Project Report

Title: Privacy-Focused Notes App with Encryption

Subtitle: A Secure, Offline-First Note-Taking Application

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Table of Contents

Abstract

Data privacy has become one of the most critical issues in the digital age. Traditional note-taking apps often rely on cloud storage, which exposes personal information to potential breaches and misuse. This project, Secure Notes, is a web-based note-taking application that ensures data confidentiality through client-side encryption. Built using React, CryptoJS, and IndexedDB, the app encrypts all notes with AES-256 encryption before storing them locally in the browser. It provides essential note-taking features such as create, edit, delete, search, pinning, and archiving, while guaranteeing that only the rightful user, with the correct passphrase, can decrypt and access the notes.

Introduction

With the rise of cloud-based productivity tools, user data privacy is often compromised. Notes, documents, and personal information are stored on third-party servers, leaving them vulnerable to data leaks. The objective of this project is to build a secure, offline-first notes application where users maintain complete control over their data. The app ensures end-to-end privacy using AES encryption, full functionality without internet dependency, and a user-friendly design for practical use.

Problem Statement & Motivation

Many existing note-taking apps such as Google Keep and Evernote prioritize cloud synchronization but compromise user privacy by storing data on external servers. This creates a risk of data breaches, unauthorized access, or surveillance. Users seeking privacy-first solutions lack simple tools that work offline and ensure data confidentiality. Secure Notes was built to fill this gap, empowering users with a privacy-focused solution.

Literature Review / Comparison

- Google Keep – Great for sync, but data stored in Google servers.

- Evernote – Feature-rich, but subscription-based and cloud-dependent.

- Notion – Excellent for collaboration, but privacy depends on external servers.

- Secure Notes – Offline-first, AES-encrypted, privacy guaranteed.

Objectives

Functional Objectives

• Build CRUD functionality for notes.

• Encrypt/decrypt notes using AES.

• Store notes in IndexedDB for persistence.

• Support search, pinning, and archiving.

Non-Functional Objectives

• Ensure offline-first usability.

• Maintain strong security with zero data leakage.

• Provide a lightweight, responsive UI.

System Design & Architecture

The system consists of three main layers:

1. Frontend (React) – UI, state management, and user interactions.

2. Crypto Layer (CryptoJS) – AES encryption/decryption logic.

3. Database Layer (IndexedDB) – Encrypted storage of notes.

Technology Stack

Technology	**Purpose**
React	UI framework, modular component-based development
CryptoJS	AES-256 encryption and decryption
IndexedDB (idb)	Local, persistent, offline storage
JavaScript (ES6)	Core programming language
HTML + CSS	Layout and styling

Implementation Details

The project is modularized into different components:

- **VaultGate.js** – Unlock screen for passphrase
- **NoteEditor.js** – Create/edit notes
- **NoteList.js** – Display all notes
- **NoteCard.js** – Individual note card UI
- **SearchBar.js** – Search notes
- **crypto.js** – AES encrypt/decrypt functions
- **db.js** – IndexedDB helper functions
- **util.js** – Utility helpers (UUID, timestamps)

Testing & Results

- Functional Testing – CRUD operations, search, pin, and archive tested successfully.
- Security Testing – Encrypted notes cannot be read without the correct passphrase.
- Offline Testing – Notes persist even without internet connection.

Advantages

- Privacy-first: No data leakage, not even developer access.
- Offline usability: Works fully without internet.
- Lightweight: Minimal dependencies.
- Unique project: Goes beyond basic CRUD.

Limitations

- Notes lost if passphrase is forgotten.
- No cross-device sync yet.
- No multi-user support.

Future Scope

• Convert to a Progressive Web App (PWA).

• Add biometric unlock (fingerprint/Face ID).

• Introduce tags/folders for better organization.

• Enable secure cloud sync with end-to-end encryption.

Conclusion

This project demonstrates how security and usability can coexist. By combining React, CryptoJS, and IndexedDB, I built a privacy-first notes application that ensures complete data confidentiality. The app strengthened my technical skills in React development and cryptography while giving me practical insights into privacy-aware software design. With future improvements, Secure Notes can evolve into a production-ready secure note-taking platform.

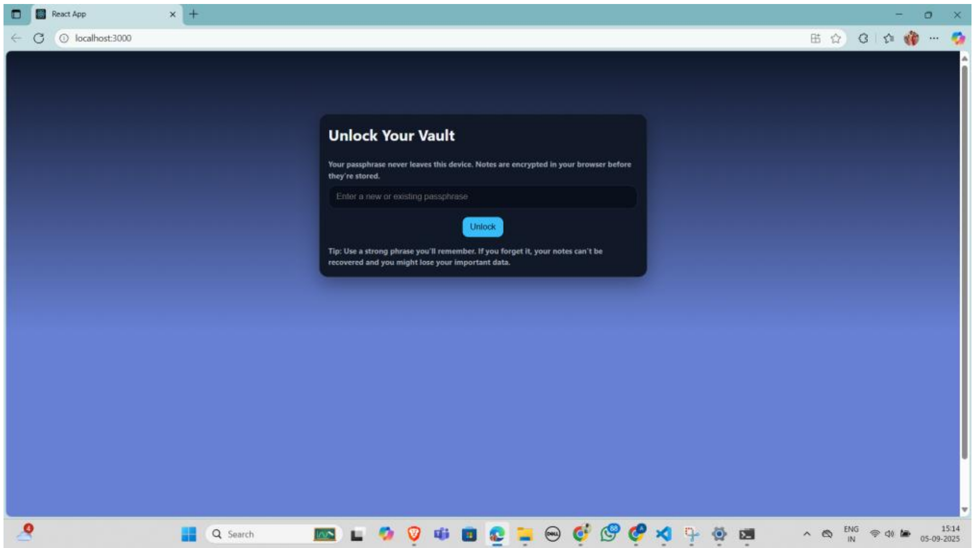
References

React Documentation – https://react.dev

CryptoJS Library – https://github.com/brix/crypto-js

IndexedDB API – https://developer.mozilla.org/en-US/docs/Web/API/IndexedDB_API

Appendix



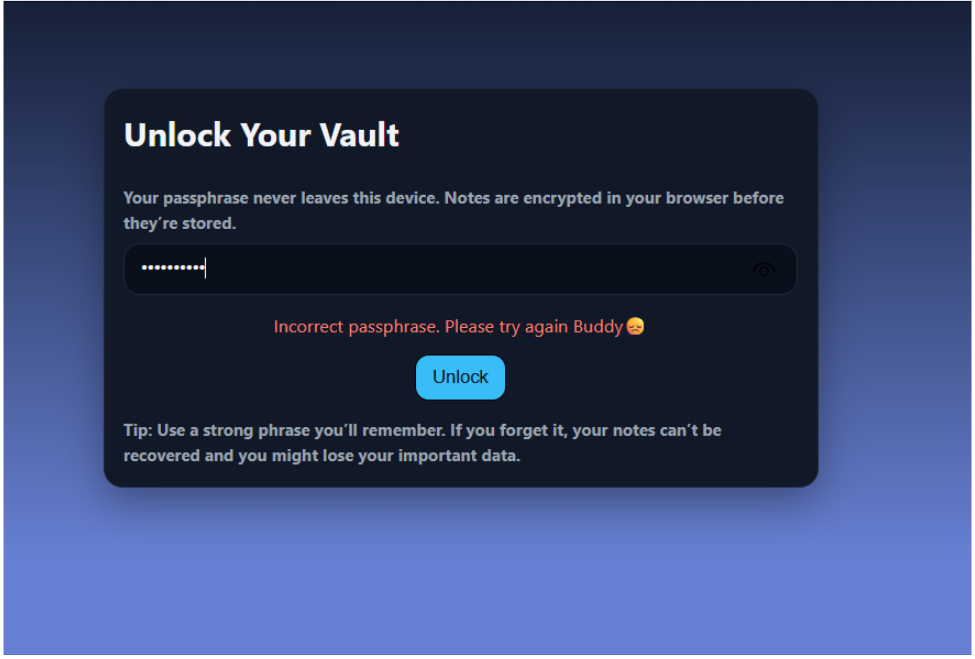
Unlock Your Vault

Your passphrase never leaves this device. Notes are encrypted in your browser before they're stored.

Enter a new or existing passphrase

Unlock

Tip: Use a strong phrase you'll remember. If you forget it, your notes can't be recovered and you might lose your important data.



Unlock Your Vault

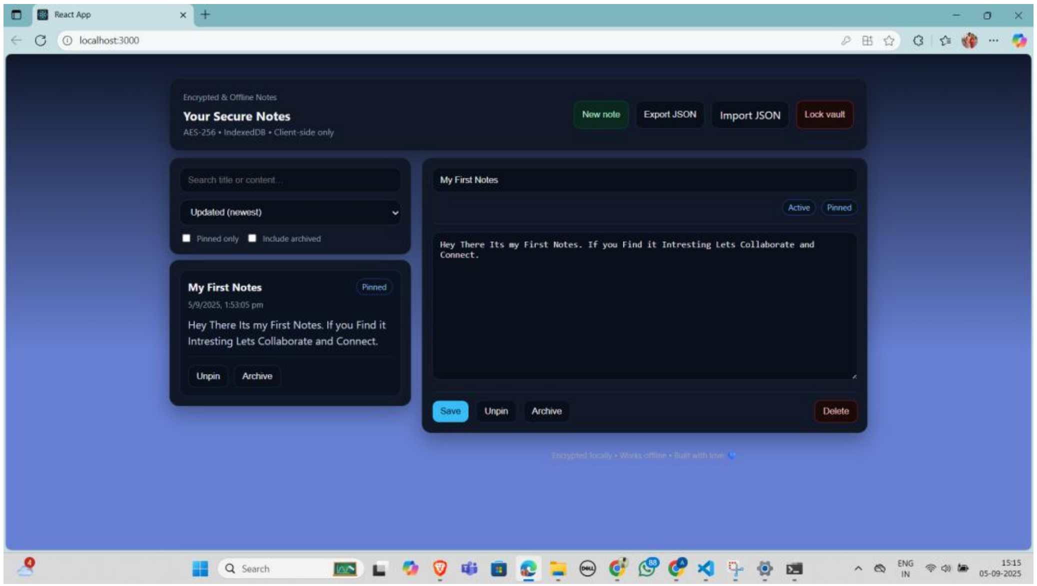
Your passphrase never leaves this device. Notes are encrypted in your browser before they're stored.

••••••••••

Incorrect passphrase. Please try again Buddy😞

Unlock

Tip: Use a strong phrase you'll remember. If you forget it, your notes can't be recovered and you might lose your important data.



Encrypted & Offline Notes

Your Secure Notes

AES-256 • IndexedDB • Client-side only

Search title or content...

Updated (newest)

□ Pinned only □ Include archived

My First Notes Pinned

5/9/2025, 1:53:05 pm

Hey There Its my First Notes. If you Find it Intresting Lets Collaborate and Connect.

Unpin Archive

My First Notes

Active Pinned

```
Hey There Its my First Notes. If you Find it Intresting Lets Collaborate and
Connect.
```

Encrypted locally • Works offline • Built with love 💙