

Functional Requirements Document (FRD)

Project: summArIze

Version: 1.0

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1. Introduction

1.1 Purpose

The purpose of this document is to define the functional requirements for summArIze, an AI-powered study assistant that helps students summarize lectures, generate quizzes, evaluate understanding, and improve retention using multiple AI agents.

1.2 Scope

summArIze allows students to:

- Upload lecture notes or transcripts
- Generate structured summaries
- Create quizzes from content
- Receive AI-generated feedback on their answers
- Track study progress

The system will use multiple AI agents, each responsible for a specific functionality.

2. System Overview

summArIze is a web-based application that integrates:

- Authentication system
- File upload system
- AI processing layer (multi agent)
- Study dashboard
- Progress tracking system

3. User Roles

Role	Description
Student	Primary user who uploads content and interacts with AI
Admin (Optional)	Manages system settings and monitors usage

4. Functional Requirements

4.1 Authentication

FR 1: The system shall allow users to create an account.

FR 2: The system shall allow users to log in securely.

FR 3: The system shall allow users to log out.

FR 4: The system shall store user data securely in the database.

4.2 Upload & Content Management

FR 5: The system shall allow users to upload text files (PDF, DOCX, TXT).

FR 6: The system shall allow users to paste lecture content manually.

FR 7: The system shall store uploaded content under the user's account.

FR 8: The system shall allow users to delete previously uploaded content.

4.3 AI Agent: Text Summarization Agent

FR 9: The system shall generate a structured summary of uploaded content.

FR 10: The summary shall include:

- Key concepts
- Definitions
- Important formulas
- Bullet-point highlights

FR 11: The user shall be able to regenerate the summary.

FR 12: The user shall be able to choose summary length (short, medium, detailed).

4.4 AI Agent: Quiz Generation Agent

FR 13: The system shall generate quiz questions based on uploaded content.

FR 14: The system shall support multiple question types:

- Multiple choice
- True/False
- Short answer

FR 15: The user shall be able to select the number of questions.

FR 16: The system shall randomize question order.

4.5 AI Agent: Evaluation / Feedback Agent

FR 17: The system shall evaluate user answers.

FR 18: The system shall provide:

- Correct/incorrect status
- Explanation for correct answer
- Suggestions for improvement

FR 19: The system shall calculate quiz score percentage.

4.6 AI Agent: Lecture/Video Processing Agent (Optional Expansion)

FR 20: The system shall accept lecture transcripts.

FR 21: The system shall convert transcripts into structured summaries.

FR 22: The system shall extract key timestamps (advanced if we have time).

4.7 Dashboard & Progress Tracking

FR 23: The system shall display user study sessions.

FR 24: The system shall show:

- Number of summaries generated
- Quiz scores history
- Improvement trends

FR 25: The system shall allow users to revisit past quizzes.

5. Non Functional Requirements

5.1 Performance

- AI response time should be under 10 seconds per request.
- The system shall support concurrent users.

5.2 Security

- User authentication must use secure protocols.
- User data must not be shared across accounts.
- API keys must be stored securely (environment variables).

5.3 Usability

- Interface must be intuitive and student-friendly.
- The system must work on both desktop and mobile devices.

5.4 Scalability

- The system shall support integration with multiple AI APIs.

- The architecture shall allow adding new AI agents in the future.

6. System Architecture

User → Frontend (Next.js UI) → Backend API →

→ AI Agent Layer (Summarizer / Quiz / Evaluator / Video Agent)

→ Database (User data, quizzes, summaries)

7. Future Enhancements

- Spaced repetition system
- Flashcard generation
- AI study plan generator
- Collaborative study mode
- LMS integration

8. Acceptance Criteria

The system is considered complete when:

- Users can upload content
- AI generates summaries
- AI generates quizzes
- AI evaluates answers
- Dashboard displays study progress
- All features work without critical errors