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REAL-TIME COLLABORATIVE DOCUMENT PLATFORM WITH VERSION CONTROL

COLLABDOC

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HACKATHON REPORT: REAL-TIME COLLABORATIVE DOCUMENT PLATFORM WITH VERSION CONTROL

1.Introduction

In collaborative environments, managing documents efficiently is essential. Traditional file sharing through emails or cloud storage often causes confusion, conflicting edits, and multiple copies of the same file. To overcome this, we have built a Real-Time Collaborative Document Platform that allows multiple users to work simultaneously on the same document with Git-inspired version control. The system includes workflow management features, text editing tools, and sharing functionalities to ensure smooth teamwork.

2. Problem Statement

The platform must enable multiple users to edit documents in real time, handle conflict-free editing, and provide version control with branching, merging, and rollback. It should include workflow management tools, proofing features such as spelling and grammar check, insert options like page break and tables, and allow users to share links while viewing a complete edit history.

3. Example Scenario

A software team is preparing a project proposal. Instead of emailing multiple versions back and forth, they open a shared document on our platform. Each member edits simultaneously and sees real-time updates. If two people edit the same section, the system automatically resolves conflicts. Users can insert cover pages, page breaks, or tables, check spelling/grammar, and track the history of edits. This ensures clarity, efficiency, and accuracy.

4. Key Features Implemented

Real-Time Collaborative Editing: Multiple users edit with live updates and presence indicators. - Version Control: Git-like branches, merges, and rollbacks. - Editing Tools: Cut, Copy, Paste, Find & Replace, Select. - Insert Tools: Page Breaks, Cover Pages, Tables. - Proofing Tools: Spelling and Grammar Checker. - Sharing & Workflow: Shareable document links, role-based permissions. - History: Complete audit trail and rollback options.

5. System Design Overview

Frontend uses HTML5, CSS, and JavaScript for the editor interface. The backend is powered by Node.js with WebSocket support for real-time communication. MongoDB/PostgreSQL databases store documents and version history. The collaboration engine is built on Operational Transformation (OT) or CRDTs for conflict-free editing.

6. Benefits

The platform eliminates version confusion, ensures smooth and conflict-free teamwork, provides an audit trail for accountability, supports professional document formatting with insert tools, and enhances productivity with proofreading and sharing features.

7. Future Enhancements

Future versions can include offline editing with auto-sync, AI-powered suggestions, integration with project management tools, and a mobile application for document editing on the go.

8. Conclusion

The proposed platform combines real-time collaboration, Git-like version control, workflow management, and text editing tools into a single system. It ensures a seamless, professional, and scalable experience for teams of any size working on important documents. This solution is robust enough for hackathon use cases and scalable for real-world enterprise applications.