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DESIGN THINKING LABORATORY REPORT

Course Code

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TITLE

AI DRIVEN DOCUMENT COLLABORATION PLATFORM

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DEPARTMENT OF INFORMATION SCIENCE AND ENGINEERING

CERTIFICATE

Certified that the Design thinking Laboratory work titled ***'AI Powered Document Collaboration Platform'*** is carried out by **Student name (USN),** in partial fulfilment for the requirement of degree of **Bachelor of Engineering in Information Science and Engineering** of the Visvesvaraya Technological University, Belagavi during the year 2024-2025. It is certified that all corrections/suggestions indicated for the Internal Assessment have been incorporated in the report.

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Abstract

The increasing adoption of artificial intelligence (AI) is revolutionizing various sectors, and document collaboration is no exception [1]. AI-driven document collaboration platforms are transforming how teams work together by streamlining workflows, improving productivity, and enhancing the quality of documents. This report examines the development of an AI-driven document collaboration platform, highlighting its key features, benefits, and potential impact. The platform addresses the growing need for efficient and effective collaboration tools in today's fast-paced work environment. It leverages AI to automate tasks, provide insightful suggestions, and facilitate seamless communication among team members [2]. One of the key advantages of this platform is its ability to improve accuracy and reduce errors associated with traditional document processing methods [3].

Traditional document collaboration tools often face limitations in handling complex tasks such as version control, real-time editing, and feedback integration. These challenges can hinder productivity and create communication barriers, especially in remote or geographically dispersed teams. The AI-driven platform tackles these issues by providing intelligent features that automate tedious tasks, track changes effectively, and facilitate clear communication. This includes features like a smart editor that allows users to easily format text, embed rich media, and insert code blocks [4]. The platform also boasts AI-powered capabilities such as real-time language translation, automated summaries of lengthy discussions, and noise cancellation in virtual meetings [5]. This facilitates seamless collaboration in diverse teams and addresses the growing need for global collaboration and inclusivity. This platform utilizes cutting-edge technologies like HTML, CSS, JavaScript, Quill.js for the front-end, Spring Boot for the back-end, WebSockets for real-time communication, and MongoDB for efficient data management. The development process followed Agile methodologies, emphasizing iterative development and incorporating user feedback throughout the design and implementation phases.

Empathy

2.1 Client Details

This AI-driven document collaboration platform caters to a diverse range of users and organizations. The target audience includes businesses of all sizes, educational institutions, and research teams that require efficient and effective tools for collaborative document creation and management. Specifically, the platform focuses on the needs of:

- **Project teams:** Streamlining workflows, improving communication, and enhancing version control for efficient project execution. The platform achieves this by offering features for task assignment, deadline tracking, progress monitoring, and centralized communication channels. This addresses the common challenges project teams face with traditional tools, such as difficulty in coordinating tasks, tracking progress, and maintaining clear communication among team members.
- **Content creators:** Facilitating real-time co-editing, providing intelligent suggestions, and simplifying content review processes. The platform offers features like real-time collaborative editing, AI-powered suggestions for grammar and style improvements, and streamlined feedback mechanisms. This helps content creators overcome challenges related to version control, inconsistent writing styles, and inefficient feedback integration.
- **Researchers:** Enabling seamless collaboration on research papers, reports, and other academic documents. The platform provides features for collaborative writing, citation management, and version control specifically tailored for research workflows. This addresses the challenges researchers face in managing large documents, ensuring accurate citations, and coordinating contributions from multiple authors.
- **Educators:** Providing a platform for collaborative learning, assignment sharing, and feedback provision. The platform offers features for creating and sharing assignments, facilitating group projects, and providing feedback to students. This helps educators overcome challenges related to managing student work, encouraging collaboration, and providing timely and effective feedback.

These users often face challenges with traditional document collaboration tools, such as difficulty in tracking changes, managing different versions, and ensuring clear communication among team members. The AI-driven platform addresses these pain points by providing intelligent features that automate tasks, enhance communication, and improve overall productivity. These features align with the platform's core focus on enhancing document collaboration through AI [2].

2.2 Need Analysis with Evidence

2.2.1 Questionnaire and Analysis

To understand the specific needs and challenges of target users, we surveyed a diverse group of users from our target audience. The survey focused on gathering insights into their current document collaboration practices, pain points, and desired features. The analysis of the survey responses revealed the following key findings:

- **Inefficient version control:** Many users struggle with managing different versions of documents, leading to confusion and potential errors.
- **Time-consuming feedback integration:** Incorporating feedback from multiple collaborators can be a tedious and time-consuming process.
- **Communication barriers:** Lack of clear communication channels can hinder collaboration and lead to misunderstandings.
- **Limited automation:** Manual tasks such as formatting, proofreading, and citation management can significantly reduce productivity.

These findings highlight the need for an AI-driven platform that can address these challenges by providing intelligent features for version control, feedback management, communication, and task automation. This aligns with the observation that AI can improve team productivity through predictive task management and streamlined workflows [6]. By automating these processes, the platform allows users to focus on more strategic tasks and enhances overall efficiency.

2.2.2 Other Materials

In addition to the survey, the need analysis involved examining various other materials, including:

- **Market research reports:** Analyzing industry trends and identifying the growing demand for AI-powered collaboration tools.
- **Competitor analysis:** Evaluating existing document collaboration platforms and their limitations in addressing user needs.
- **User feedback from existing platforms:** Gathering insights from online reviews and forums to understand user experiences and identify areas for improvement.

These materials provided valuable context and further validated the need for an AI-driven document collaboration platform that can effectively address the challenges faced by users in various domains.

Define

3.1 Problem Statement

Based on the empathy research, the core problem this platform aims to solve is the inefficiency and complexity of traditional document collaboration processes. Users often struggle with managing different versions, integrating feedback, and ensuring clear communication, which can hinder productivity and create barriers to effective teamwork. This is further compounded by the challenge of knowledge workers wasting significant time searching for necessary information within documents [7]. This highlights the need for a solution that not only streamlines collaboration but also improves information accessibility and retrieval within documents.

3.2 Empathy Map

To further understand the target user, an empathy map was created, visually representing their needs and challenges related to document collaboration:

Says	Thinks	Does	Feels
"Version control is a nightmare"	"I'm worried about losing important changes"	Constantly checks for conflicting edits	Frustrated, anxious
"Feedback is hard to manage"	"It's difficult to keep track of comments"	Spends hours consolidating feedback	Overwhelmed, unproductive
"Communication is unclear"	"I'm not sure who's responsible for what"	Sends multiple emails to clarify tasks	Confused, disconnected from the team
"Finding information is difficult"	"Where is that important paragraph?"	Scans through lengthy documents repeatedly	Stressed, wastes time on manual searches

Ideate

The ideation phase involved brainstorming solutions and features for the AI-driven document collaboration platform. Various techniques were employed, including brainstorming sessions, SWOT analysis, and user story mapping, to generate ideas and explore potential solutions. Mind maps were created to visually organize and connect these ideas, facilitating a comprehensive understanding of the platform's functionalities and user interactions.

During this phase, several challenges were identified, including the potential reliance on manual processes for certain aspects of development [8]. To mitigate this, the team focused on identifying areas where AI and automation could be effectively integrated to streamline the development process and enhance the platform's capabilities.

Prototype

The prototype of the AI-driven document collaboration platform was developed using HTML, CSS, and JavaScript for the front-end, along with Spring Boot for the back-end. This technology stack was chosen for its flexibility, scalability, and suitability for building real-time collaborative applications.

The prototype included key features such as real-time co-editing, AI-powered suggestions for grammar and style, automated version control, and integrated communication channels. Screenshots and diagrams of the prototype were created to visually showcase the platform's user interface and functionalities.

Test

To evaluate the platform's usability and effectiveness, user testing sessions were conducted with a representative group of target users. Participants were asked to perform various tasks using the prototype, such as creating and editing documents, collaborating with others, and providing feedback. During these sessions, data was collected on user interactions, task completion times, and feedback on the platform's features and overall experience.

The feedback received from users was generally positive, with many highlighting the platform's ease of use, intuitive interface, and helpful AI-powered features. Some suggestions for improvement included enhancing the platform's search functionality and providing more customization options for users. This feedback was valuable in identifying areas for refinement and further development.

Conclusions and Future Scope

This report has outlined the development of an AI-driven document collaboration platform designed to address the challenges of traditional collaboration processes. By leveraging AI for tasks such as real-time translation, automated summaries, and intelligent suggestions, the platform streamlines workflows, enhances communication, and improves overall productivity. The research conducted, including user surveys and analysis of existing materials, has validated the need for such a platform and highlighted its potential impact on various user groups, including project teams, content creators, researchers, and educators.

The platform's ability to foster teamwork and provide a seamless collaboration experience [2] aligns with the growing trend of AI shifting organizational practices to be more adaptive and creative [9]. This suggests that AI-driven collaboration tools like this platform will play a crucial role in shaping the future of work and enabling teams to be more efficient, innovative, and productive.

Future development of the platform will focus on incorporating user feedback, enhancing existing features, and exploring new AI-powered capabilities. This includes improving search functionality, providing more customization options, and integrating with other tools and platforms. The goal is to continuously evolve the platform to meet the changing needs of users and remain at the forefront of AI-driven document collaboration.

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