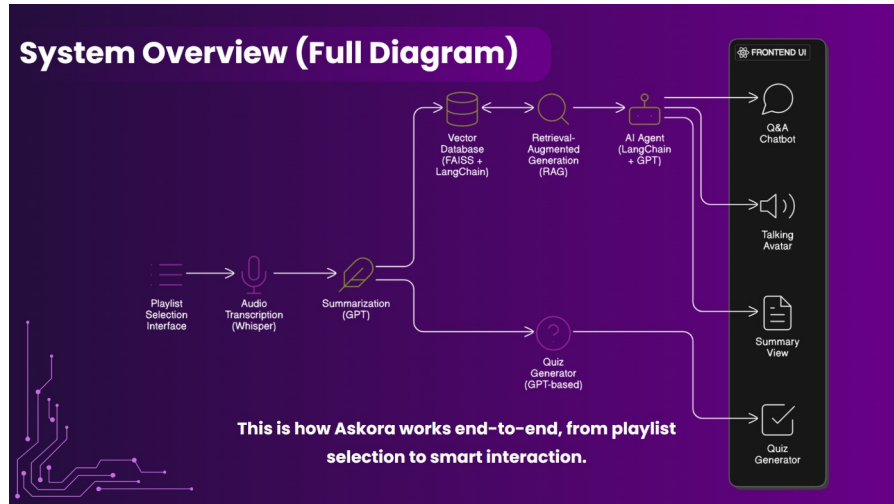
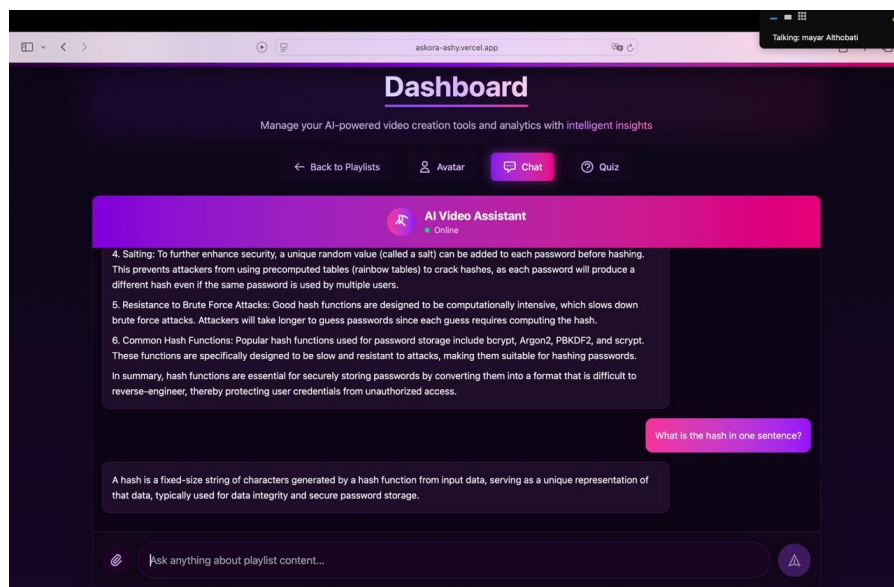


Askora - AI Video Summarization and Learning Platform

Block Diagram of Askora Pipeline:



Interactive Learning Dashboard:



Project Overview

Askora is a full-stack AI-powered web application that transforms YouTube playlists into interactive and personalized learning experiences. Built with a React + Vite frontend and a FastAPI backend, Askora leverages advanced AI techniques for video summarization, contextual question answering (Q&A), voice interaction, and intelligent quiz generation. It is designed for students, educators, and lifelong learners who want to engage with content actively rather than passively.

Core Features

1. AI Video Summarization

- Users select a curated list of YouTube playlists from the frontend.
- Preprocessed audio from the videos is transcribed using Whisper.
- Cleaned transcripts are summarized using GPT to extract key topics.
- Summaries are compiled into structured articles for instant access.

2. Interactive Q&A

- Users ask questions about playlist content.
- The system performs semantic search using FAISS + OpenAI embeddings.
- A LangChain-based agent handles the user query and returns context-aware answers.
- If the question is out-of-scope (not playlist-related), it is rejected with an appropriate message.

3. Playlist Management

- Users browse and select from pre-summarized playlists.

- Each playlist provides a ready-to-read article.

4. Smart Knowledge Quizzes

- GPT dynamically generates quiz questions for playlist topics.
- Quiz answers are validated in real-time.
- Promotes recall and retention.

5. AI Voice Interaction

- Users can interact through voice using browser speech recognition.
 - Responses can be delivered through ElevenLabs text-to-speech.
 - Enhances accessibility and hands-free learning.
-

Technical Stack

Frontend (React + Vite)

- Tailwind CSS for styling
- Framer Motion for smooth animations
- Axios for API communication
- Modular UI components for scalability

Backend (FastAPI)

- REST endpoints for all AI tasks (/ask, /generate-question)
- Handles vectorstore operations, RAG logic, similarity scoring, and context logging

Vectorstore and RAG

- Transcripts are chunked and embedded using OpenAI embeddings
- FAISS is used for fast vector similarity search
- RAG retrieves the top-matching chunks and forwards them to GPT for answer generation

Agent Architecture

- Built with LangChain's ReAct agent structure
 - Custom tool (CyberSecurityQA_tool) ensures that answers are filtered for topic relevance
 - Logs interactions and responses into CSV for evaluation
-

User Journey

Landing Page

- Presents the purpose and capabilities of Askora
- Users start by selecting a playlist

Dashboard

- Shows AI-generated summaries
- Allows navigation, bookmarking, and progress tracking

Q&A Chatbot

- User inputs question via text or voice
- Agent validates, retrieves context, and provides a smart response

Quiz Section

- Auto-generated quizzes from playlist content
- Feedback shown immediately after each answer

Knowledge Base

- Personal space for saved articles, answers, and quiz results
 - Encourages continuous and customized learning
-

Example Use Cases

- **Students:** Quickly grasp lectures, ask questions, and test knowledge
 - **Educators:** Create micro-learning modules from video tutorials
 - **Lifelong Learners:** Summarize long-form content and revisit key insights
-

Evaluation

- The system was evaluated using the [RAG Evaluator](#), a tool specifically designed to assess RAG systems.
- Chosen because it evaluates based on retrieved content and uses globally recognized metrics ideal for RAG pipelines.
- Key metrics assessed:
 - **BERT F1:** Measures semantic similarity with reference
 - **Perplexity:** Measures fluency and predictability

- **Diversity:** Checks uniqueness and redundancy in answers
- **Racial Bias:** Ensures ethical and unbiased generation

Evaluation Method

- Each entry compared model response to reference answers using the original context.
- In-scope and out-of-scope queries were both tested to verify intelligent handling.

Visual Results

Evaluation Table & Metrics Overview

Min	Max	Average	Metric
0.5017	0.6893	0.6302	BERT F1
9.481	47.181	17.5203	Perplexity
0.9333	0.9844	0.9547	Diversity
0.4585	0.4962	0.4773	Racial Bias

Deployment Highlights

- Frontend and backend are deployed separately for modularity
- Quiz generation is performed entirely client-side using OpenAI API
- Voice interaction integrates ElevenLabs and Web Speech API
- Evaluation logs saved and analyzed using CSV export

Backend Endpoint Highlight: /ask

- Accepts: { "question": "<user question>" }

- Loads latest conversation history
- Uses LangChain agent to identify and answer relevant questions
- Context is filtered and ranked via FAISS + similarity scoring
- Logs interactions to CSV for later analysis

Response Format:

```
{  
  "question": "...",  
  "answer": "..." }
```

Summary

Askora is a powerful AI-driven learning platform that turns passive video watching into active engagement. By combining summarization, context-aware Q&A, smart quizzing, and voice support, Askora makes learning faster, smarter, and more enjoyable. It's a tool built for the future of education — modular, intelligent, and scalable.
