Training Day-13 report

07 July, 2025

Today, I continued work on the **Collaborative Text Editor Web App**, focusing on enhancing the real-time editing experience by implementing **Conflict-free Replicated Data Types (CRDTs)**. This marked a significant shift from the basic string-based approach to a more robust and scalable solution using specialized data structures.

Work Undertaken:

• Replaced the earlier **string-based text sharing logic** with a CRDT-based model for improved consistency and collaboration.
• Integrated the **yjs library**, a powerful CRDT framework designed specifically for collaborative applications.
• Refactored parts of the application to work with **Yjs documents** instead of plain text strings.
• Focused on handling **real-time updates** between clients in a conflict-free manner.

Challenges Faced:

1. **Document Synchronization Format:**
   – Initially struggled to determine how document updates should be sent and received efficiently across sockets.
   – Researched and discovered that **Uint8Array** could be used to transmit **binary document updates**.
   – This method proved efficient and solved the issue of inconsistent document states during real-time editing.

2. **Syntax and Typo Issues:**
   – Encountered some minor **syntax errors and typos** during integration, which were resolved after careful debugging and review.

Key-Learnings:

• Gained a practical understanding of **CRDTs** and how they support **conflict-free collaborative-editing**.
• Learned about the role of **Uint8Array** in sending raw binary data efficiently across the network, reducing the chances of data loss or mismatch.
• Strengthened understanding of **document versioning**, synchronization, and peer-to-peer communication in real-time systems.

Conclusion:

Today's work significantly improved the technical foundation of the collaborative editor. By adopting CRDTs through Yjs and addressing network efficiency using binary updates, the application is now better equipped for real-time editing scenarios. The base system is stable, and further enhancements can now focus on UI and feature extensions.