MINOR PROJECT

Cognitive Query System Using Generative AI

PROJECT PRESENTATION

Submitted In Partial Fulfilment of the Requirements
for the Degree of

Bachelor of Technology
In
Artificial Intelligence & Data Science

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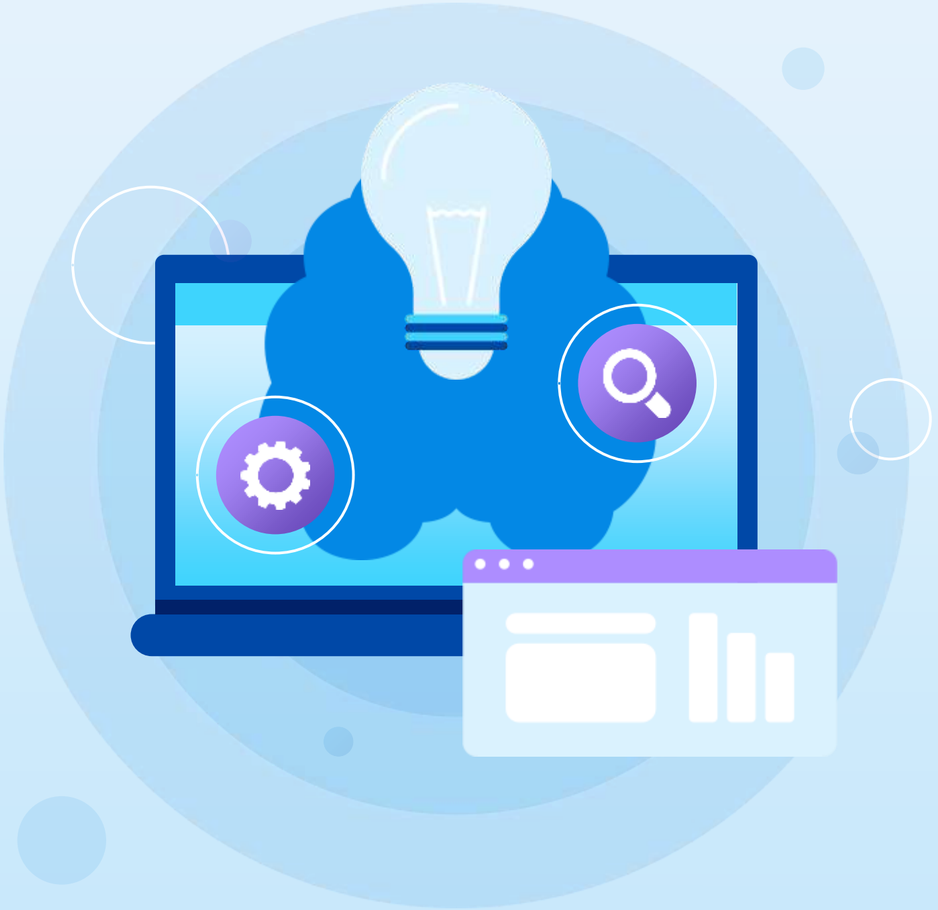
Cognitive Query System Using Generative AI



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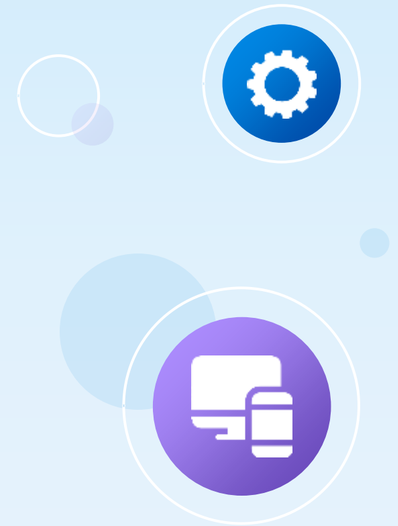

Why Cognitive Query System?

- **User-Friendly:** Intuitive interactions for natural language queries.
- **Fast Retrieval**: Quickly processes diverse queries for instant results.
- **Multi-Format Handling:** Integrates text, images, and documents seamlessly.
- **Informed Decisions:** Provides insights for data-driven strategies.
- **Scalable Solution:** Adapts to growing data and user needs.

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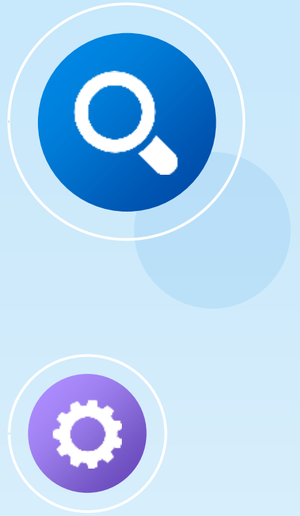
Introduction



This project combines three key functionalities into one seamless application:

Chat with Multiple PDF Documents

Allows users to query and interact with PDF documents, extracting meaningful insights in real-time.

Large Image Model Application

Enables users to perform searches based on images and retrieve relevant data or images.

Document LLM Application

Facilitates dynamic querying of databases, enabling efficient data retrieval and manipulation.

This unified platform leverages AI technologies to deliver a user-friendly, multi-functional solution for efficient data interaction.

Methodology

Chat with Multiple PDFs

- PDF documents are processed using PyPDF2 for text extraction.
- Text chunks are vectorized using Google AI Embeddings.
- LangChain handles natural language queries, enabling real-time responses.

Large Image Model Application

- Users upload images.
- AI algorithms process and search for similar or relevant images based on embeddings.

Document LLM Application

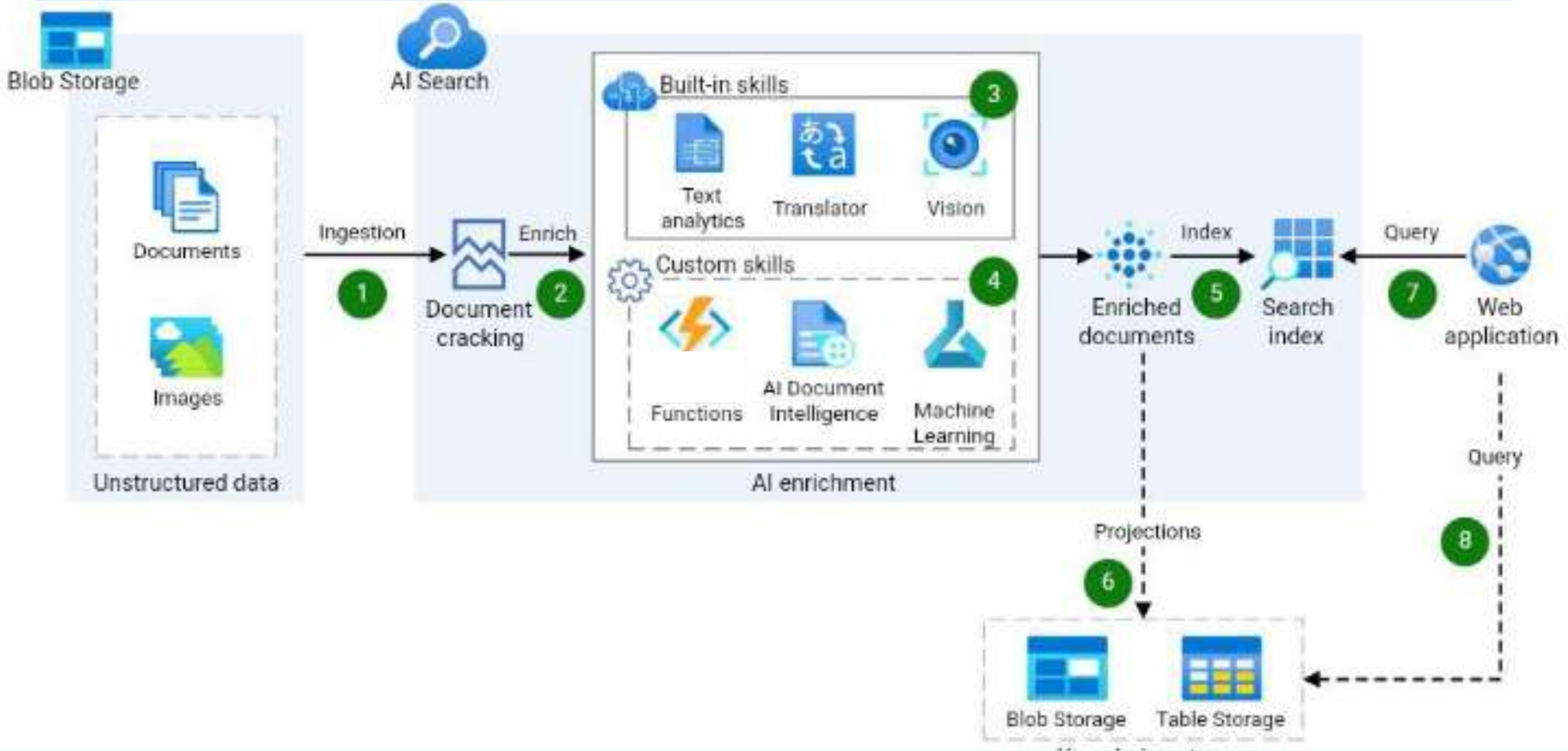
- SQL queries are processed and executed against a connected database.
- Real-time results are displayed based on the user's input.

All components are tied together using Streamlit for the user interface, ensuring smooth interaction and real-time feedback.

In Simple words:

Prompt ---> LLM ---> Gemini Pro ---> Query --->Database---> Response

Block Diagram



Project Workflow Overview

1. Ingestion:

- This step involves the intake of unstructured data (documents and images) stored in blob storage. The data is ingested into the system for further processing.

2. Document Cracking:

- The ingested documents and images undergo "cracking," which is the process of extracting and organizing text and metadata from them. This prepares the data for enrichment and further AI-based processing.

3. Built-in Skills:

- Once the documents are processed, built-in AI capabilities are applied. These skills may include:
  - Text Analytics: Extracts insights and information from text.
  - Translator: Translates content into different languages.
  - Vision: Analyzes and processes images using AI.

4. Custom Skills:

- In addition to built-in AI capabilities, custom AI models or functions can be applied. These include:
  - AI Document Intelligence: Extracts meaning from documents using custom AI models.
  - Machine Learning: Applies machine learning models to improve the data processing and provide deeper insights.

5. Enriched Documents:

- After applying the built-in and custom skills, the documents are now enriched with AI-derived metadata and information. These enriched documents are ready for indexing.

6. Projections to Knowledge Store:

- The enriched data is projected to knowledge stores such as Blob Storage and Table Storage for further access and management. This step involves saving the enriched content in structured formats.

7. Search Index:

- The enriched documents are indexed for fast retrieval. Users can query this index via the web application, which provides quick access to the enriched content.

Technologies Implemented

- **Streamlit:** Provides the user interface for PDF and Q&A functionalities.
- **PyPDF2:** Extracts text from uploaded PDF files.
- **LangChain:** Splits text into chunks for better processing and searching.
- **FAISS:** Enables fast similarity-based search for PDF content.
- **Google Gemini AI:** Powers real-time Q&A responses and PDF-based queries.
- **Google AI Embeddings:** Converts text into vectors for accurate search.
- **dotenv:** Manages API keys securely.
- **SQLlite:** To insert some records.
- **LLM Application:** gemini-1.5-flash
- These tools ensure seamless integration of document-based queries and conversational AI.

Why This Project Stands Out...

- **Enhanced User Experience:** Streamlined access to multiple functionalities in a single interface.
- **Increased Efficiency:** Quick retrieval of information from various data sources.
- **Versatility:** Supports diverse query types (PDF, image, documents) for broader applications.
- **Data Integration:** Combines different data processing methods for comprehensive insights.
- **User-Friendly Interface:** Intuitive design for ease of navigation and interaction.

APPLICATIONS

1.Educational Sector:

- Assists students in research by answering queries from PDFs and images.

2. Business Intelligence:

- Enables data-driven decision-making through queries and data retrieval.

3. Legal Industry:

- Aids in extracting information from legal documents and case files.

4. Healthcare:

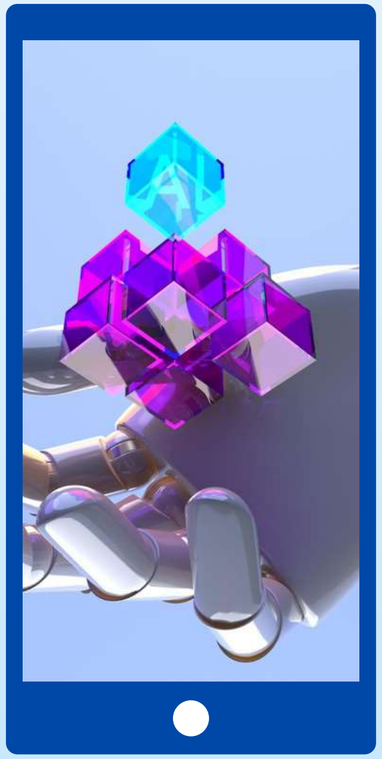
- Processes medical images and documents for quicker diagnoses and patient information retrieval.

5. Data Analysis:

- Facilitates image and document analysis for various research applications.

Future Prospects

- Advanced AI Integration
- Expansion of Features
- Data Security Enhancements



- Cross-Platform Compatibility
- Collaboration Opportunities

CONCLUSION

1.Integration of Technologies:

- This project combines advanced NLP, AI image processing, and SQL querying to provide a comprehensive solution.

2. Enhanced User Experience:

- The user-friendly interface allows seamless interaction with PDFs, images, and databases, improving accessibility to information.

3. Future Potential:

- With ongoing advancements in AI and machine learning, the system can evolve to meet more complex user needs and expand its applications.

4. Impact:

- The cognitive query system represents a significant step toward smarter, more efficient information retrieval across various industries.

RESULT

- **Improved Efficiency:**
  Reduced time for data retrieval across multiple formats (PDFs, images, Docs).
- **User Satisfaction:**
  Positive feedback from users on the intuitive interface and quick responses.
- **Accurate Information Retrieval:**
  High accuracy in processing queries and delivering relevant information.
- **Increased Accessibility:**
  Enhanced access to diverse data sources through a unified platform.
- **Scalability:**
  Successfully handles increasing data volume and user demands.

Thank you