

Product Research Document

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Multi-Modal LLM Chat Interface with Sequential Mode Constraint

1. Executive Summary

This document outlines the journey of creating a multi-modal LLM chat interface that supports sequential modes (file upload/analysis and web search). We've identified key customer pain points, defined a target persona ("Researcher Rita"), and mapped the customer journey. Multiple solution concepts were ideated, effort estimates calculated, and opportunities prioritized using the RICE framework. Finally, a detailed one-year roadmap with clear tasks and milestones is proposed.

2. Market & Customer Problem Analysis

Prioritizing Customer Problems

Issue	Description
Mode Exclusivity Friction	Users are frustrated when they cannot run file upload and web search concurrently.
UI Clarity & Mode Switching	Ambiguity around which mode is active and how to transition between them.
Workflow Interruption & Context Loss	Switching between modes may break the conversation flow and lose crucial context.
Performance & Latency Concerns	Sequential processing may introduce delays.
Transparency of System Constraints	Lack of clarity on why modes are mutually exclusive can erode trust.
Integration Quality of Reasoning Module	Ensuring the reasoning module can effectively synthesize insights from both data sources.

Target Persona & Jobs-To-Be-Done (JTBD)

Persona: Researcher Rita

- **Role:** Data Analyst / Research Professional
- **Background:** Highly skilled and tech-savvy; relies on advanced tools for deep-dive analysis. Frequently uses internal reports (e.g., PDFs, spreadsheets) and requires up-to-date external data for validation. Expects a seamless, intuitive user experience that minimizes workflow disruption.

Jobs-To-Be-Done (JTBD)

- **Primary Job:** When I need to solve a complex research problem, I want to gather and analyze both internal documents and real-time web data, so that I can generate a comprehensive and accurate analysis.
- **Supporting Jobs:**
 - When I upload a research report, I want the tool to quickly extract key insights so that I can understand the document's content without manually reading it all.

- When switching to web search mode, I want to easily validate and complement my document insights with up-to-date external information.
- I want the reasoning module to merge these insights seamlessly, preserving context across sequential tasks.

Customer Journey Mapping

Stage	Description
Discovery & Awareness	Rita learns about the tool through industry blogs or professional networks.
Onboarding & Education	Rita explores onboarding tutorials that explain the distinct modes and why they are sequential.
File Upload Phase	Rita uploads a research document (e.g., a PDF report) and receives a summarized analysis.
Mode Transition	After reviewing the file insights, Rita switches to web search mode to gather additional external data.
Web Search Phase	Rita performs targeted queries, with the interface automatically injecting context from the file analysis.
Reasoning & Synthesis	Rita invokes the reasoning module that integrates insights from both file analysis and web search.
Review & Feedback	Rita reviews the final synthesized report and provides feedback, contributing to iterative improvements.
Iteration & Continuous Improvement	Based on feedback, Rita refines her workflow and prepares for future tasks using the tool.

3. Ideation and Concept Development

Ideation Approaches

Approach	Description
Mode-Centric Workflow & Wizard Approach	A step-by-step wizard guides users through file upload, followed by web search, then triggers the reasoning module.
Dual-Pane Context Preservation UI	A split-screen layout that displays file analysis results while the user engages in web search, ensuring constant context visibility.
Interactive Context Bookmarking	Allow users to “bookmark” key insights in the file analysis which are then used to auto-generate search queries.
Asynchronous Background Processing	Queue and pre-fetch web search queries based on preliminary file insights to shorten wait times once the user switches modes.

Proposed Solution Concepts

Opportunity	Description
Opportunity 1	Full Multi-Modal Chat Interface with Integrated Reasoning
Opportunity 2	Standalone File Upload & Analysis Tool
Opportunity 3	Enterprise Integration Product (Analytics & Dashboard)
Opportunity 4	Dedicated Web Search Module with Contextual Linking

4. Effort Estimation & Resource Planning

Breakdown of Prototype Components

Component	Effort (Hours)
Front End Development	300–400
Back End Development	500
Reasoning Module	200
Integration	
Web Search API	80
Integration	
File Parsing & Analysis	100
Integration	
Security Implementation	100
Database & State	80
Management	
Infrastructure & DevOps	150
Testing & QA	150
Project Management &	150
Documentation	
Total Estimated Effort	1,700–1,800
Estimated Budget	\$130,000 (assuming \$75/hour)

5. Opportunity Prioritization Using RICE Framework

RICE Score Calculations

Opportunity	Reach	Impact	Confidence	Effort (Hours)	RICE Score
Opportunity 1	50,000 users/quarter	8	70% (0.7)	1,800	155.56
Opportunity 2	30,000 users/quarter	7	80% (0.8)	800	210
Opportunity 3	10,000 enterprise customers	9	60% (0.6)	2,000	27
Opportunity 4	40,000 users/quarter	6	75% (0.75)	1,000	180

Prioritization Summary

Opportunity	RICE Score
Opportunity 2	210
Opportunity 4	180
Opportunity 1	155.6
Opportunity 3	27

6. Roadmap & Task Planning

Roadmap Overview

Priority Order (Highest to Lowest):

1. Opportunity 2: Standalone File Upload & Analysis Tool
2. Opportunity 4: Dedicated Web Search Module with Contextual Linking
3. Opportunity 1: Full Multi-Modal Chat Interface with Integrated Reasoning

4. Opportunity 3: Enterprise Integration Product (Analytics & Dashboard)

Roadmap Timeline (One-Year Plan)

Q1 – Planning & Prototyping

Opportunity	Tasks
Opportunity 2	Gather detailed requirements via user interviews (target: Researcher Rita) Create UI/UX prototypes for the file upload screen and analysis dashboard
Opportunity 4	Evaluate and select file parsing libraries and analytics tools Define search module requirements and integration points with search APIs Develop wireframes for the dedicated search interface Research and select a web search API provider

Q2 – Development & Integration

Opportunity	Tasks
Opportunity 2	Build front-end file upload module and results display Develop back-end API endpoints for file processing Integrate and test file parser libraries Milestone: Internal demo of basic file upload and analysis functionality
Opportunity 4	Develop API connectors for the chosen web search provider Implement UI components for search and contextual linking Conduct integration testing for seamless data retrieval Milestone: Internal demo of the web search module

Q3 – Consolidation & Context Integration

Opportunity	Tasks
Opportunity 1	Define sequential interaction flows integrating file analysis and web search Design a guided (wizard-style) UI for mode switching Develop caching mechanisms to preserve context across modules Milestone: Prototype demonstrating smooth sequential mode transitions
Cross-Module Integration	Run integration tests to ensure that data from Opportunities 2 and 4 can be merged effectively in the reasoning module

Q4 – Testing, Refinement & Enterprise Scoping

Opportunity	Tasks
Opportunity 1	Integrate the reasoning module that synthesizes file and search data
	Conduct comprehensive user acceptance testing (UAT) with target users
Opportunity 3	Optimize performance and refine the user flow based on feedback
	Scope enterprise-level requirements (custom dashboards, enhanced security)
	Develop a proof-of-concept (POC) integration module for enterprise clients
	Pilot test with early enterprise partners
	Milestone: Demonstration of an enterprise-ready integration POC
Final Cross-Cutting Tasks	Perform comprehensive security audits, final performance tests, and prepare documentation for deployment

Visual Roadmap Diagram (Text Representation)

Q1 (Months 1-3):

- [Opportunity 2]: Requirements gathering, UI/UX prototyping, library evaluation
- [Opportunity 4]: Requirements definition, wireframing, API research

Q2 (Months 4-6):

- [Opportunity 2]: Front-end & back-end development, parser integration, internal demo
- [Opportunity 4]: API integration, UI development, internal demo

Q3 (Months 7-9):

- [Opportunity 1]: Design guided UI, define interaction flows, build context caching, prototype de
- [Opportunities 2 & 4]: Integration testing for context merging

Q4 (Months 10-12):

- [Opportunity 1]: Reasoning module integration, UAT, performance optimization
- [Opportunity 3]: Enterprise scoping, POC development, pilot testing
- Cross-cutting: Security review, documentation, deployment planning

7. Conclusion & Next Steps

This comprehensive product research document has:

- **Identified and prioritized key customer problems** based on validated pain points.
- **Defined the target persona ("Researcher Rita")** and developed a JTBD framework along with a detailed customer journey map.
- **Explored multiple ideation approaches** that address the sequential mode constraint while preserving context.
- **Estimated development effort** with a detailed breakdown of tasks and associated man hours.
- **Used the RICE framework to quantitatively prioritize product opportunities**, ranking a standalone File Upload & Analysis Tool highest.
- **Plotted a detailed roadmap** for a one-year development cycle, including key milestones and cross-module integration.

Next Steps:

- Initiate Q1 activities focusing on gathering requirements and prototyping for Opportunities 2 and 4.

- Engage with target users to refine requirements and validate UI/UX designs.
- Assemble the development team and begin task execution as per the roadmap.
- Schedule regular reviews at the end of each quarter to incorporate user feedback and adjust the plan as necessary.

This research provides a clear, data-driven path forward, ensuring that the product development aligns with both customer needs and strategic business opportunities. Let's make this journey together and create something truly impactful for our users!