

Tech Tome Engineering E-book Portal Using Mern Stack

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ABSTRACT:

The Tech Tome Engineering E-Book Portal is a complete web application built with the MERN (MongoDB, Express.js, React.js, Node.js) stack. It is meant to offer engineering students free access to reference books of an academic nature and department books like Computer Science (CSE), Electronics and Communication (ECE), etc. The portal is separated into two main interfaces: the User Panel and the Admin Panel.

Students can download, read, and view department e-books freely without any limits through the User Panel. Admin Panel allows administrators to control content submission, viewing of download history, and identifying the suitability of uploaded content. Admins may also modify or delete book entries for content quality and suitability maintenance. The project targets closing the gap between learning content and students and offering easy, free, and effective learning material access required.

Keywords: Student Resource Hub, Department-wise Book Filtering, Open Access Learning, Web-Based Learning Portal, Web-Based Learning Portal.

INTRODUCTION:

In the technological era, access to study material is the phase of the learning process of the students, i.e., engineering, where reference books and current information constitute the area of interest. Good textbooks are beyond the reach of the majority of the students due to limitations such as cost, availability, or accessibility. As an alternative to this, we present the Tech Tome Engineering E-Book Portal, an e-learning portal developed using the MERN (MongoDB, Express.js, React.js, Node.js) stack technologies based on free and open access to engineering textbooks.

It is a student interface for students belonging to various departments of engineering such as Computer Science and Engineering (CSE) and Electronics and Communication Engineering (ECE). It is an online library from where students are free to search and read books without any barrier. It comprises two panels: the User Panel, from which students can search books based on their department, and the Admin Panel, from which administrators can upload and maintain upload of books, student usage, and ensure quality of the uploaded material.

Using the most advanced frontend and backend technologies, the portal boasts a highly optimized

interface with assured data integrity and safety. The project aims to offer open educational resources (OER) with the minimum use of printed books and creating an interactive web environment where knowledge is distributed to all for free in the field of engineering.

FEATURES:

Tech Tome Engineering E-Book Portal has a wide range of features designed to enhance the user experience of students and administrators. These features ensure effortless access to academic content and efficient content management.

User Panel (Student Side):

- **Free Access to E-Books:** Students can download and read textbooks without login restrictions or fees.
- **Department-Wise Book Filtering:** Books are department-wise filtered similar to CSE, ECE, etc., for easy convenience.
- **Responsive and Clean UI:** User-friendly interface that works well on devices (tablet, mobile, desktop).
- **Search Functionality:** Allows students to quickly search books by title or keyword.
- **View & Download Options:** Students have the option to choose either to read the book online or download it for offline use.

Admin Panel:

- **Admin Authentication:** Proper admin login to access backend controls.
- **Book Review and Approval:** Admin is able to view books uploaded by students and decide whether to approve, decline, or edit the content.
- **Book Editing:** Admins can modify the title, description, department, or PDF file of any book within the system.
- **User Activity Monitoring:** Admin can view upload/download history and user activity logs.
- **Content Management System:** User-friendly interface to add, modify, or delete books in the portal.

General Features:

- **MERN Stack Architecture:** Built with MongoDB, Express.js, React.js, and Node.js for end-to-end stack performance.
- **Secure File Storage:** Stored e-books are stored and managed securely.
- **Real-Time Updates:** Admin updates are updated in real-time on the user side.
- **Scalable Design:** The design is scalable to include more departments or even multiple institutions.

Use Cases:

• **Student Registration and Login**

The students can register and log onto the portal through their credentials. It gives them access to all the e-books provided along with the ancillary features. Secure authentication does not allow unauthorized users to access the platform.

• **Browse and Filter Books by Department**

Students can easily navigate and filter books according to their department, i.e., CSE or ECE. This provides instant access to relevant material specific to their academic requirements. The interface is made for easy navigation and effective searching.

- **View or Download E-Books**

Once a book is chosen, students can either read it directly from the browser or download it for reading offline. This is possible with flexible access to resources, enabling students to study anywhere and at any time. There are no limits on downloads.

- **Upload E-Books for Review**

Students have the option to upload new books to the portal for sharing with others. These uploads are sent to the admin for review and approval. This promotes a collaborative and growing digital library.

- **Admin Login and Access**

Admins can securely log in to a dedicated admin panel with access to backend features. This interface allows them to manage book data, monitor users, and approve content. Admin access is restricted to ensure system integrity.

- **Delete Irrelevant or Duplicate Books**

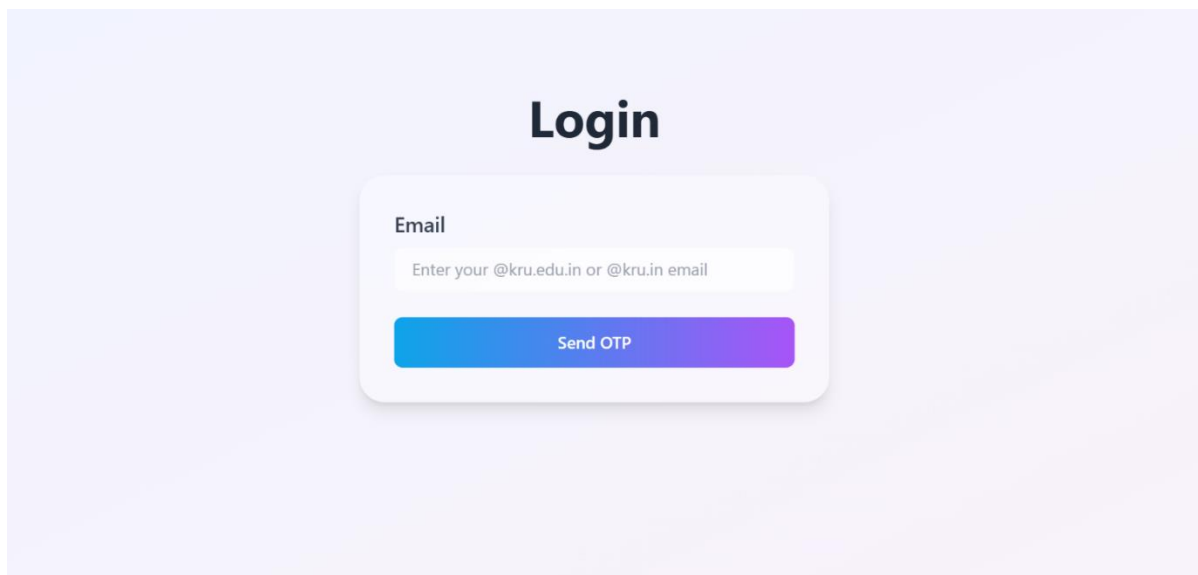
If a book is outdated, irrelevant, or duplicated, the admin can remove it from the portal. This keeps the system clean and user-friendly. Regular content cleanup ensures students access only the best resources.

User Panel:

The User Panel in the Tech Tome Engineering E-Book Portal is designed to provide students with a simple, efficient, and accessible interface to interact with the portal. It offers essential academic services like book discovery, viewing, downloading, and optional book uploads. The functionalities are developed with a focus on ease-of-use and free access to learning materials.

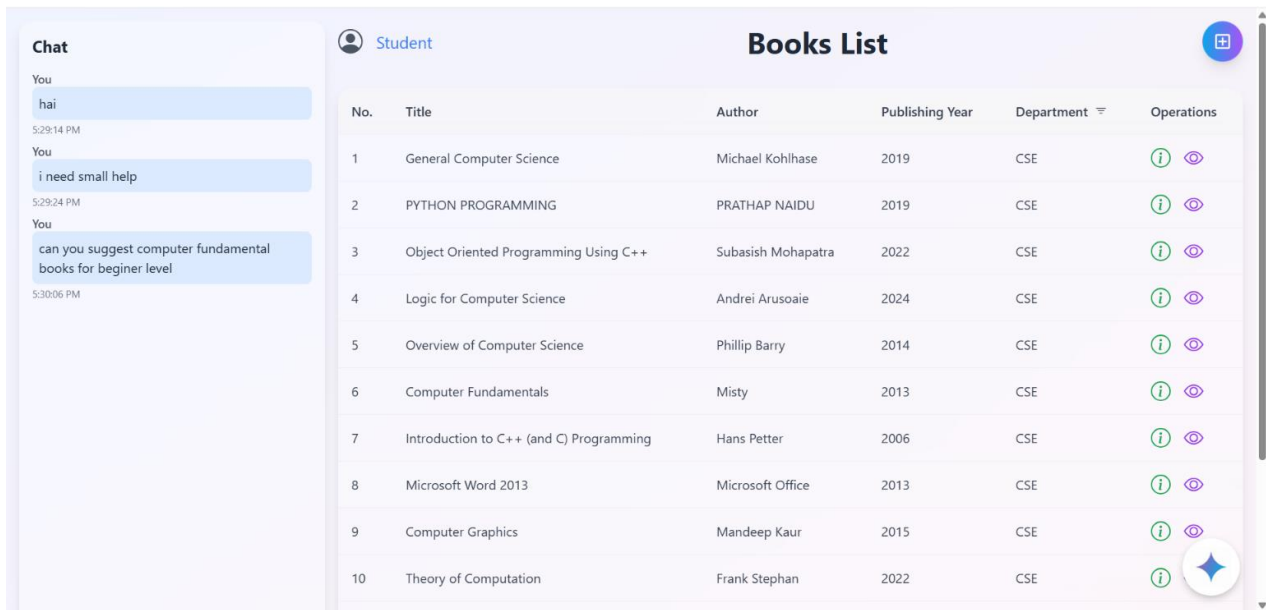
1. User Registration and Login





















- Allows students to create a new account or log in to their existing account.
- Ensures secure access to the portal's resources.
- Prevents unauthorized access to the student functionalities.



2. Dashboard Access

- After successful authentication, the students are redirected to a personalized dashboard.
- Displays recently added books and popular resources.
- Provides immediate access to departments and book categories.



No.	Title	Author	Publishing Year	Department	Operations
1	General Computer Science	Michael Kohlhase	2019	CSE	 
2	PYTHON PROGRAMMING	PRATHAP NAIDU	2019	CSE	 
3	Object Oriented Programming Using C++	Subasish Mohapatra	2022	CSE	 
4	Logic for Computer Science	Andrei Arusoaie	2024	CSE	 
5	Overview of Computer Science	Phillip Barry	2014	CSE	 
6	Computer Fundamentals	Misty	2013	CSE	 
7	Introduction to C++ (and C) Programming	Hans Petter	2006	CSE	 
8	Microsoft Word 2013	Microsoft Office	2013	CSE	 
9	Computer Graphics	Mandeep Kaur	2015	CSE	 
10	Theory of Computation	Frank Stephan	2022	CSE	 

3. Department-Wise Book Browsing

- Students can filter books based on departments such as:
 - CSE (Computer Science and Engineering)
 - ECE (Electronics and Communication Engineering)
 - And any other added departments.
- Ensures relevant book access tailored to the student's curriculum.

4. Search Functionality

- Enables keyword-based search to locate specific books by:
 - Title
 - Author
 - Tags or keywords
- Helps users find books quickly without manual scrolling.

5. View E-Book

- Opens the selected book in a PDF viewer embedded in the browser.
- Students can read the material online without downloading it.
- Useful for previewing the content before full access.

General Computer Science
320201 GenCS I & II Lecture Notes

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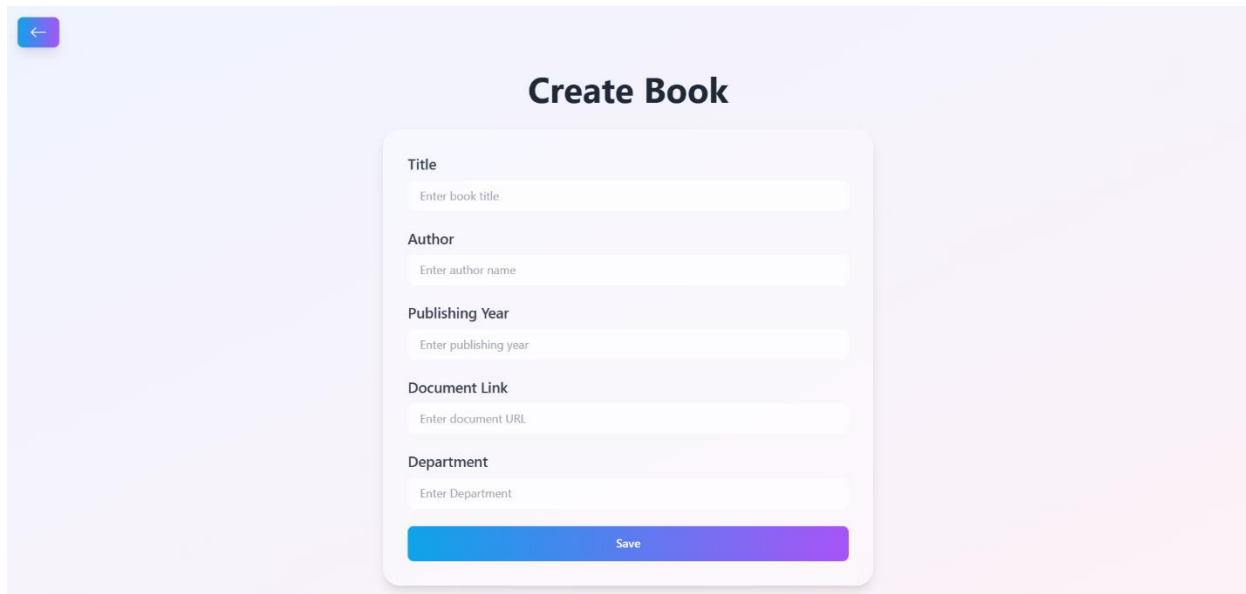
December 1, 2014

6. Download E-Book

- Allows students to download any available book with a single click.
- There are no restrictions, limits, or approval barriers for downloads.
- Promotes offline study and uninterrupted access.

7. Create E-Book (Optional)

- Students can upload academic books or materials they wish to share.
- Create form includes:
 - Book title
 - Author
 - Publishing Year
 - Document Link
 - Department
- Files are stored temporarily until approved by the admin.



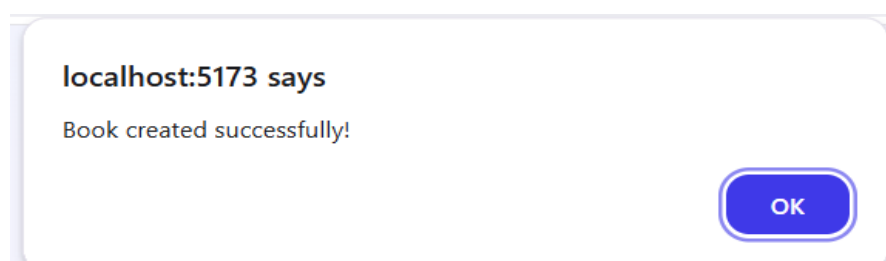
The screenshot shows a mobile application interface for creating a book. At the top, there is a back arrow icon. The main heading is "Create Book". Below this, there is a form with the following fields:

- Title**: Enter book title
- Author**: Enter author name
- Publishing Year**: Enter publishing year
- Document Link**: Enter document URL
- Department**: Enter Department

At the bottom of the form is a blue "Save" button.

8. View Upload Status

- Students can track the status of the books they have uploaded:
 - Pending
 - Approved
 - Rejected
- Encourages transparency in the upload-review process.



9. Profile Management

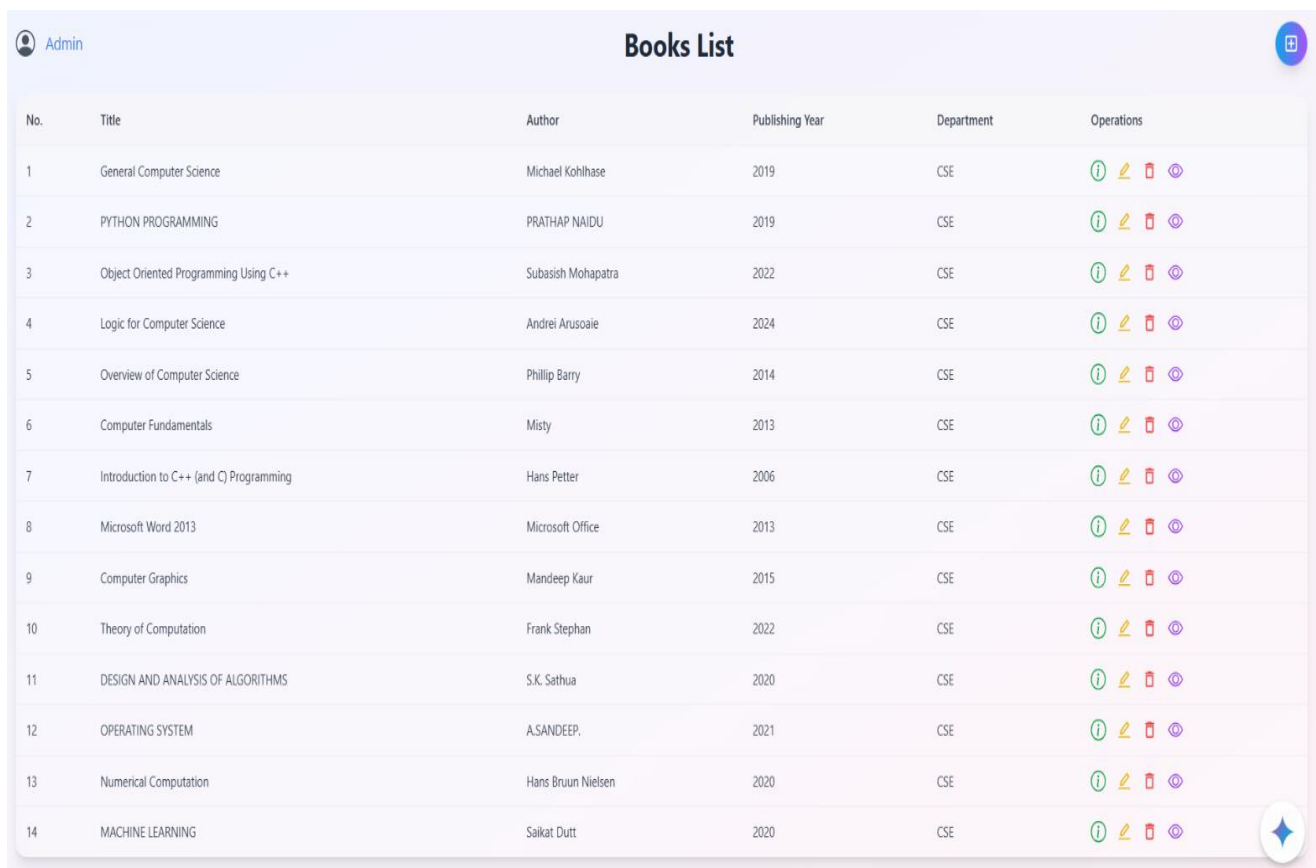
- Students can update personal details like name, email, or password.
- Ensures the account remains secure and up-to-date.

10. Logout

























































- Securely logs the user out of the session.
- Clears session data to prevent unauthorized reuse.

Core Administrative Functions:

In the Admin Panel of the Tech Tome Engineering E-Book Portal, four primary functions form the backbone of content management: **Info**, **Edit**, **View**, and **Delete**. These core operations enable administrators to maintain the quality, accuracy, and organization of the digital content offered to students.



The screenshot shows an 'Admin' panel with a 'Books List' table. The table has columns for No., Title, Author, Publishing Year, Department, and Operations. Each row represents a book with its corresponding metadata and a set of icons for administrative actions (Info, Edit, Delete, View).

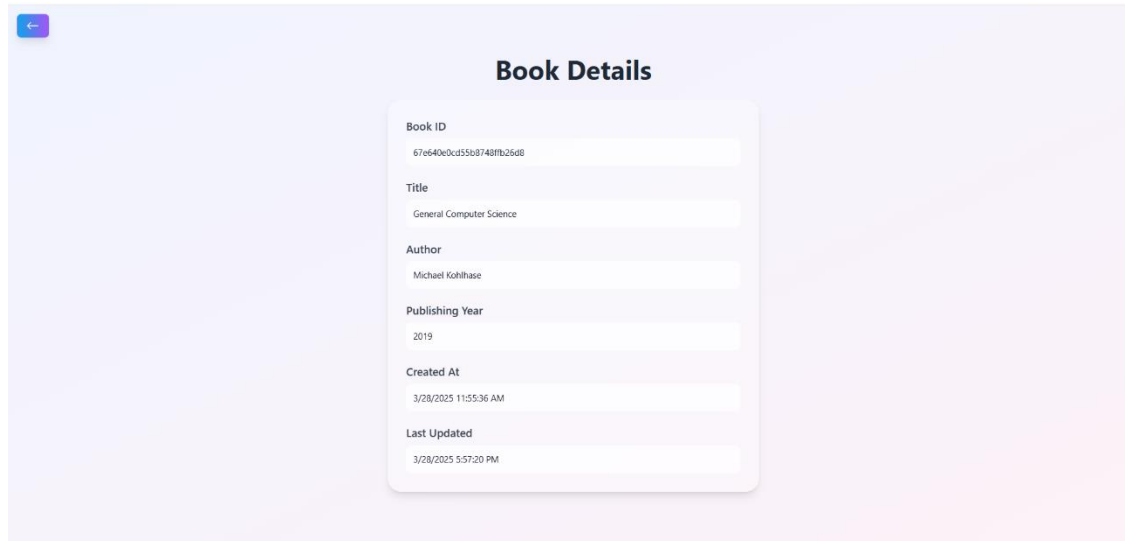
No.	Title	Author	Publishing Year	Department	Operations
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2	PYTHON PROGRAMMING	PRATHAP NAIDU	2019	CSE	   
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8	Microsoft Word 2013	Microsoft Office	2013	CSE	   
9	Computer Graphics	Mandeep Kaur	2015	CSE	   
10	Theory of Computation	Frank Stephan	2022	CSE	   
11	DESIGN AND ANALYSIS OF ALGORITHMS	S.K. Sathua	2020	CSE	   
12	OPERATING SYSTEM	A.SANDEEP.	2021	CSE	   
13	Numerical Computation	Hans Bruun Nielsen	2020	CSE	   
14	MACHINE LEARNING	Saikat Dutt	2020	CSE	   

1. Info (View Book Details)

This function allows the administrator to access complete metadata about any uploaded book. Information includes:

- Book title
- Description
- Department
- Uploaded file name
- Upload date and uploader information

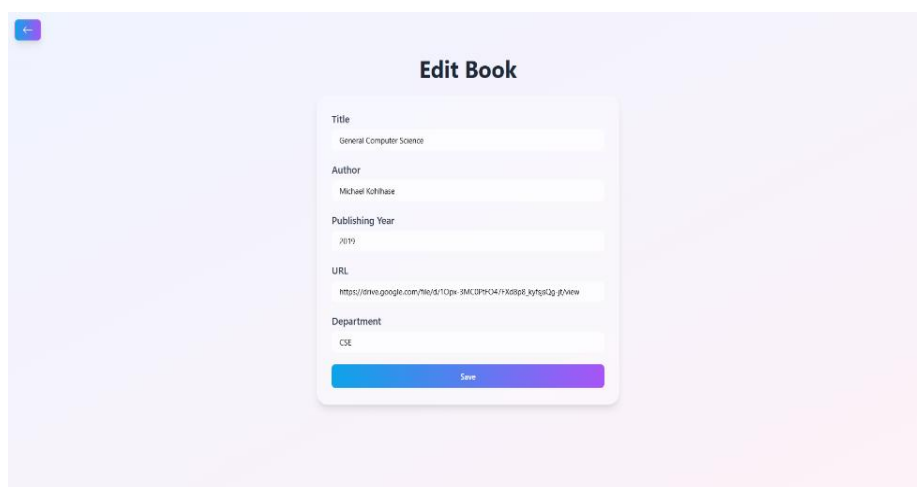
This overview helps admins quickly assess whether a book meets academic standards and is appropriate for publication.



2. Edit (Modify Book Content)

The **Edit** functionality allows administrators to update or correct book information before approval or after publishing. Editable fields include:

- Book title or filename
- Description
- Department category
- Uploaded PDF replacement
- This is useful for formatting corrections, department reassignment, or improving clarity in student submissions.



3. View (Preview the Book)

The **View** function enables the admin to open and read the actual book content in a PDF viewer without downloading it. This helps the admin assess:

- Content quality

- Formatting and completeness
- Relevance to engineering curriculum

It ensures that only valuable and well-prepared resources are approved for student access.

4. Delete (Remove Book Permanently)

Admins can delete any book that is:

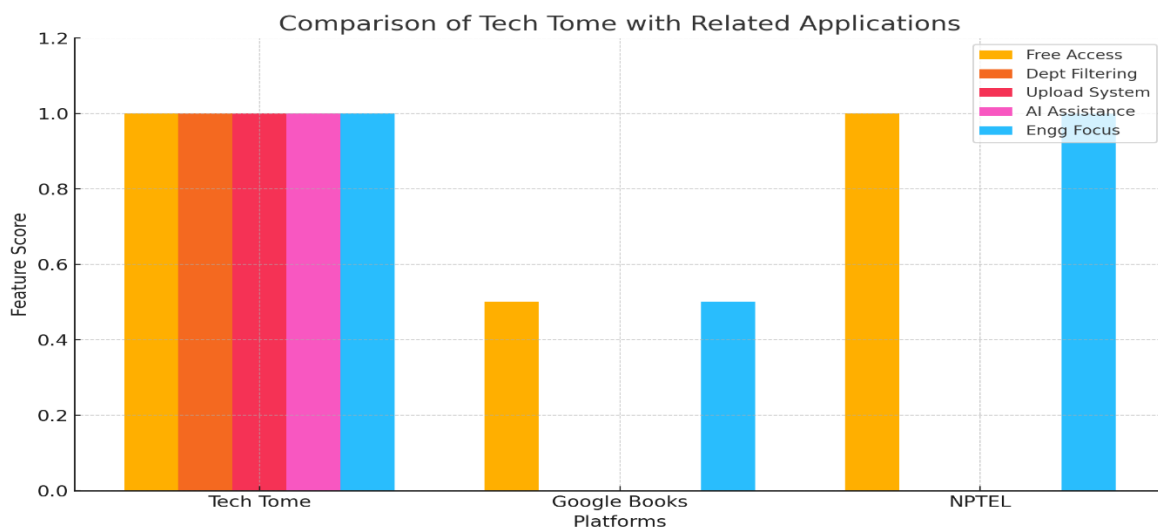
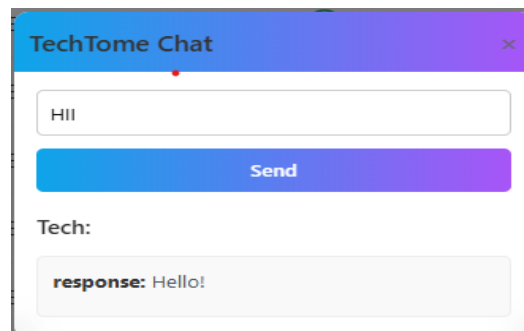
- Irrelevant
- Duplicated
- Outdated
- Incorrect or inappropriate

The **Delete** function removes the book from the database and front-end, ensuring that the portal stays clean and academically sound.

AI Chatbot Integration:

To enhance user support and interactivity, the Tech Tome Engineering E-Book Portal includes an integrated **AI Chatbot**. This smart assistant is designed to help students navigate the platform, answer common queries, and recommend books based on user input.

The chatbot is available 24/7 on the user panel, providing instant assistance with actions like searching for books, understanding portal features, or guiding new users through the registration and download process. It significantly reduces the need for manual support and improves the overall user experience by offering a quick, conversational interface.



Here's the comparison bar graph that visually shows how the Tech Tome Engineering E-Book Portal stands out compared to Google Books and NPTEL across key features.

You can include this in your technical paper under a section like "Comparative Analysis" to strengthen your project's uniqueness and relevance.

Conclusion:

The Tech Tome Engineering E-Book Portal is a comprehensive digital platform developed using the MERN stack, aimed at simplifying access to academic resources for engineering students. With its dual-panel system for users and administrators, the portal ensures efficient book management, free accessibility, and secure content moderation. Key functionalities such as department-wise filtering, book viewing/downloading, admin approval workflows, and AI chatbot integration make the system user-friendly, scalable, and innovative. By embracing modern web technologies and user-centred design, this platform contributes significantly to the digital transformation of academic resource sharing.

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