

Project Title: Ask KSA

1. Project Overview

Idea: A RAG-powered assistant that helps expatriates navigate Saudi government procedures (visas, iqama renewal, labor laws) by answering questions from official documents, with voice support for accessibility.

Key Features:

- **Document Q&A:** Query PDFs from sources like [Absher](#) or [Ministry of Labor](#).
- **Multilingual Support:** Arabic/English answers
- **Voice Interface:** Speech-to-text + text-to-speech.
- **Source Citations:** Answers reference official documents

2. Rationale & Market Relevance

Problem:

1. KSA's 10M+ expats struggle with complex procedures and language barriers.
2. Existing solutions usually lack accuracy for legal and regulatory procedures.

Why This Project?

1. **High Impact:** Directly addresses Vision 2030 goal of improving expat experiences.
2. **Technical Innovation:** Combines RAG with LLMs for Arabic/English for precision and fluency, respectively.
3. **Gap in Market:** No open-source tools tailored to KSA's legal documents with voice support.

Existing Solutions:

1. Government portals (Information is scattered, limited FAQs).
2. Generic chatbots.

3. Workflow & Methodology

Overall Approach:

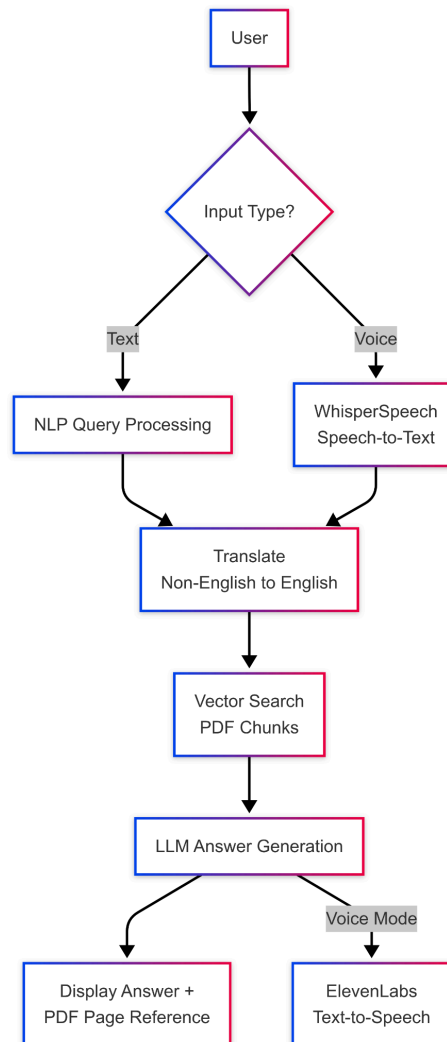
1. Ingest PDF → 2. Extract text/sections → 3. Embed chunks → 4. Store in Vector → 5. Retrieve Info + Text generation → 6. Display the answer with references

Tech Stack:

- **PDF Processing** → PyMuPDF (text + metadata extraction)
- **Embeddings** → BAAI/bge-small (optimized for Arabic/English)
- **Voice** → WhisperSpeech (Speech to text) and Chat TTS (Text to Speech)

- LLM → Not Decided

4. ERD & Workflow



Step-by-Step Workflow

- **User Input:** A user interacts with the system via text or voice (spoken question).
- **Input Routing:** The system checks the input type:
 - Text: Directly sends to the NLP pipeline.
 - Voice: Converts speech to text using Whisper (Speech-to-Text/STT).
- **Translation (If Needed):** Non-English queries, like Arabic, are translated to English using Google Translate/NLLB for consistent processing.
- **Retrieval (RAG Core):**
 - The translated text is converted to embeddings (numeric representations) using BAAI/bge-small.
 - Searches the vector database (pre-loaded with PDF chunks) to find the most relevant document sections.
- **Answer Generation:** The retrieved chunks + user query are fed to an LLM to generate a human-like answer. The LLM cites specific PDF pages/sections.
- **Output Delivery:** Text Mode: Displays the answer + references in the UI.