style-type: none"> <li>1. User accesses the search bar.</li> <li>2. User searches for posts using a specific <b>sub-domain</b> (e.g., "Web Development").</li> <li>3. User searches for users based on a high <b>contribution score</b>.</li> </ol>	The system returns a list of posts and a list of user profiles filtered by the requested criteria (sub-domains/contribution scores/fields).
TC-M07	Admin Content Management		Admin is logged in and there is content in the AI-flagged queue.	<ol style="list-style-type: none"> <li>1. Admin accesses the <b>Moderation Dashboard</b>.</li> <li>2. Admin reviews the flagged content details and the AI's reason.</li> <li>3. Admin chooses the "<b>Remove Content</b>" action.</li> </ol>	The content is removed from public view, the removal is recorded in the Moderation Log, and a notification is sent to the content author.

## Chapter 5. Implementation

### 5.1 Work Breakdown Structure (WBS)

The MindMesh system is divided into several functional modules to simplify development, improve maintainability, and ensure smooth collaboration among users.

22

- **User Management Module**

This module handles user registration, login, profile management, and role assignment (student, educator, researcher, moderator). It ensures secure authentication and authorization within the system.

- **Manage Post Module**

A module to allow users to create/edit/view/delete Posts, including managing Post content, Timestamp, and Visibility and is designed to support structured discussions on the platform.

- **Reply and Discussion Module**

The Reply Module allows users to reply to Posts and engage in threaded discussions, supporting Parent/Child replies and enabling the logical flow of conversations.

- **Manage Category Module**

This module is used to Categorize Post into Categories and Subcategories. It allows Users to easily Browse and discover Content by Topic of interest.

- **Endorsement Module**

The Endorsement Module allows Users to Upvote/Endorse Posts and Replies, encouraging valuable contributions and promoting Quality Participation.

- **Follow & Collaborate Module.**

This module allows Users to Follow other Users and Follow their Activity within the platform so that users can Collaborate on work.

- **Notification Module**

The Notification Module will Inform Users of important events in the platform: such as Replies, Endorsements, Follows, and Moderation Actions.

- **Moderation and Reporting Module**

The Moderation and Reporting Module will allow moderators to monitor users' content, Flag Inappropriate Content, and Maintain a healthy discussion environment with Moderation Logs.

- **Database Management Module**

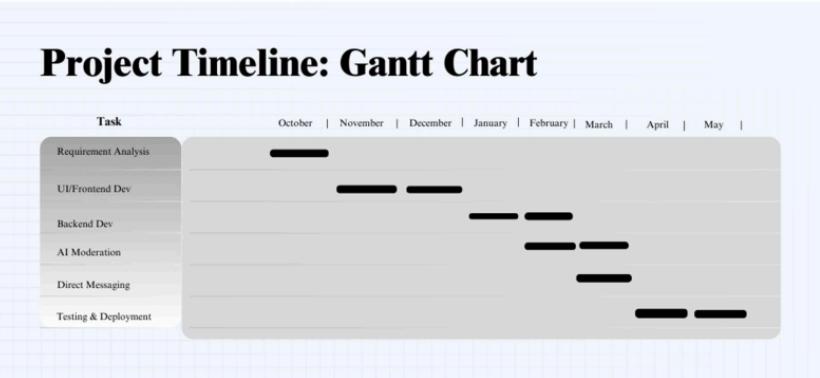
This module manages all aspects of Data Storage, Accessing Data, Relationships between Data, and Data Integrity using Postgresql to maintain Data Consistency and Reliability across the platform.

### 5.2 Team Roles and Responsibilities

Table 5.1. Individual Tasks

Team Member	Activity
Syed Hassan Raza Naqvi	Frontend Design and Implementation (React.js)

Ahmad Talha Bakhat	Backend Development (Node.js)
Hanzla Khalid	AI Integration and Direct messaging module
Saraj	Database Design and Deployment



### 5.3 Tools and Technologies 18

- **Frontend:** React.js, Tailwind CSS
- **Backend:** Node.js with Express
- **Database:** PostgreSQL
- **AI Moderation:** Mistral or Gemini API
- **Authentication:** (university login)
- **Version Control:** GitHub/GitLab
- **Hosting:** AWS (Docker, Nginx) /Azure

### 5.4 Implementation Details

MindMesh will use a modular three-level microservices architecture; thereby, ensuring that it may grow in size and volunteer base and be maintained and separated into modularized components. As a result, MindMesh will maximize the separation of its concerns by making it easier to scale each of the components that make up MindMesh separately, thereby increasing overall performance of each section of MindMesh as it is built.

#### 5.4.1 System Architecture and Design Choices

The core system architecture will be an API-centric model:

##### Frontend (React.js/Tailwind CSS):

- A React-built SPA will give users a quick and responsive UX on the frontend of their web browser.
- The design will use Tailwind for styling purposes to allow for an easy and effective way to style the UI, while remaining a clean and scholarly-looking product with a mobile device capability.
- All frontend/back-end interactions will use only RESTful APIs for communication via various methods of using an Asynchronous HTTP client like Axios, for instance.

- All views will use React Router for routing and displaying content in the central page (i.e. the main page), category pages, detailed posts & profiles and potential messaging capability.

#### **Backend (Node.js/Express):**

The backend will provide both the REST API Gateway and business logic.

- The REST API uses Controller-Service-Repository pattern.
- Controllers for HTTP requests and format responses.
- Services for core business logic (e.g. post creation, scoring, triggers for AI moderation).
- Repositories abstract the specific data logic of the PostgreSQL Database.
- The Express.js framework provides minimalism and flexibility for developing REST APIs.
- node-postgres (pg) or ORM like Sequelize/Prisma are used to manage connection pools to PostgreSQL database for Query Execution Efficiency and Protection against SQL Injection using Parameterized Queries.

#### **• Database (PostgreSQL):**

**PostgreSQL** is chosen for its robustness, ACID compliance, and advanced features (e.g., JSONB support for flexible data storage, strong indexing for performance).

The schema will include core tables:

- Users (including user type: Student, Teacher, Researcher).
- Categories (for sub-domains).
- Posts (with foreign keys to Users and Categories).
- Comments (linked to Posts and Users).
- Endorsements (for tracking content approval).
- UserScores (for the scoring module).
- Follows and Messages (for the social features).

### **5.4.2 Module Implementation Details**

#### **5.4.2.1 A. Authentication and User Management**

- **Authentication:** Only educational emails are allowed to login/signup into the platform.
- **Authorization:** JWTs (JSON Web Tokens) will be used for session management after successful login.

#### **5.4.2.2 B. Forum System with Categorization and Posts**

- **Data Structure:** The Forum System gets categorized posts into separate tables. A table of categories will define organization/type so that there is a clear organization and hierarchy (for example, parent classes are Computer Science; child classes are Artificial Intelligence and Machine Learning, Web Development, and Data Structures). Thus, the way the categories are listed in the Forum System will dictate how all users will be able to navigate through the posts.
- **Post Creation:** The dedicated endpoint for post creation will be POST /api/posts. This is where the workflow for AI Moderation begins; after new posts have been created, they will then be moderated before being persisted and published in the Forum System.

#### 5.4.2.3 C. AI-Driven Moderation

The AI Moderation module will use a Pre-Moderation process for any new posts, while existing content will be processed through the Reactive process for any reported content.

- **Workflow Trigger** : When a new post or comment (report) is submitted to the system, this action will trigger an API call to the AI Moderation module from the Express Service layer.
- **API Check** : The Mistral API or Gemini API will be used to provide a comprehensive and rounded approach to content moderation.
  - AI API will receive a prompt or instruction (or the Moderation API if one exists) as follows: "Classify the submitted content along multiple dimensions / categories (e.g. Academic Relevance, Hate Speech / Harassment, Spam / Irrelevant Content)".
  - The responses from both APIs will consist of a standard structure in JSON format (e.g. toxicity score, academic relevance rating).
- **Decision Logic** : The Express Service layer will take the response from API and if it return a High Toxicity Score or return a Low Relevance Score, the content will be blocked from being posted immediately and will need to be reviewed by an admin. If the scores are ambiguous, the content will be tagged for Human Moderation, but may be able to remain posted temporarily with a status of "Pending Review" based on the severity threshold.

#### 5.4.2.4 D. Following and Direct Messaging Systems

**Following:** A table with columns for Follower ID and followed\_id will store one-way relationships between users in the database. A user's feed will contain posts from users they are following and posts from users with a high endorsements. A weighted combination of newly posted materials from categories a user is subscribed to will also be included in the user's feed.

**Direct Messaging (DM):** The Direct Messaging feature (DM) will consist of a Socket.io layer (or similar) running on top of Node.js to support real-time communication with minimal latency. The Express API is only intended to provide RESTful endpoints for retrieving, creating, updating, and deleting posts. In addition to creating, updating, and deleting posts, DM messages sent through the Socket.io layer will be filtered by the AI moderation component, which will perform basic safety checks on all messages before allowing them through to the end-user.

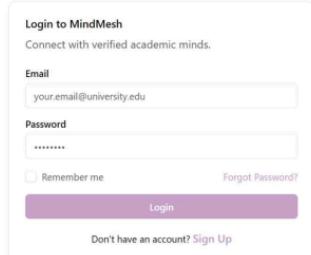
#### 5.4.3 Deployment and DevOps

GitHub is the version control system we will use, and we will follow the Git Flow Model, implementing feature branches, pull requests and peer review to support collaboration and produce high-quality code throughout the team.

To create a consistent development, testing, and deployment environment for both the React frontend and Node.js backend, and allow for easier porting, we will use Docker to create separate containers for each part of the application. Once we are ready to deploy the containerized application, we will use Kubernetes (through lightweight container orchestrators such as Minikube or K3s). Nginx will serve as a reverse proxy to connect the frontend and backend services, and provide access to the static files that make up the final React application package. We will use free-tier or open-source hosting services for our PostgreSQL database that include basic persistence and backup support.

Lastly, we will create a basic Continuous Integration/Continuous Deployment (CI/CD) pipeline using GitHub Actions to automate building, testing, and deploying the application whenever changes are made on the main branch.

## 5.5 Screenshots of Prototype / System



Login to MindMesh  
Connect with verified academic minds.

Email

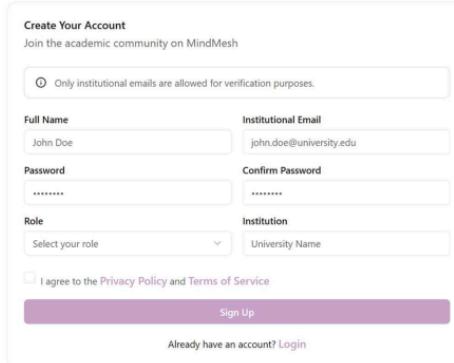
Password

Remember me [Forgot Password?](#)

[Login](#)

Don't have an account? [Sign Up](#)

Login Page



Create Your Account  
Join the academic community on MindMesh

Only institutional emails are allowed for verification purposes.

Full Name <input type="text" value="John Doe"/>	Institutional Email <input type="text" value="john.doe@university.edu"/>
Password <input type="password" value="*****"/>	Confirm Password <input type="password" value="*****"/>
Role <input type="text" value="Select your role"/>	Institution <input type="text" value="University Name"/>

I agree to the [Privacy Policy](#) and [Terms of Service](#)

[Sign Up](#)

Already have an account? [Login](#)

Sign Up Page

The screenshot shows the MindMesh platform's main page. At the top, there is a search bar and navigation links for 'All Pages' and 'Create Post'. Below the search bar, there are three post cards:

- Novel Approach to Transfer Learning in Neural Networks** (Machine Learning category)  
Recent experiments show promising results in domain adaptation using meta-learning techniques...  
Dr. Sarah Chen • 2 hours ago  
234 Endorsements, 12 Refutes, 45 Comments, 4 Shares
- Quantum Computing: Breaking RSA Encryption Sooner Than Expected?** (Quantum Computing category)  
New quantum algorithms suggest that current encryption methods may be vulnerable within the next decade...  
Prof. Michael Park • 5 hours ago  
456 Endorsements, 23 Refutes, 89 Comments, 6 Shares
- Climate Models: Improving Accuracy with Machine Learning** (Climate Science category)  
Integration of deep learning has improved prediction accuracy by 23% in recent studies...  
Dr. Emily Watson • 1 day ago  
189 Endorsements, 8 Refutes, 34 Comments, 5 Shares

To the right of the posts, there is a sidebar with 'Trending Topics' and 'Recommended Users' sections.

**Trending Topics**

Topic	Posts
Neural Networks	1234 posts
Quantum Computing	802 posts
Climate Science	756 posts
Gene Therapy	543 posts
Astrophysics	421 posts

**Recommended Users**

User	Description	Follow
Dr. James Wilson	Quantum Physicist 2.3K followers	Follow
Prof. Lisa Anderson	AI Researcher 1.5K followers	Follow
Dr. Robert Chang	Neuroscientist 3.6K followers	Follow

Main page

The screenshot shows a detailed view of a post by Dr. Sarah Chen. The post is titled "Novel Approach to Transfer Learning in Neural Networks" and was posted 2 hours ago. It includes a bio for Dr. Sarah Chen, her profile picture, and follower statistics. The post content discusses domain adaptation using meta-learning techniques, mentioning the development of a neural network pre-trained on a diverse set of tasks to develop a more robust internal representation. The author claims their approach differs from traditional transfer learning by incorporating task-specific adaptation layers that learn to modulate the pre-trained features based on the target domain. The post has resulted in a 23% improvement in accuracy across various benchmark datasets. Key findings include faster convergence with fewer training samples, better generalization to out-of-distribution data, and reduced computational requirements during fine-tuning. The post also notes significant implications for applications where labeled data is scarce, such as medical imaging and rare language processing.

**Author**

Dr. Sarah Chen  
AI Researcher  
MIT  
2.3K Followers, 234 Posts  
Follow

**Related Posts**

- Deep Learning Optimization Techniques
- Meta-Learning in Computer Vision
- Transfer Learning Best Practices

Post

The screenshot shows the 'Create Post' interface. On the left, there's a form titled 'Create Post' with fields for 'Title' (containing 'Deep Learning'), 'Category' (set to 'Machine Learning'), and 'Content' (a rich-text editor with placeholder text 'Write your post content...'). Below the content area are two buttons: 'Publish Post' and 'Save as Draft'. On the right, a box titled 'Posting Guidelines' lists six rules: Be respectful and professional, Cite your sources, Use appropriate categories, Avoid plagiarism, Stay on topic, and No self-promotion.

Create Post

Title  
Deep Learning

Category  
Machine Learning

Content

B I  $\leftrightarrow$

Write your post content...

Publish Post Save as Draft

Posting Guidelines

- Be respectful and professional
- Cite your sources
- Use appropriate categories
- Avoid plagiarism
- Stay on topic
- No self-promotion

Create Post page

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Publications

Upload Publication

Transfer Learning in Neural Networks: A Comprehensive Review  
S. Chen, J. Wilson, L. Anderson • Journal of Machine Learning Research • 2024  
45 citations 123 endorsements View PDF Endorse

Meta-Learning for Domain Adaptation  
S. Chen, R. Chang • NeurIPS 2023 • 2023  
28 citations 89 endorsements View PDF Endorse

Publications Page

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### About MindMesh

Connecting verified academic minds worldwide

**Our Mission**

MindMesh is dedicated to creating a trusted platform where academics, researchers, and students can collaborate, share knowledge, and advance their fields. We combine the best of Reddit's community discussions, Quora's question-answer format, and LinkedIn's professional networking.

**AI Moderation**

Advanced AI ensures quality content and maintains academic standards

**Verified Community**

All members verified through institutional emails

**Domain-Focused**

Organized by academic fields and specializations

**Recognition System**

Achievements and contribution scores for quality participation

### About Page

← Admin - User Management

Total Users	Verified	Pending	Suspended
1,234	1,123	87	24

Q Search users by name, email, or institution... Filters

User	Institution	Status	Joined	Posts	Followers
Dr. Sarah Johnson	Stanford University	active	2024-01-15	45	234
Prof. Michael Chen	MIT	active	2024-02-20	89	567
Dr. Emily Rodriguez	Harvard University	active	2024-03-10	23	145
James Wilson	Not specified	pending	2024-10-28	2	12
Dr. Lisa Anderson	UC Berkeley	suspended	2024-05-15	67	289

### Admin Page - User Management

## Chapter 6. References

- [1] M. Wu, Q. Yu, S. L. Li, and L. Zhang, “Geographic and gender disparities in global education achievement during the COVID-19 pandemic,” International Journal of Applied Earth Observation and Geoinformation, vol. 111, 102850, Jul. 2022, doi: 10.1016/j.jag.2022.102850. [Online]. Available: <https://pubmed.ncbi.nlm.nih.gov/35720110/>. [Accessed: Sept. 16, 2025].
- [2] “Stack Overflow Developer Survey 2024,” Stack Overflow, 2024. [Online]. Available: <https://survey.stackoverflow.co/2024>. [Accessed: Sept. 16, 2025].

## B 4

### MindMesh\_FYP

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## \*% detected as AI

AI detection includes the possibility of false positives. Although some text in this submission is likely AI-generated, scores below the 20% threshold are not surfaced because they have a higher likelihood of false positives.

### Caution: Review required.

It is essential to understand the limitations of AI detection before making decisions about a student's work. We encourage you to learn more about Turnitin's AI detection capabilities before using the tool.

### Disclaimer

Our AI writing assessment is designed to help educators identify text that might be prepared by a generative AI tool. Our AI writing assessment may not always be accurate (i.e., our AI models may produce either false positive results or false negative results), so it should not be used as the sole basis for adverse actions against a student. It takes further scrutiny and human judgment in conjunction with an organization's application of its specific academic policies to determine whether any academic misconduct has occurred.

## Frequently Asked Questions

### How should I interpret Turnitin's AI writing percentage and false positives?

The percentage shown in the AI writing report is the amount of qualifying text within the submission that Turnitin's AI writing detection model determines was either likely AI-generated text from a large-language model or likely AI-generated text that was likely revised using an AI paraphrase tool or word spinner.

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AI detection scores under 20%, which we do not surface in new reports, have a higher likelihood of false positives. To reduce the likelihood of misinterpretation, no score or highlights are attributed and are indicated with an asterisk in the report (\*%).

The AI writing percentage should not be the sole basis to determine whether misconduct has occurred. The reviewer/instructor should use the percentage as a means to start a formative conversation with their student and/or use it to examine the submitted assignment in accordance with their school's policies.

### What does 'qualifying text' mean?

Our model only processes qualifying text in the form of long-form writing. Long-form writing means individual sentences contained in paragraphs that make up a longer piece of written work, such as an essay, a dissertation, or an article, etc. Qualifying text that has been determined to be likely AI-generated will be highlighted in cyan in the submission, and likely AI-generated and then likely AI-paraphrased will be highlighted purple.

Non-qualifying text, such as bullet points, annotated bibliographies, etc., will not be processed and can create disparity between the submission highlights and the percentage shown.



## APPENDIX -A

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MindMesh_FYP			
ORIGINALITY REPORT			
<b>12%</b>	<b>6%</b>	<b>1%</b>	<b>11%</b>
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS
PRIMARY SOURCES			
<b>1</b>	<b>Submitted to Higher Education Commission</b>	<b>5%</b>	
	<b>Pakistan</b>		
	Student Paper		
<b>2</b>	<b>Submitted to Dorset College</b>	<b>2%</b>	
	Student Paper		
<b>3</b>	<b>www.slideshare.net</b>	<b>1%</b>	
	Internet Source		
<b>4</b>	<b>Submitted to Murdoch University</b>	<b>1%</b>	
	Student Paper		
<b>5</b>	<b>Submitted to Benedictine University</b>	<b>&lt;1%</b>	
	Student Paper		
<b>6</b>	<b>Submitted to Australian College of Business and Technology</b>	<b>&lt;1%</b>	
	Student Paper		
<b>7</b>	<b>Submitted to Dublin Business School</b>	<b>&lt;1%</b>	
	Student Paper		
<b>8</b>	<b>Submitted to Kingston University</b>	<b>&lt;1%</b>	
	Student Paper		
<b>9</b>	<b>Submitted to Universidad TecMilenio</b>	<b>&lt;1%</b>	
	Student Paper		
<b>10</b>	<b>Submitted to CTI Education Group</b>	<b>&lt;1%</b>	
	Student Paper		



PRIMARY SOURCES

- |    |   |      |
|----|---|------|
| 1  | Submitted to Higher Education Commission<br>Pakistan        | 7%   |
| 2  | Submitted to COMSATS University Islamabad,<br>Lahore Campus | 2%   |
| 3  | Submitted to Dorset College                                 | 2%   |
| 4  | ijsrem.com  | 1 %  |
| 5  | www.ukessays.com  | 1 %  |
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| 7  | repository.cuilahore.edu.pk                                 | <1 % |
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| 10 | Submitted to University of Wales Institute,<br>Cardiff      | <1 % |
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- Student Paper
- Student Paper
- Internet Source
- Internet Source
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23

Student Paper

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Bastos, Tiago Miguel Vilar. "Sistema de Software para Aconselhamento Nutricional", Universidade de Aveiro (Portugal)

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