Human-Computer Interface

Final Report: EchoNote

Project Name	**EchoNote**
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School	**School of Computer Science and Technology**
Major	**Software Engineering**
Instructor	**Dr. Shuang LIANG**
Date	**2025.6**

1. Background and Motivation

1.1 Current Limitations of Traditional Memo Applications

Traditional memo applications effectively handle basic note-taking tasks but suffer from significant limitations. Users often experience difficulties with quickly entering information, efficiently retrieving notes, and performing deeper content analysis. The conventional approach typically requires manual input, which can be cumbersome and time-consuming. Additionally, existing memo apps lack advanced analytical capabilities, making it hard for users to leverage their notes effectively, particularly in extracting insights or summarizing important information quickly.

1.2 Motivation: Leveraging AI and Voice Interaction for Enhanced Productivity

Given these challenges above, there is a clear motivation to integrate advanced technologies such as AI and voice interaction into memo applications.

With the rise of large AI language models and significant advancements in natural language processing, it has become feasible to transform traditional memo apps into intelligent tools. Our Project: EchoNote, aims to address these issues by providing a seamless voice-to-text experience, facilitating rapid and effortless information entry.

Furthermore, EchoNote integrates intelligent AI analysis, enabling features such as keyword extraction, automated summarization, and context-aware question answering. This innovation aims to significantly enhance user productivity and provide a flexible, efficient personal information management tool.

2. Related Work

2.1 Analysis of Existing Applications

2.1.1 Apple Notes

Apple Notes provides users with essential note-taking functionality, such as text entry, handwriting, image attachment, and basic organization options through folders and tags. However, its lack of advanced analytical tools, such as intelligent summaries and keyword extractions, limits its usability for more complex note-taking needs.

Figure 1 Apple Notes

Figure 2 Microsoft OneNote

2.1.2 Microsoft OneNote

OneNote is recognized for its robust organizational capabilities, supporting hierarchical note structures and multimedia integration. It provides extensive compatibility across devices. Nevertheless, it still heavily relies on manual input, lacking advanced voice integration and AI-driven features for automatic note summarization and query answering.

2.1.3 Google Keep

Google Keep offers quick and straightforward note-taking features with efficient search functionality and labeling options. Its voice note transcription is convenient but does not extend to comprehensive analytical capabilities like smart summarization or contextual query processing, restricting deeper usability.

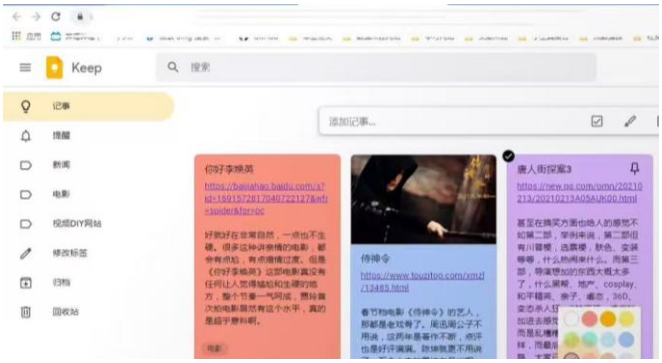

Figure 3 Google Keep

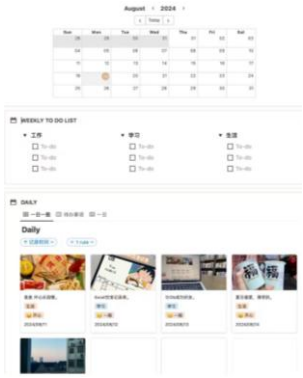

Figure 4 Notion

2.1.4 Notion

Notion combines note-taking with database functionalities, allowing for extensive customization and integration capabilities. It supports rich content embedding and complex management structures. However, Notion does not yet extensively leverage AI for real-time note processing or provide voice interaction capabilities.

2.2 Summary of Strengths and Limitations

Application	Strengths	Limitations
Apple Notes	Simple interface, good basic features	No advanced AI or voice capabilities
Microsoft OneNote	Rich multimedia, strong organization	Limited voice and AI functionalities
Google Keep	Quick, easy, good basic voice notes	No deep analytical capabilities
Notion	Highly customizable, powerful databases	Minimal AI integration, no voice input

3. Goals

3.1 Efficient and Convenient Voice Recording

EchoNote improves note efficiency by allowing users to record thoughts and tasks through speech, reducing the need for typing and making it ideal for use during meetings or on the go.

3.2 AI-driven Intelligent Content Analysis and Querying

The mini-Program uses AI to extract keywords, summarize notes, and answer questions, helping users better understand and use their content.

3.3 Comprehensive Note Management

Users can create, edit, tag, pin, and search notes efficiently, enabling structured and fast information retrieval.

3.4 Ensuring Data Security and User Privacy

All user data is stored locally to protect privacy and prevent unauthorized access.

3.5 Cross-platform Consistent User Experience

Built with UniApp, EchoNote works seamlessly across phones, tablets, and desktops, ensuring a consistent user experience.

4. Design

4.1 Conceptual Design

4.1.1 Core Concept: Voice-Driven Intelligent Note-Taking

EchoNote is built around the core concept of voice-driven intelligent note-taking, fundamentally reimagining traditional note-taking practices. By integrating sophisticated voice recognition and natural language processing technologies, EchoNote eliminates the need for manual typing, enabling users to quickly and effortlessly record ideas and tasks through voice. Additionally, its AI-driven analytical capabilities facilitate a deeper understanding and better organization of recorded content.

4.1.2 Target Users and Usage Scenarios

EchoNote targets three primary user groups:

- **General users** who seek quick and convenient methods to capture daily ideas, reminders, and tasks.
- **Students and professionals** who rely on efficient and intelligent tools for organizing and analyzing extensive notes.
- **Multi-device users** who require seamless access to notes across phones, tablets, and desktop computers, benefiting from synchronized experiences.

Typical usage scenarios include recording quick thoughts during commutes, capturing detailed notes during meetings or lectures, and managing personal tasks and reminders with minimal manual input.

4.2 Physical Design

4.2.1 Low-Fidelity Prototypes

4.2.1.1 Main Memo Page

The low-fidelity prototype of the main memo page clearly displays basic note functionalities, allowing easy voice and text note input, categorization, and quick retrieval. It provides an intuitive structure designed for rapid interaction and minimal user effort.

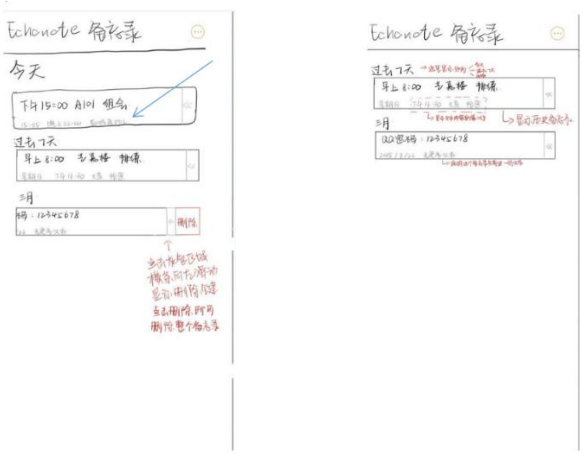

Figure 5 Low-Fidelity Prototypes: Main Memo Page

4.2.1.2 To-Do and Voice Recognition Page

This prototype demonstrates a dedicated to-do list integrated with voice recognition functionality, streamlining the creation and management of tasks. Users can quickly add, modify, or complete tasks through voice commands, significantly improving task management efficiency.

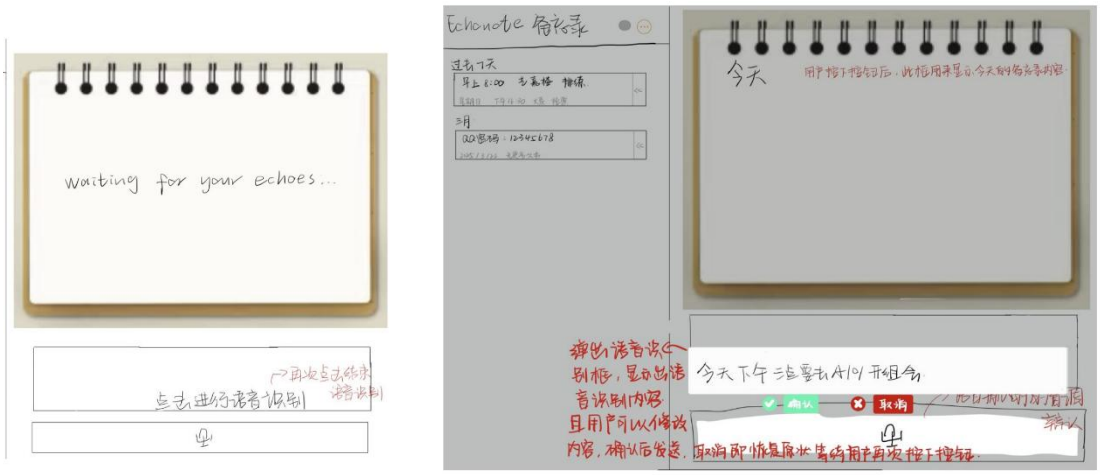

Figure 6 Low-Fidelity Prototypes: To-Do and Voice Recognition Page

4.2.2 High-Fidelity Prototypes

4.2.2.1 Memo Editing Page

The high-fidelity memo editing interface incorporates enhanced text formatting, theme customization, and advanced search capabilities. Users can conveniently edit notes, change styles, and search content with intuitive interactions, ensuring both efficiency and ease of use.

4.2.2.2 AI Assistant Page

The AI assistant interface integrates seamlessly with the memo editing page, providing real-time support, automated summaries, and intelligent queries. Users can leverage the AI assistant for additional insights, quick summaries, and problem-solving without interrupting their workflow.

4.2.2.3 To-Do List Page

This page features an organized and intuitive interface for managing to-do tasks. Users can quickly add, complete, and review tasks. The page clearly distinguishes pending and completed

tasks, ensuring clarity and effectiveness in task management.

4.2.2.4 Personal Profile Page

The personal profile page provides users with personalized settings and preferences. Here, users can manage synchronization across devices, adjust AI settings, and control data privacy options, enhancing their overall personalized experience with EchoNote.

Figure 7: Memo Editing Page

Figure 8: AI Assistant Page

Figure 9: Todo List Page

Figure 10: Personal Profile Page

5. Result

EchoNote’s functionality is structured around four main interfaces: "Memo Editing," "AI Assistant," "To-Do," and "Personal Profile," providing users with comprehensive and user-friendly tools for efficient note-taking and task management.

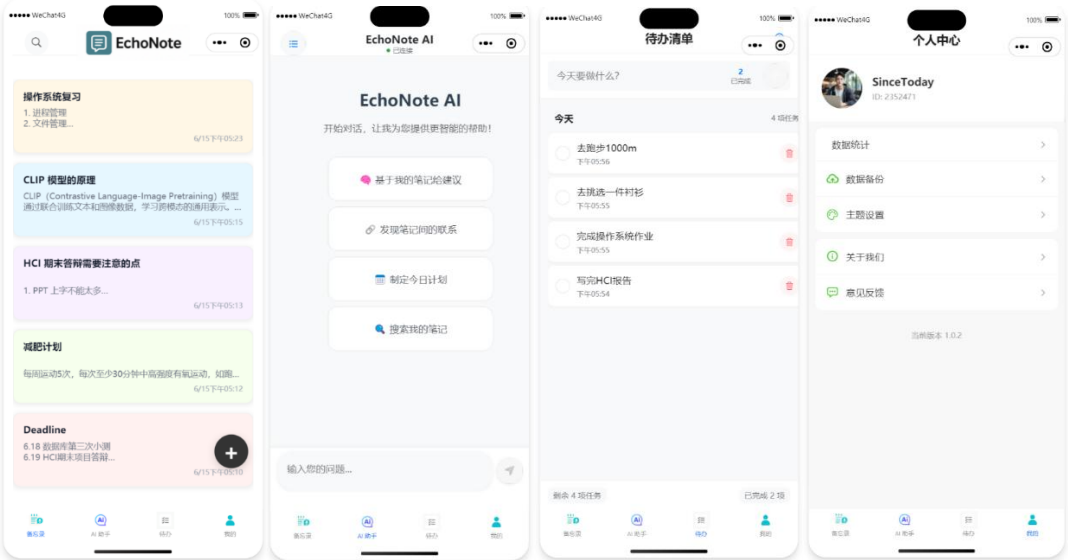

Figure 11: Pages of EchoNote Mini-Program

5.1 Memo Editing Features

The Memo Editing interface forms the core functionality of EchoNote, allowing users to create and format notes quickly. Users can input notes via voice commands or typing, enhancing

convenience and efficiency. Notes can be formatted using various customizable styles, significantly improving readability and user experience.

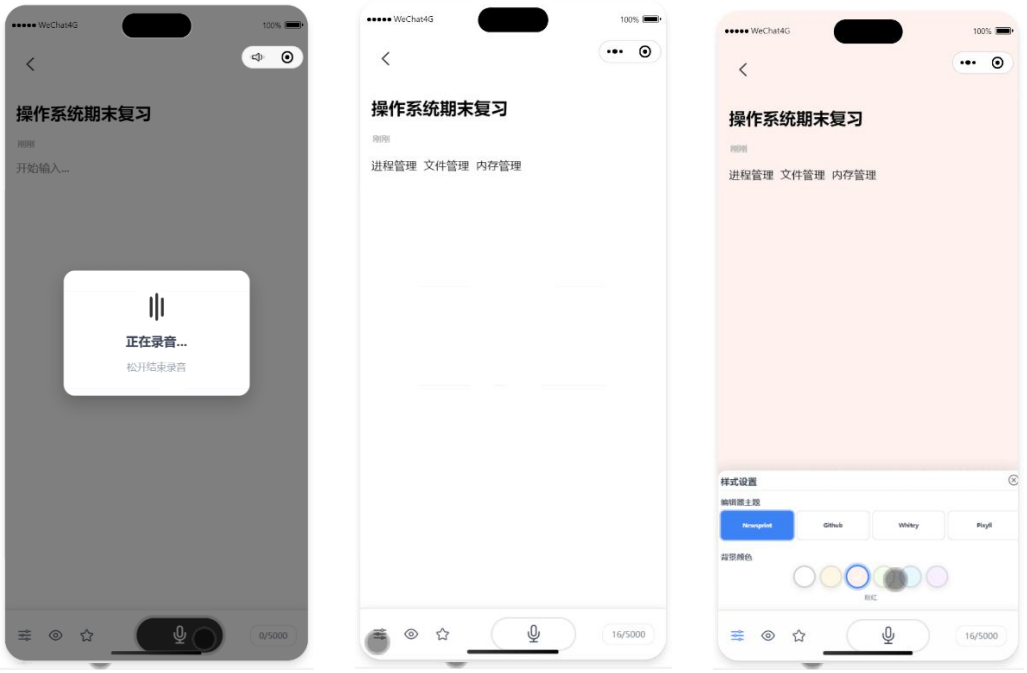

Figure 12: Basic function of EchoNote: Voice input, switch color theme

Additionally, notes already saved on the homepage can be easily managed, including pinning important notes to the top for quicker access or deleting obsolete entries.

EchoNote further enhances note personalization by integrating Typora's .css style files, enabling users to select from multiple editing themes. Moreover, the interface supports powerful search capabilities, allowing users to quickly locate specific notes using keyword searches.

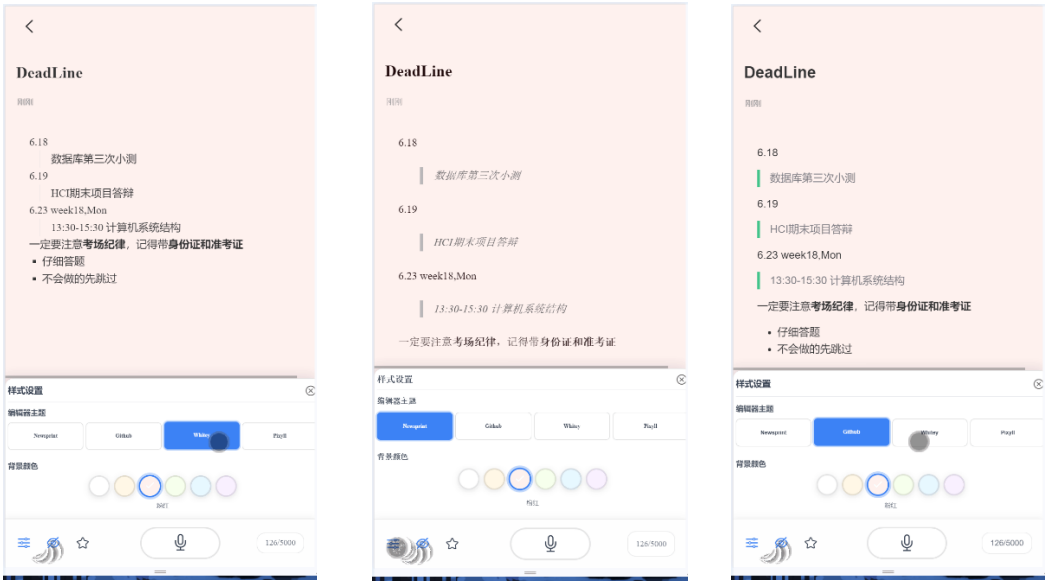

Figure 13: Flexible theme switching for styles

While writing notes, users may occasionally encounter moments where they are unsure how to proceed, need clarification, or simply want assistance generating additional content. In EchoNote, the AI Assistant is designed to follow the user's note-taking process in real time. This means that as users type or dictate their notes, the AI Assistant remains contextually aware of the content. At any point during writing, users can engage the assistant without leaving the page. Whether it's to complete a sentence, refine a paragraph, or answer a question related to the note's subject, the assistant is always ready to help. This seamless interaction ensures smoother writing, fewer interruptions, and more complete, coherent notes.

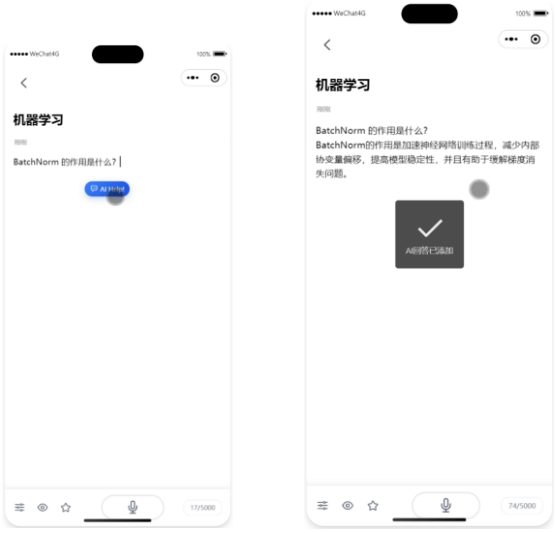

Figure 14: Using AI during the input process

5.2 To-Do Task Management

EchoNote's dedicated To-Do interface significantly simplifies task management, allowing users to effortlessly add, manage, and track tasks. Users can quickly enter new tasks either manually or through voice recognition, marking them complete with a simple tap. Completed tasks are organized in a clear, separate view, ensuring a tidy and focused interface for ongoing activities, thereby boosting user productivity and task management efficiency.

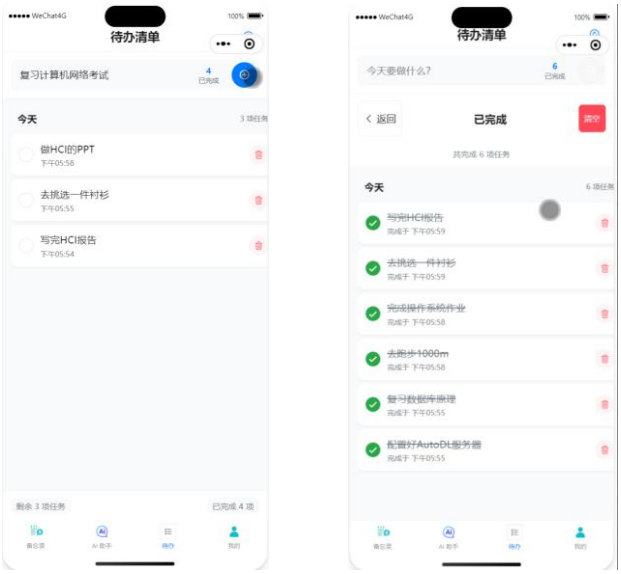

Figure 15: To-do interface and completed interface

5.3 Integrated AI Assistant

The assistant interface is powered by the Qwen3 large language model and supports a variety of natural language queries. Users can ask about their notes, explore relationships between entries, and search for specific content. A built-in history view also allows users to review or delete past interactions, making the assistant both helpful and manageable.

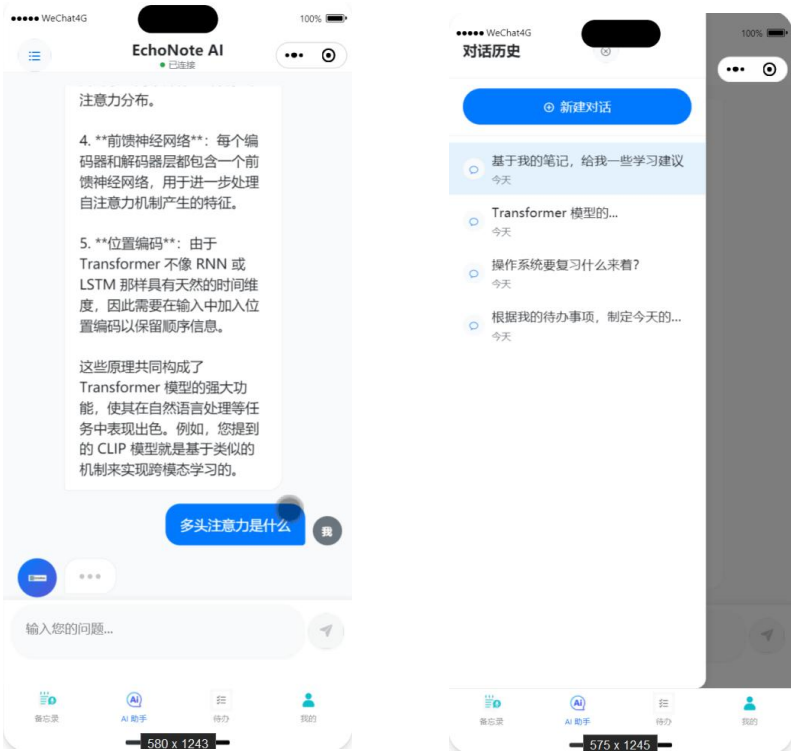

Figure 16: Basic question-and-answer function and history records

EchoNote's AI Assistant deeply integrates with the user's notes and to-do items. It can summarize recent memos, extract key points, and assist users in generating daily plans based on their recorded tasks. This allows for a more proactive experience, where the assistant doesn't just answer questions but actively helps organize and make sense of personal content.

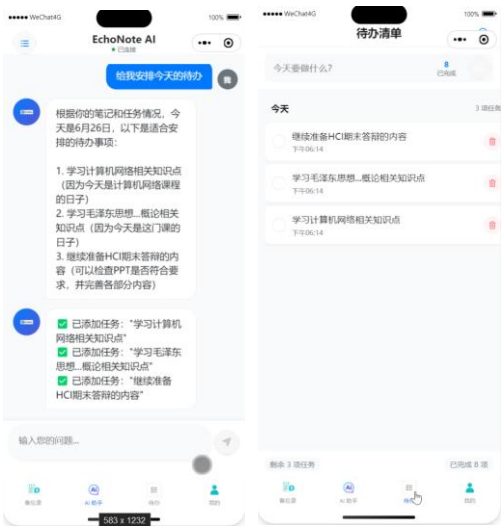

Figure 17: Utilizing AI to manage the to-do page

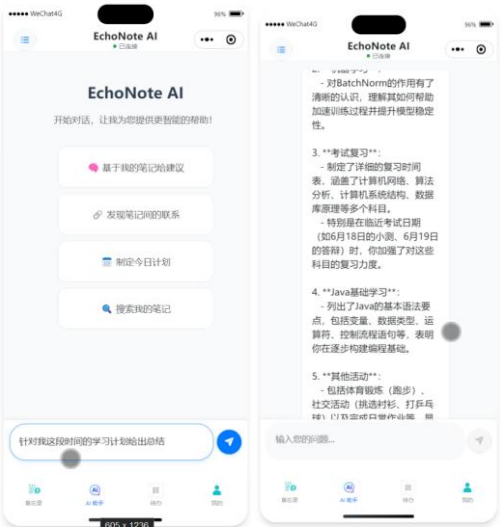

Figure 18: Utilize AI to summarize and extract the content of the notes

6. Evaluation

6.1 User Feedback and Testing Outcomes

Multiple internal tests and peer reviews showed that users found the interface clean and easy to use. Key features like voice input and note creation were especially appreciated. However, some users mentioned the lack of customization options, such as themes and layout.

6.2 Performance Assessment of AI Features

The integration of Qwen3-powered AI allowed for fast, context-aware responses, keyword extraction, and note summarization. These features were praised for improving content efficiency and usefulness. The ability of the AI to support task planning and query answering in real-time was one of the project's highlights.

Classroom principles about recognition vs. recall also informed our critique: in complex input scenarios, voice recognition was sometimes inaccurate, especially with technical or ambiguous phrases.

6.3 Usability and User Experience

EchoNote performed well in speed, clarity, and ease of use. It fits naturally into users' habits and supports multi-device syncing with local storage. Future improvements could focus on more personalization and flexible input options.

7. Summary

This project was a collaborative effort built upon the principles and tools we explored throughout the course on HCI. From the early stages of user need analysis to the design of intuitive interfaces and evaluation through user testing, we consistently applied key concepts such as mental models, design, and usability heuristics.

EchoNote reflects our core idea: using AI to enhance traditional tools and bring users more flexibility and convenience. We wanted to take something familiar—like a memo app—and make it smarter, faster, and easier to use without changing how users naturally interact with such tools. Through voice interaction, AI-driven content analysis, and thoughtful interface design, we believe we've created a product that aligns with real user needs while embodying the spirit of human-centered innovation we've studied in class.

8. About Our Team

8.1 Team Members and Contributions

组员	分工	贡献度
2352471 刘震	框架搭建、技术开发、文档撰写、艺术设计	55%
2353733 王奕昕	ppt 制作、文档撰写、艺术设计	35%
2351707 马敏慧智	无	10%

8.2 Project Repository and Resources

Our full project is publicly available at **https://github.com/SinceTodayL/EchoNote**, You can read the README file to obtain the dynamic display content of the project, or you can run this project locally following the method in README file.