

FINAL REPORT

AC4150E- HUMAN MACHINE INTERACTION

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Course: AC4150E

Class: 152296

CAIN



Table of content

- ▶ Project Name & Value Proposition
- ▶ Team Member Names and Roles
- ▶ Problem/Solution Overview
- ▶ Needfinding
- ▶ POVs & Experience Prototypes
- ▶ Design Evolution
- ▶ Values in Design
- ▶ Final Prototype Implementation
- ▶ Summary & Next Steps
- ▶ Final Remarks

Project Name & Value Proposition

Our Name

Value Proposition

"CAIN" means...

- 🔍 Clarifying complexities in your documents
- 🤖 Adapting to your questions with smart, relevant responses
- 🌐 Interacting seamlessly to meet your needs
- 🤝 Navigating you through knowledge effortlessly

Our one-liner is "Your intelligent assistant for document insights and streamlined workflows."

CAIN is a revolutionary chatbot designed to simplify document management by offering precise summaries, accurate queries, and effortless navigation. It transforms how you interact with and understand your documents, saving time and enhancing productivity.

Team Member Names and Roles

Our Team



Phung Minh Chien
20213565

Designer + Developer



Ma Khoa Hoc
20210388

Designer + Developer



Nguyen Danh Huy
20213571

Designer + Developer

Problem Solution Overview

Problems

- Difficulty retrieving specific information in large documents.
- Uncomfortable experience while working with only 1 document in a chat.
- Lack of user-friendly and accessible interface.

Solution

- A chatbot with natural language queries for quick searches.
- Tools for document summarization, deeply understand about the document
- Intuitive, and accessible design for diverse user needs.

Needfinding

Interview

Who, Why, When, Where?

- **General Users (1 participants)**
- **Advanced Users (1 participant): They can provide in-depth feedback on optimizing the chatbot's functionality, develop the functions related to extracting information from documents in a more convenient way.**
- **Inexperienced Users (1 participant): They can provide critical feedback on the way to approach our application for new users.**

The interview was held on MS team and Discord platform from 9 to 11 pm on Tuesday October 21, 2024.

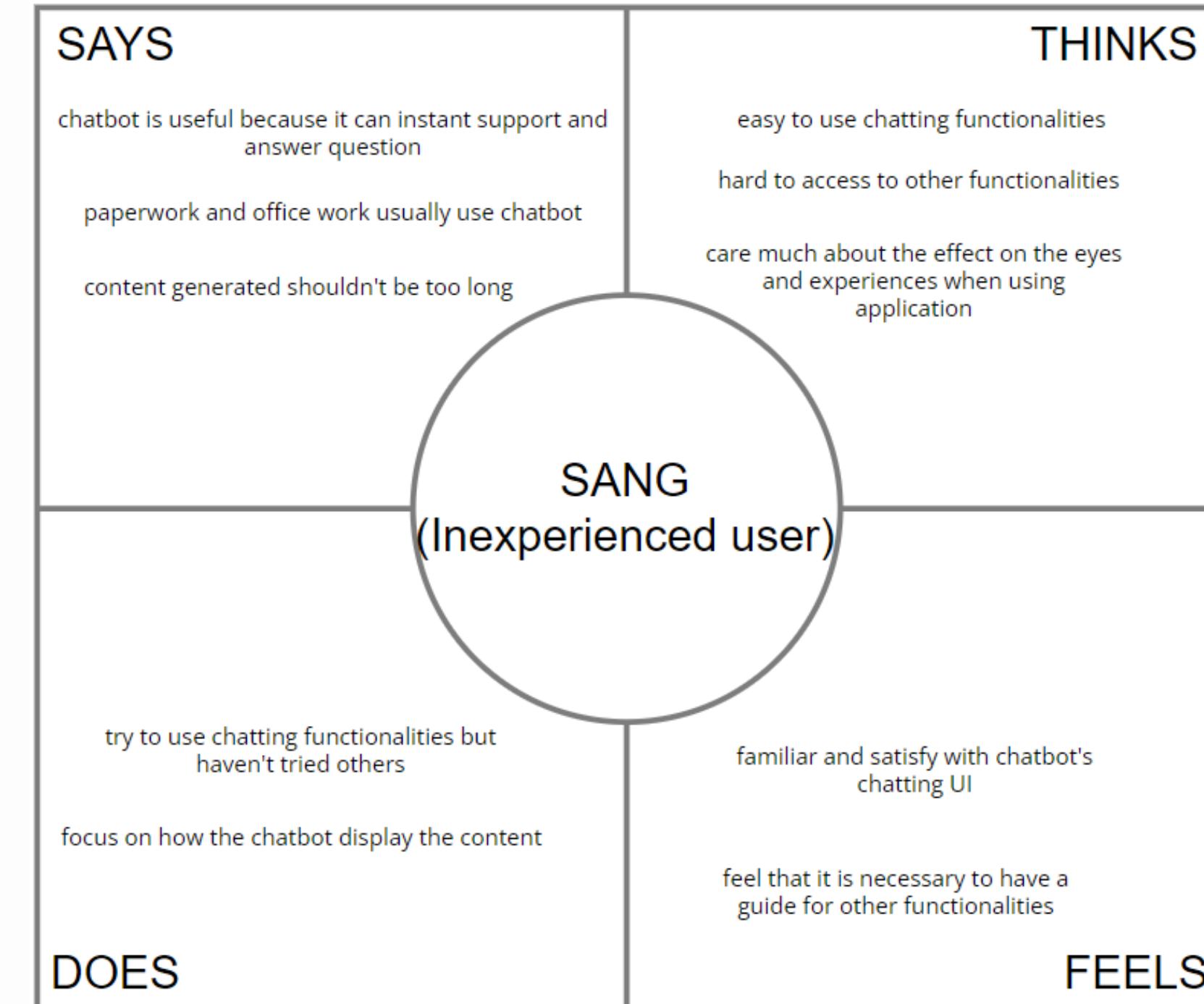
Interview

For our needfinding interviews, we interviewed 3 people:

- ·Sang (21 years old): 4th year student from EE-EP of SEEE; Rarely use Chat GPT or chatbot to analyze documents
- ·Thanh (21 years old): 4th year student from SEEE; Working with Chat GPT regularly but not using Document chatbot to analyze documents
- ·Nghia (20 years old): 3th year student from SEEE; Must work with digital documents regularly and use Chat GPT and Document chatbot to analyze documents

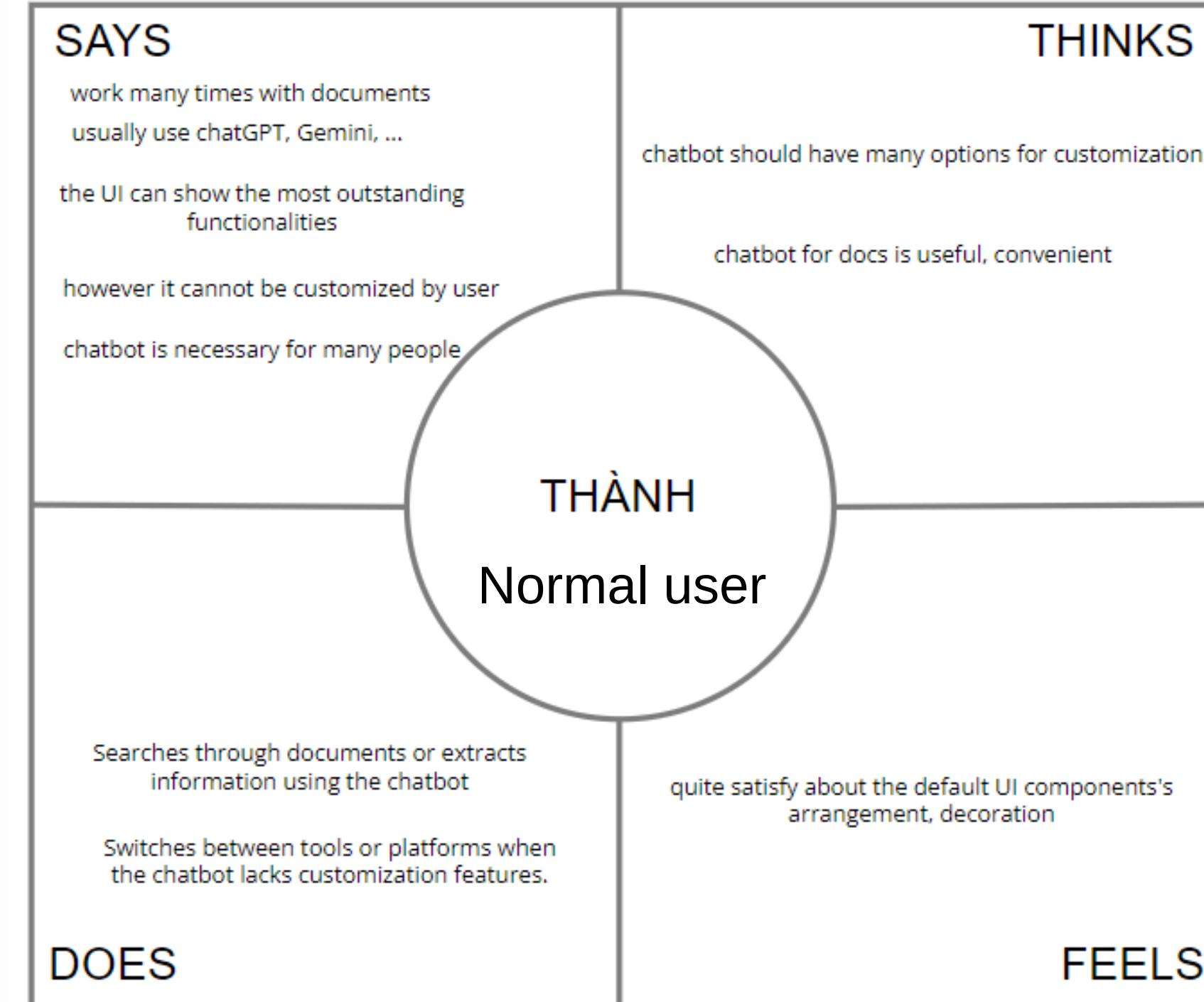
Synthesis

Sang's empathy map



Synthesis

Thanh's empathy map



Synthesis

After analysis, we found that users need a flexible chatbot that balances simplicity with advanced features. It should handle complex document tasks, offer customization options, and support effective document summarization and querying to meet diverse user needs.

POVs & Experience

Prototypes

Top 3 HMWs from across all three interviews

- How might we design a chatbot that delivers highly accurate and context-aware responses from uploaded documents?
- How might we streamline the process of uploading, managing, and retrieving files independently of conversations?
- How might we create a chatbot interface that reduces eye strain and promotes visual comfort during extended use?

Top 3 Solutions

- ·Context-Aware Chatbot Design: Develop a chatbot with advanced NLP to provide accurate, context-aware responses based on uploaded documents, ensuring precise answers to user queries.
- ·File Management and Streamlined Uploading: Create a system that allows users to upload, organize, and manage documents independently from the conversation interface for seamless interaction.
- ·User-Friendly and Intuitive Interface: Design an interface prioritizing user comfort with adjustable text sizes, contrast control, and clear tutorials, making advanced features easy to use, especially for beginners.

Experience Prototypes

Prototype 1: Chatbot for Document Understanding

Prototype 2: Chatbot for File Management

Prototype 3: Chatbot with Advanced Features for Document Analysis

Experience Prototypes

Prototype 1: Chatbot for Document Understanding

We created a chatbot that can analyze and answer questions based on the documents uploaded by users. When users upload a document, the chatbot uses NLP (Natural Language Processing) to understand the content and answer specific questions about the document. We asked users to inquire about the document, such as: "How many pages are in this document?" and "What does this document say about environmental issues?"

Experience Prototypes

Prototype 2: Chatbot for File Management

We designed a feature that allows users to upload, organize, and search for documents independently from the conversation. Users can easily drag and drop documents into the chatbot and then organize them into separate folders. The chatbot provides options to search for and retrieve documents based on criteria such as document name, upload date, or keywords within the document

Experience Prototypes

Prototype 3: Chatbot with Advanced Features for Document Analysis

In this trial, the chatbot was equipped with advanced features such as document comparison and summarization. Users could upload two documents and ask the chatbot to compare them and highlight differences or ask the chatbot to summarize the content of a document for quick insight. We also provided detailed analysis features to help users understand key topics within the document.

Design Evolution

Final solution

Prototype 1: Chatbot for Document Understanding

Description: We created a chatbot that can analyze and answer questions based on the documents uploaded by users. When users upload a document, the chatbot uses NLP (Natural Language Processing) to understand the content and answer specific questions about the document. We asked users to inquire about the document, such as: "How many pages are in this document?" and "What does this document say about environmental issues?"

Tasks

Simple Task – Search Notebook by Name:

Moderate Task – Chat to Ask About Chosen File:

Complex Task – Upload Document File to Notebook:

Design evolution

The two realizations that excited us the most

Website

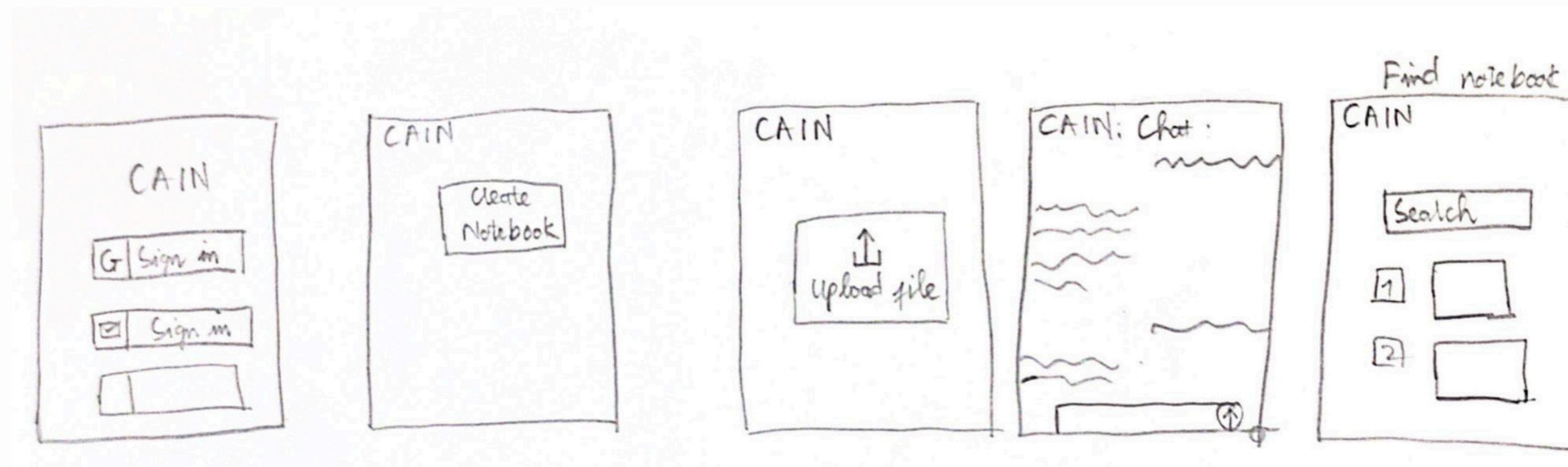


Mobile app



Design evolution

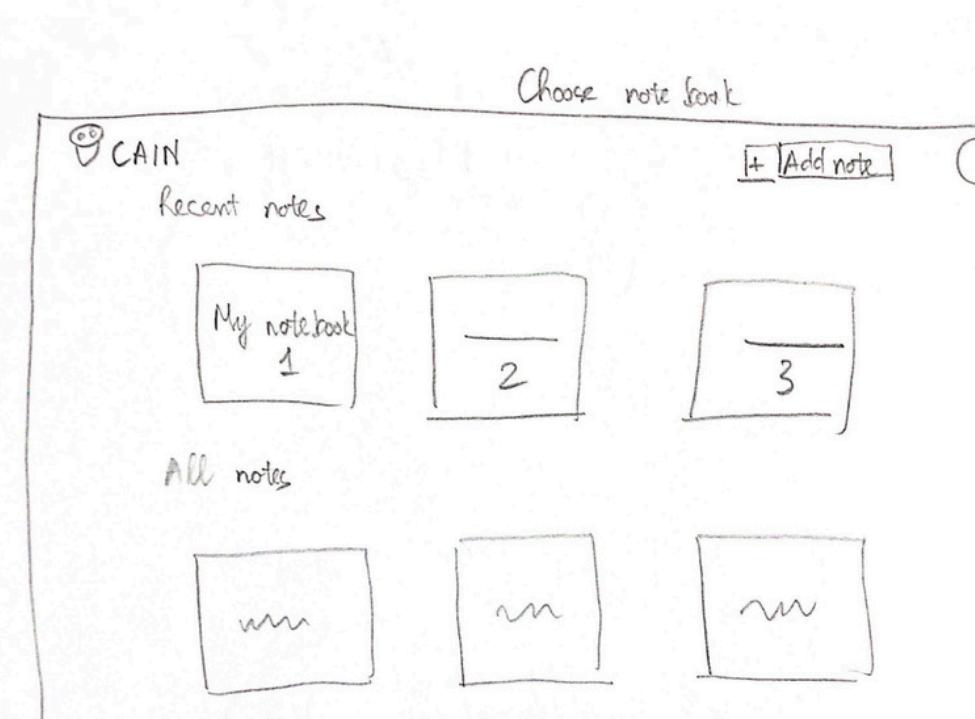
Low-fi Prototype/Initial Sketches



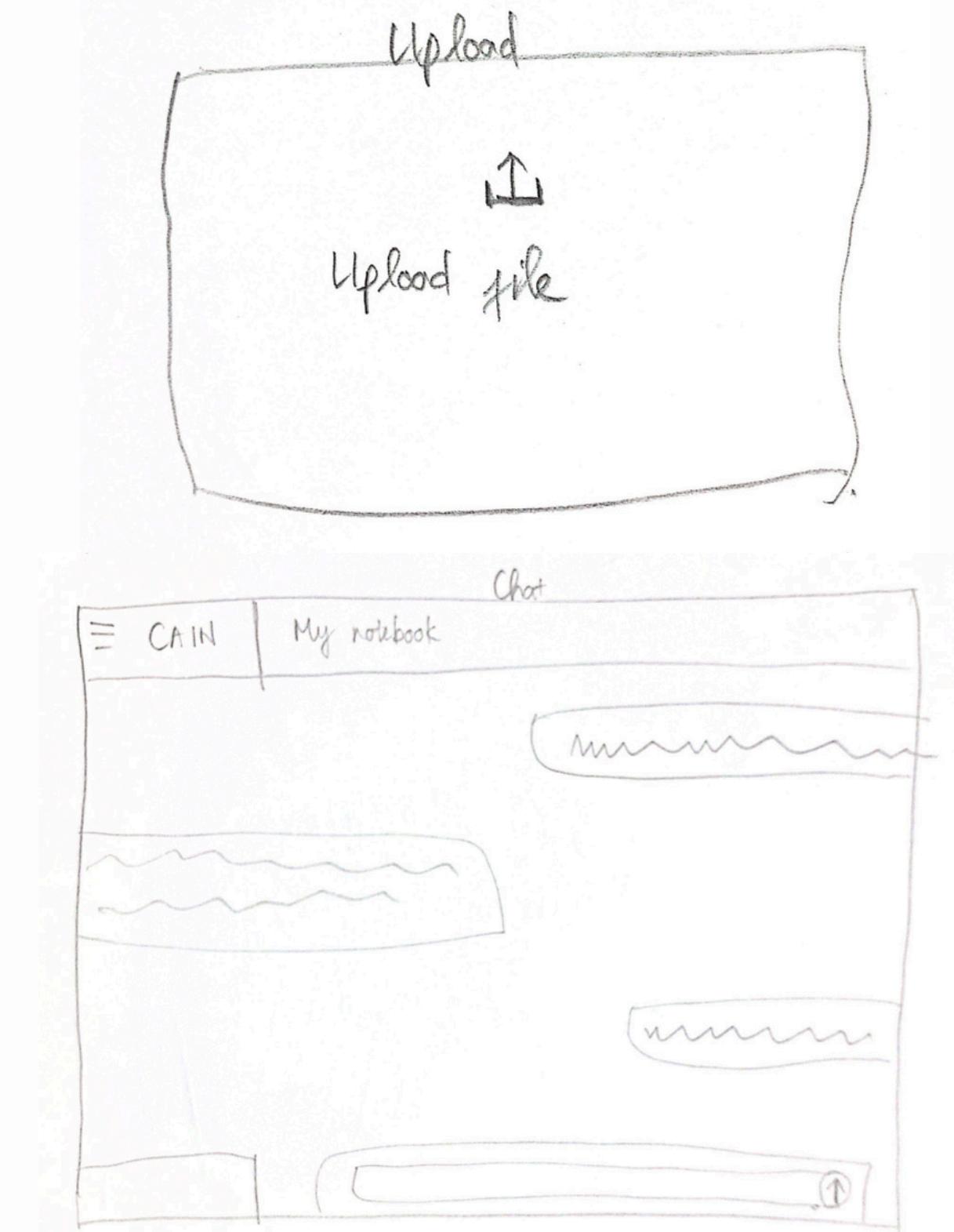
Mobile app

Design evolution(Low-fi)

Low-fi Prototype/Initial Sketches



Website



Design evolution(Low-fi)

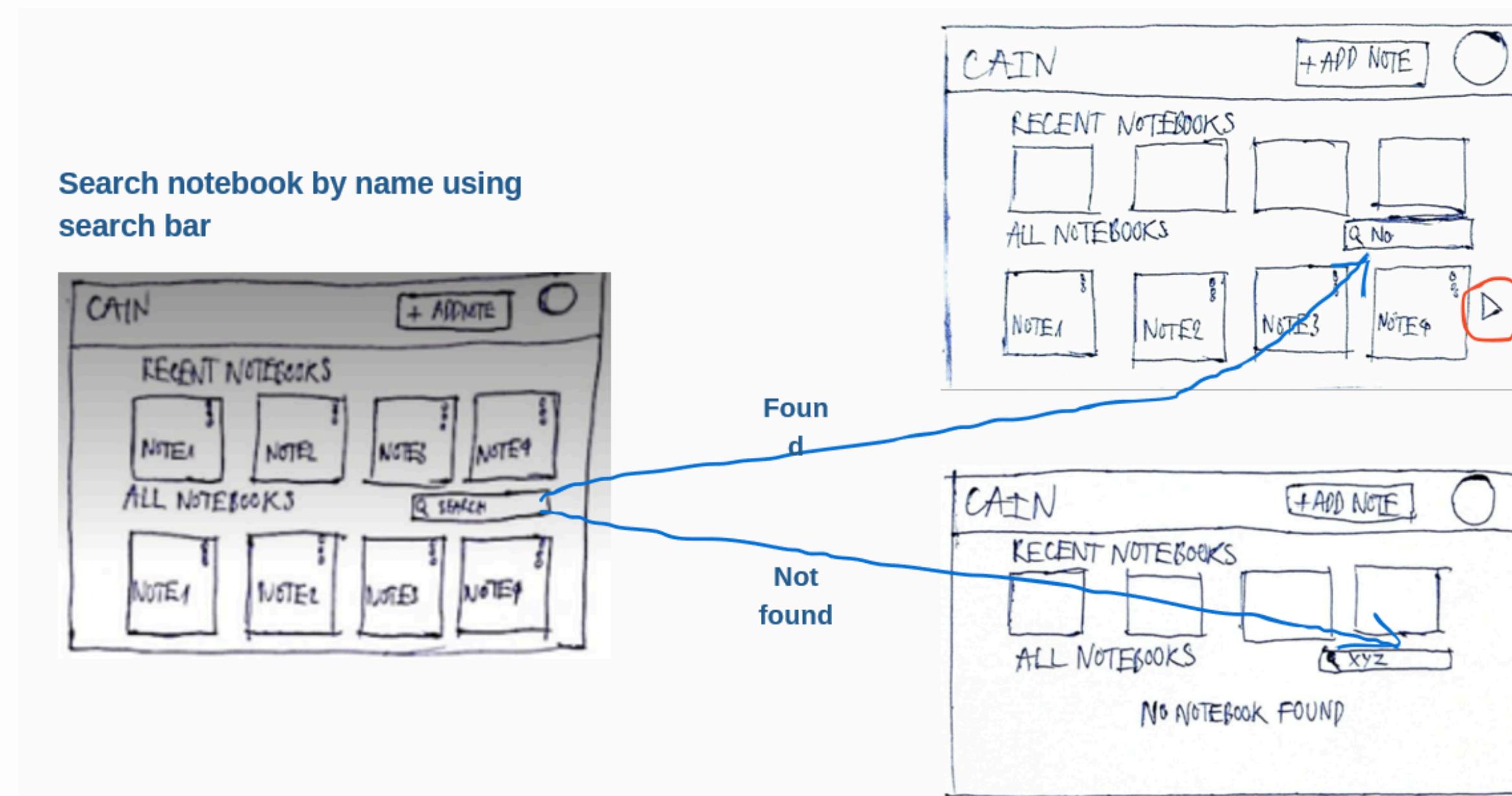
After analyzing the feasibility of each realization and voting on the idea we were most excited to design and build, we found that a website is the ideal choice.

Website > Mobile app



Design evolution(Low-fi)

Search Notebook by Name(Simple)



Design evolution(Low-fi)

Chat to Ask About Chosen File(Moderate)

The image displays three hand-drawn wireframes illustrating the design evolution of a mobile application interface.

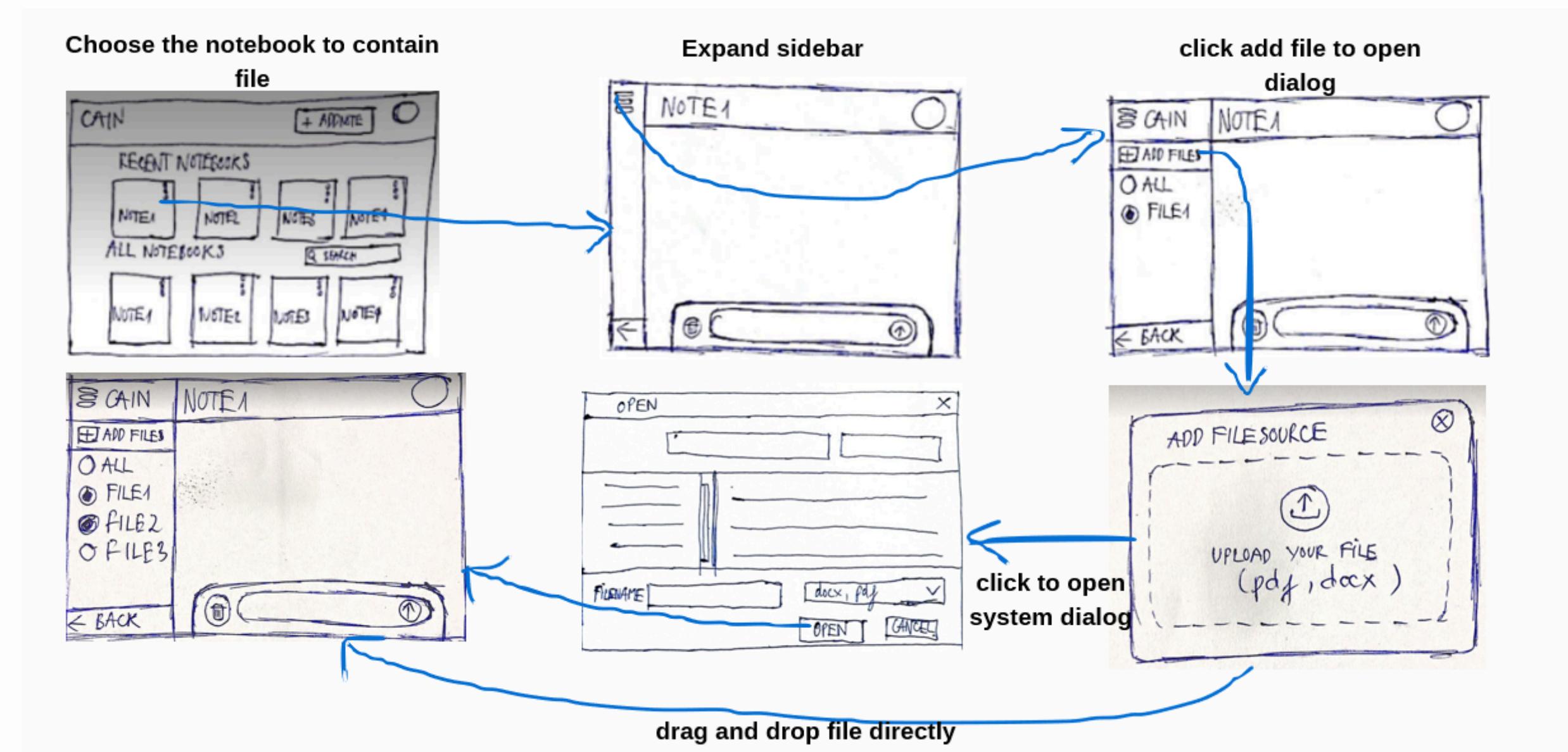
Sketch 1: Shows a screen with "CAIN" at the top left and "NOTE1" at the top right. A sidebar on the left contains a "ADD FILE" button and four radio buttons labeled "ALL", "FILE1", "FILE2", and "FILE3". A blue arrow points from this screen to Sketch 2.

Sketch 2: Shows the same layout as Sketch 1, but the "ALL" radio button is now selected. A blue arrow points from Sketch 1 to this screen. To the right, a text box says: "Now you can freely chat with CAIN and ask about chosen files".

Sketch 3: Shows the same layout as Sketch 2, but the "ALL" radio button is highlighted with a blue oval. A blue arrow points from Sketch 2 to this screen. A text box in the center says: "You can choose 'All' radio button to select all the files in notebook". At the bottom, there is a button labeled "CAN I ASK SMTH! 🤔".

Design evolution(Low-fi)

Upload Document File to Notebook(Complex)



Design evolution(Low-fi)

Usability Testing

With these low-fi prototypes, we began usability testing. We interviewed 3 college students, 1 HUST student, 1 HUCE student and 1 student from DAV. We were particular about finding students to test our prototypes with since CAIN is designed for students who work with digital documents regularly.

Design evolution(Low-fi)

Usability Testing

After having our final three students test the revised prototype, we came away with some big picture goals and implications.

- Change file selection icon from round button to square button
- Add a loading animation to track task completion, making the experience more transparent.
- Add a pop-up that disappears after 5 seconds to notify the user that the file was uploaded successfully.

Design evolution(Low-fi)

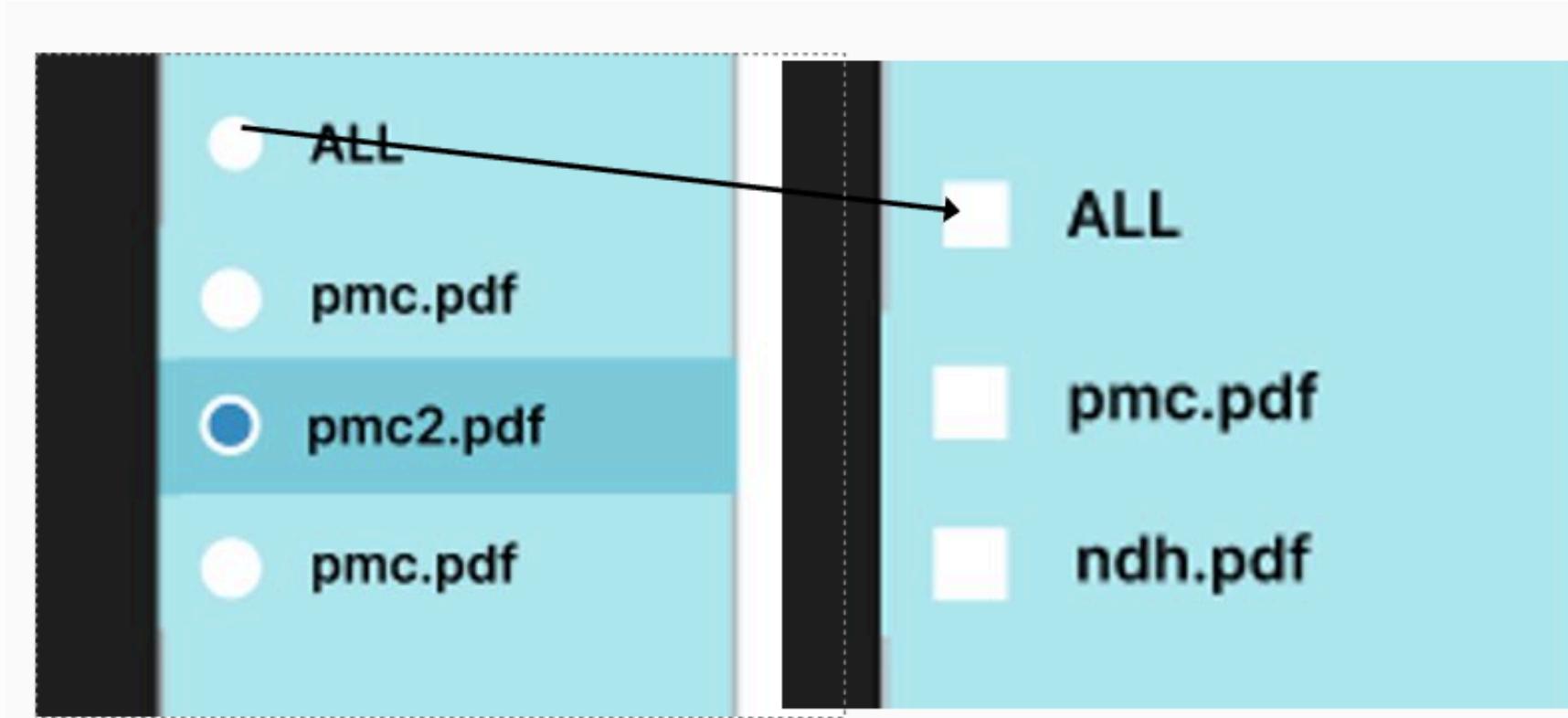
Usability Testing

Our big next steps going into the med-fi prototype were:

- - More flexibility
- - More screens
- - Add more usability goals
- - Change file selection icon from round button to square button

Design evolution(Med-fi)

Major design change #1

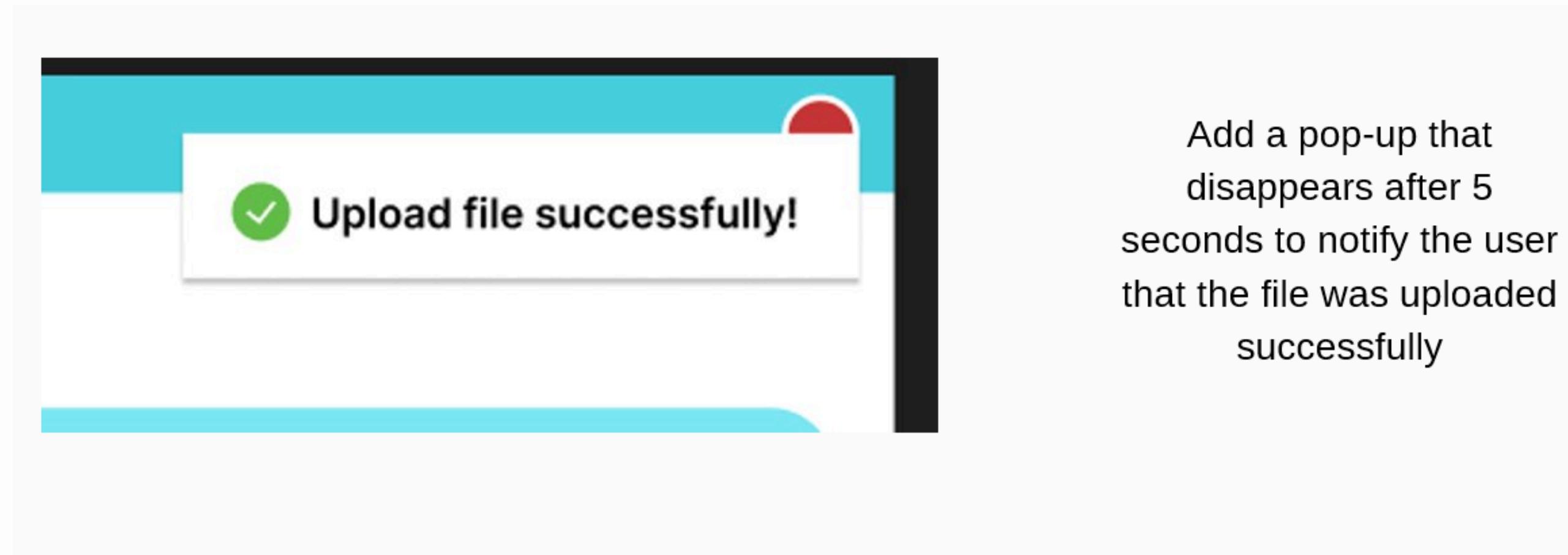


Change the radio buttons to checkboxes for selection so that users know they can select multiple files simultaneously

File Selection Type	File Options
Radio Buttons (Original)	ALL pmc.pdf pmc2.pdf ndh.pdf
Checkboxes (Proposed Change)	<input type="checkbox"/> ALL <input type="checkbox"/> pmc.pdf <input checked="" type="checkbox"/> pmc2.pdf <input type="checkbox"/> ndh.pdf

Design evolution(Med-fi)

Major design change #2



Add a pop-up that disappears after 5 seconds to notify the user that the file was uploaded successfully

Design evolution(Med-fi)

Search Notebook by Name (Simple)

Search notebook by name using search bar

The screenshot shows a digital notebook interface. At the top, there's a header with the brand name 'CAIN' and a button for 'Add new AI note'. Below the header, there are two sections: 'Recent notes' and 'All notes'. Both sections display four cards, each representing a notebook. Each card has a title ('My notebook 1', 'My notebook 2', 'My notebook 3', 'My notebook 4'), a date ('October 1st, 2024'), and a trash icon. In the center of the screen is a search bar with the placeholder text 'Search'. A black rectangular box highlights this search bar area. To the right of the search bar, there's a detailed view of the first notebook card, which is titled 'My notebook 1' and dated 'October 1st, 2024'. Above this detailed view, there's a text box containing the search query 'My notebook 1'.

Allow the user to type in a notebook name, and display the corresponding notebook

All notes

My notebook 1

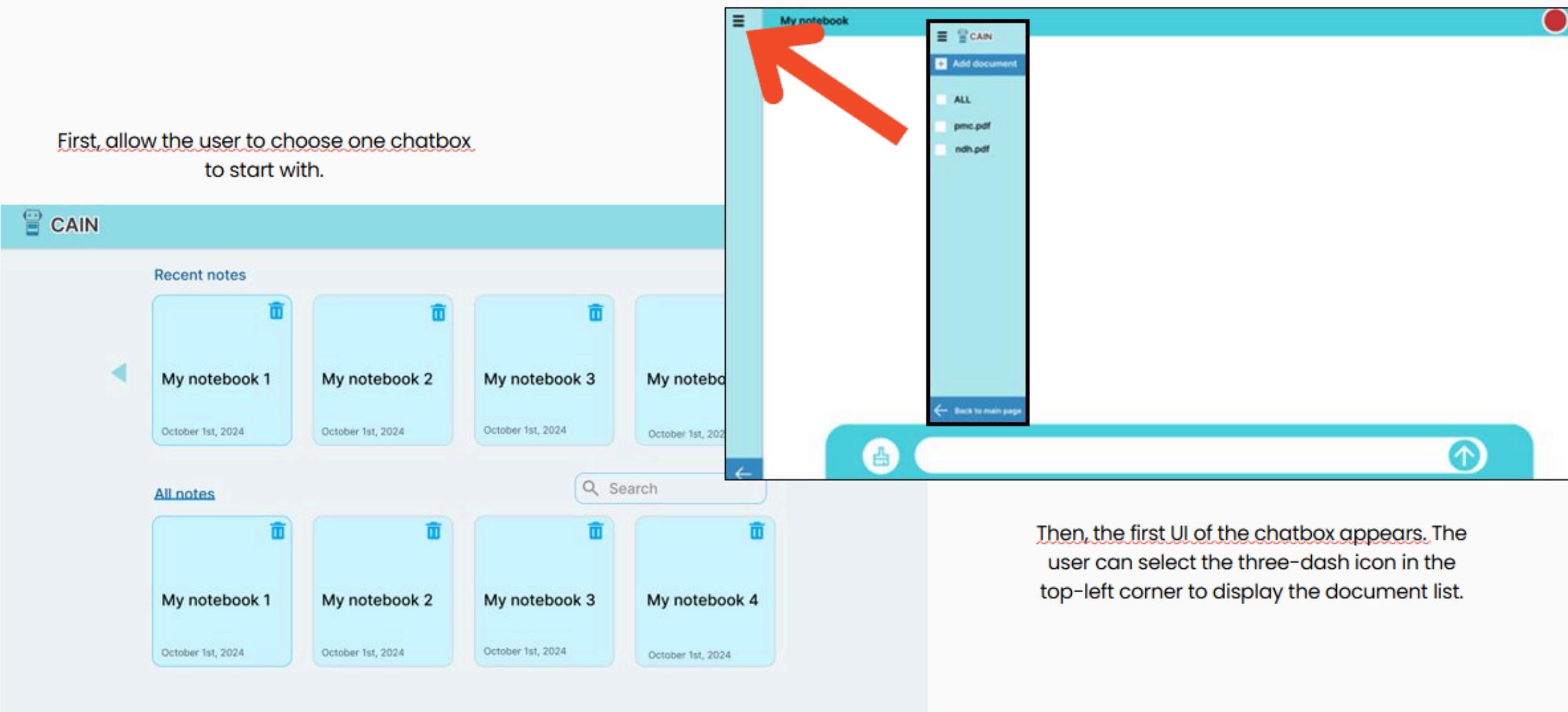
October 1st, 2024

Design evolution(Med-fi)

Chat to Ask About Chosen File (Moderate)

Chat to ask about chosen file

First, allow the user to choose one chatbox to start with.



The screenshot shows a user interface for a application named "CAIN". The main area displays "Recent notes" and "All notes", each listing four items labeled "My notebook 1" through "My notebook 4" with creation dates. A sidebar on the right contains a "My notebook" section with a three-dash icon, an "Add document" button, and a list of files: "ALL", "pmc.pdf", and "ndh.pdf". A red arrow points to the three-dash icon in the top-left corner of the "My notebook" panel. Below the sidebar is a "Back to main page" link. At the bottom of the sidebar is a blue footer bar with a left arrow, a central search bar, and a right arrow.

Then, the first UI of the chatbox appears. The user can select the three-dash icon in the top-left corner to display the document list.

Design evolution(Med-fi)

Chat to Ask About Chosen File (Moderate)

Chat to ask about chosen file

The user can select one or multiple files to start chatting with CAIN

While the bot is processing, a three-dot loading indicator pops up.

Type something to ask about the document

← Back to main page

← Back to main page

CAIN

Add document

ALL

pmc.pdf

ndh.pdf

CAIN

Add document

ALL

pmc.pdf

ndh.pdf

My notebook 1

Add document

ALL

pmc.pdf

ndh.pdf

Hello

Chào bạn

Back to main page

Up arrow icon

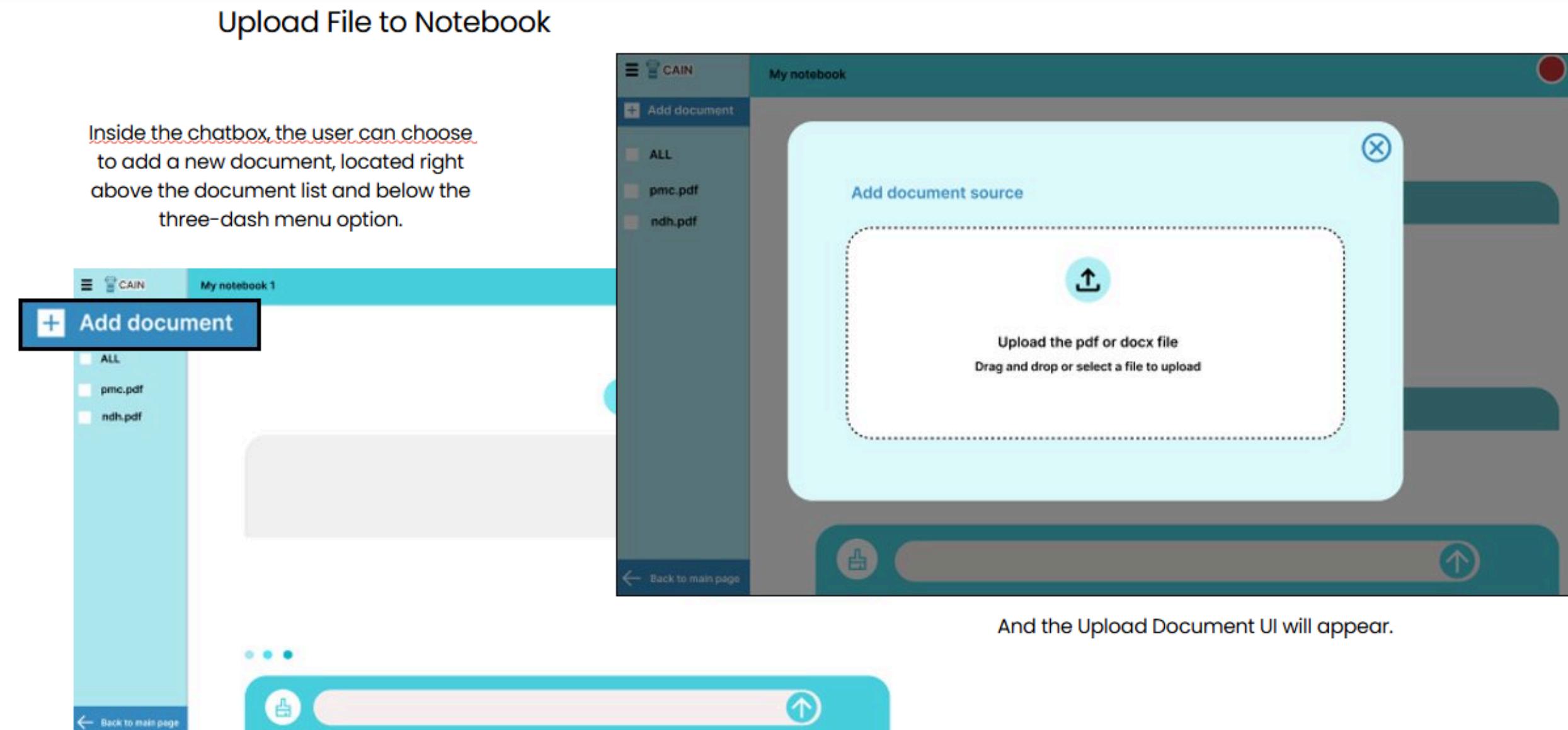
Up arrow icon

Design evolution(Med-fi)

Upload Document File to Notebook (Complex)

Upload File to Notebook

Inside the chatbox, the user can choose to add a new document, located right above the document list and below the three-dash menu option.



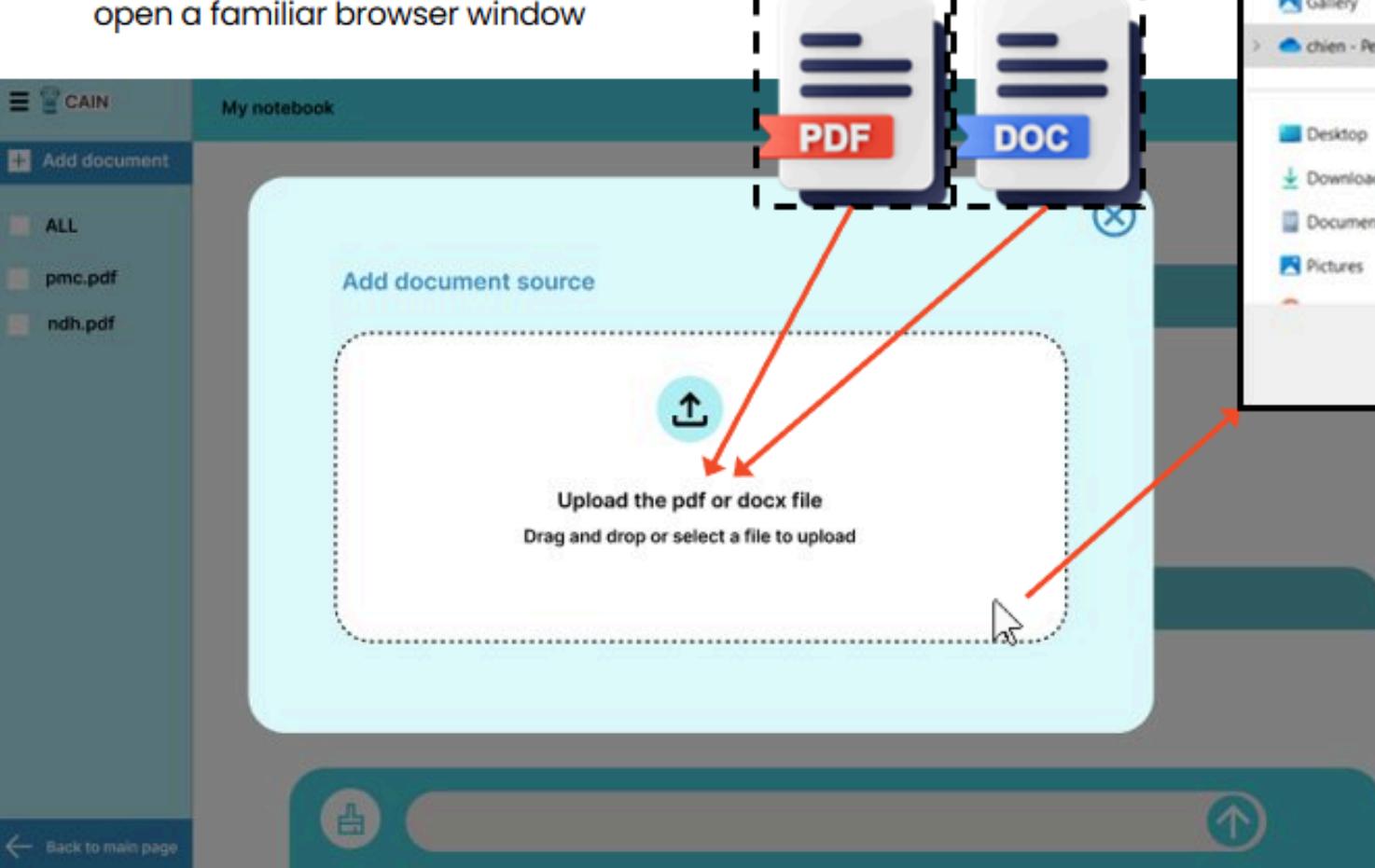
And the Upload Document UI will appear.

Design evolution(Med-fi)

Upload Document File to Notebook (Complex)

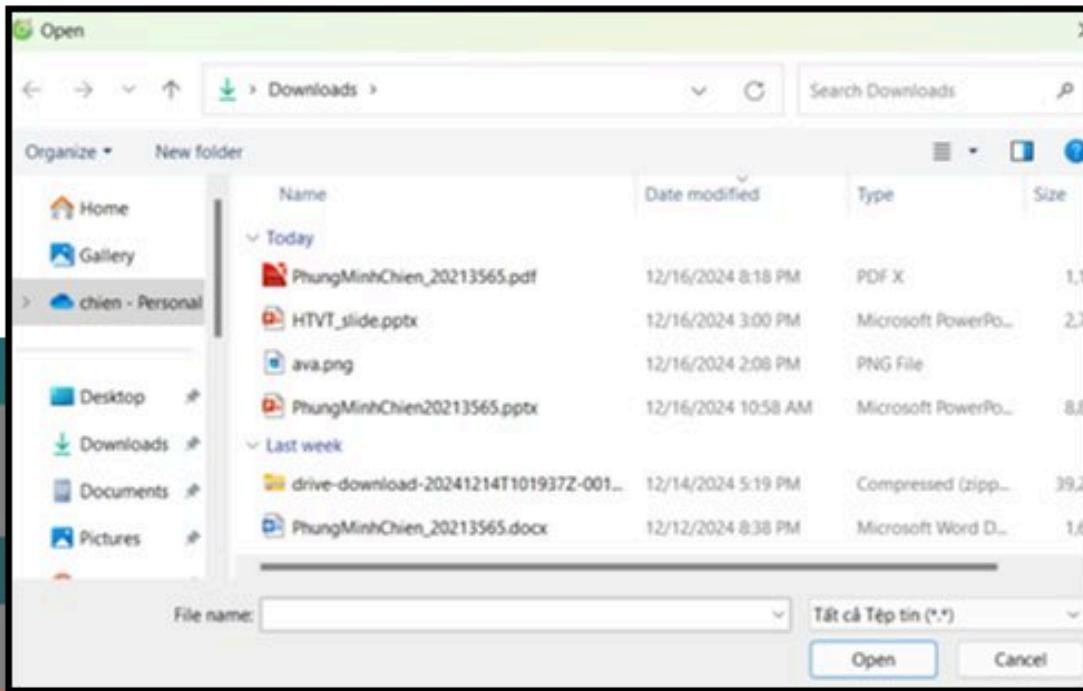
Upload File to Notebook

The user can drag a document from their computer or click the area, which will open a familiar browser window



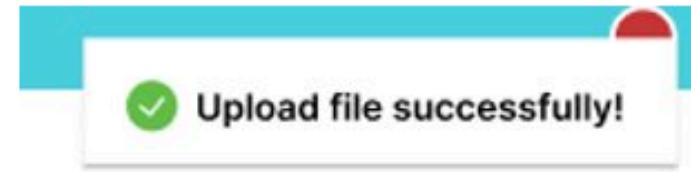
Upload the pdf or docx file
Drag and drop or select a file to upload

Familiar browser window appear.



Name	Date modified	Type	Size
PhungMinhChien_20213565.pdf	12/16/2024 8:18 PM	PDF X	1.1
HTVT_slide.pptx	12/16/2024 3:00 PM	Microsoft PowerPo...	2.7
ava.png	12/16/2024 2:08 PM	PNG File	
PhungMinhChien20213565.pptx	12/16/2024 10:58 AM	Microsoft PowerPo...	8.8
drive-download-20241214T101937Z-001...	12/14/2024 5:19 PM	Compressed (zipp...	39.2
PhungMinhChien_20213565.docx	12/12/2024 8:38 PM	Microsoft Word D...	1.6

Clicking 'Open' triggers a popup to notify the user whether the file was uploaded successfully or not



Design evolution(Med-fi)

After making HEURISTIC EVALUATION SYNTHESIS, we decided to focus heavily on fixing the severity 3 and 4 violations. In total we had 14 violations, 2 from severity 3 and 1 from severity 4.

values in Design

Values in Design

Privacy: The chatbot ensures user confidentiality by securely storing uploaded documents, encrypting sensitive files, and maintaining strict data privacy protocols, fostering trust in its usage.

Productivity: Batch uploads, instant summaries, and multi-document queries streamline tasks, enabling users to retrieve insights efficiently and save significant time during analysis.

Customization: Users can tailor their experience by organizing documents, adjusting visual themes, and setting preferences, ensuring the chatbot fits diverse workflows seamlessly.

Accessibility: Features like adjustable text sizes, contrast modes, and voice commands make the chatbot inclusive and effective for users with varying abilities or preferences.

Final Prototype Implementation

Final Prototype Implementation

A wide variety of tools were used to build and run our prototype. For the implementation of the med-fi prototype, we used Figma to design any additional graphics that went into our website. We continued to use and update our Figma prototype.



Final Prototype Implementation

Advantages

Figma is ideal for chatbot interface design due to its real-time collaboration, cross-platform accessibility, and interactive prototyping capabilities. It also offers a robust plugin ecosystem and seamless version control, enabling efficient design workflows.

Disadvantages

However, Figma's reliance on stable internet, occasional performance issues on low-end systems, and limited advanced animation options can be drawbacks. Additionally, its learning curve for beginners and the cost for team features might pose challenges.

Final Prototype Implementation

Hard-Coded Data & Limitations

Our chatbot website prototype, currently designed on Figma, focuses on simulating core functionalities for user interaction. Since the implementation is not yet functional, we rely on static designs to represent the user experience.

Wizard of Oz Techniques

Our Figma prototype leverages Wizard of Oz techniques to simulate advanced chatbot features: Dynamic recommendations, Summarization and Q&A responses, Multi-document queries.

This approach ensures we can validate design choices and user flows before transitioning to full implementation.

Summary & Next Steps

Main Learnings

This quarter, we deepened our understanding of the design thinking process by exploring empathy-driven solutions, iterative prototyping, and feedback integration. The studio theme of creating user-centered tools allowed us to focus on addressing real-world challenges, particularly in managing and interacting with digital documents. Our project highlighted the importance of balancing functionality with user experience, teaching us how to design for accessibility, customization, and clarity.

Future Additions

With more time, we would:

- Develop Dynamic Features: Move beyond static prototypes by implementing functional uploading, summarizing, and multi-document querying features.
- Enhance Personalization: Add user-specific customizations like file categorization, search optimization, and tailored responses.
- Integrate Accessibility Options: Include voice interaction and multilingual support to expand usability.
- Test and Iterate: Conduct broader usability testing with diverse users to refine the interface and functionality based on real-world feedback

Final Remarks

Final Remarks

Thank you for being a part of our chatbot design journey. This project has been an inspiring experience—from conducting insightful user interviews to brainstorming innovative solutions and refining our final prototype. For a closer look at our design process and to explore the final prototype, feel free to visit our website (https://dfa8336hgjz.github.io/hmi_report/index.html).

A special thank you to Professor Tran Thi Thanh Hai and Nguyen Viet Tung for guiding us through an engaging and enriching quarter of learning.

THANK YOU!