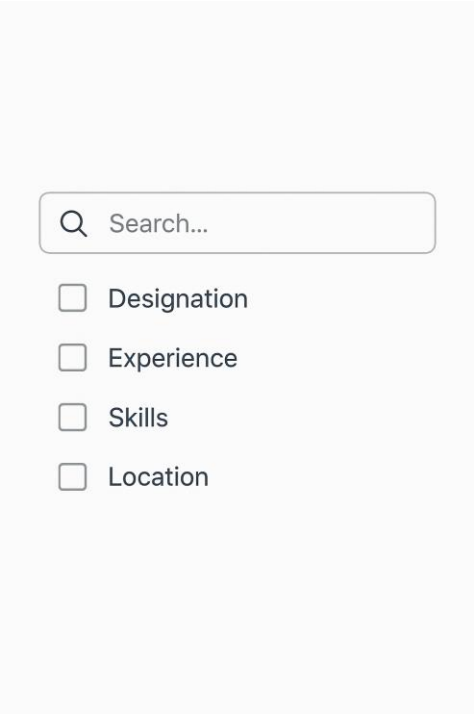
Project Statement:

Enhancing apps with Azure AI capabilities - Semantic Search and Voice Search

Requirements:

Developing a chat bot which will be handling the semantic search of data related to searching of a employee profile in portal. by outperforming the existing solutions which are having issues like selecting multiple no of check boxes like Technologies worked and what kind of skills,organization,designation which will be an tedious job for the user in order to search a profile via portal.

Existing solution for this Project Statement



(Ai generated image-Copilot)

Proposed solution:

Flow for the project:

Requirements >>> Data Resources >> Excel spread sheet or Sql Data Base connection (Retrieving data from an sql server database where we will store required user/employee details)

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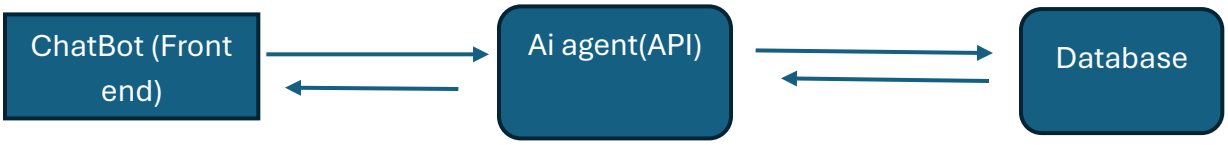
Expected development:



(Semantic search)

(Hr will be searching for Employee Profile) (LLM) SQL ServerDB

By Raising a query on the Chatbot query window)

Funtionality specification:

Front end:Angular/Node js

We will be developing a front end which will be consist of the Ui for chatbot

Consist of Dynamic ui and a query window should be designed which will be integerated with Backend Ai agent(which functionality is to convert the Query statement into an sql query which will be done by Ai agent which will perform a semantic search on the data and interact with database for fetching the required data) and finally after fetching data by performing the semantic search it should be display the output in the front end chatbot window.

(Example prompt for chat bot-Ai generated image(Copilot)

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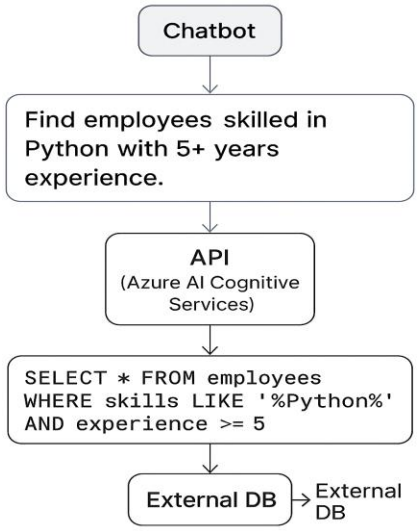
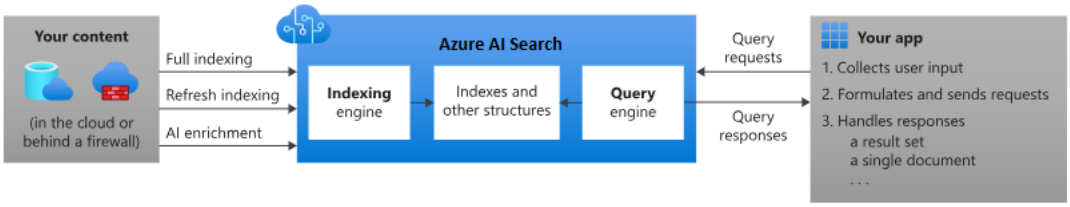


(Ai generated image-Copilot)

About **Azure AI Search (Ai cognitive services):**

requests to a search index and handles the response.



(image from Azure official website)

Project Development Models & Framesworks:

Query prompt(Prompt text) >>> Semantics >>> SQL query >> fetch details from database >> display at front end ui by semantic search.

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Stage 1: Prompt to Semantics Conversion (Azure Models)

Model Name	Functionality	Token Processing	Parameters	Azure Cost (per 1M tokens)
GPT-4o (Azure OpenAI)	Converts natural prompts into structured semantic intent with high accuracy	Up to 128K context window	Temperature, top-p, frequency penalty	**Input:** $2.50 **Output:** $10.00
GPT-3.5 Turbo (Azure OpenAI)	Fast and cost-effective semantic parsing for simpler prompts	Up to 16K context window	Temperature, top-p, presence penalty	**Input:** $0.50 **Output:** $1.50
Semantic Kernel (Framework)	Orchestrates prompt workflows across Azure models	Depends on underlying model	Prompt templates, connectors, memory	Depends on model used (e.g., GPT-4o)

Stage 2: Semantics to SQL Query Conversion (Azure Models)

Model Name	Functionality	Token Processing	Parameters	Azure Cost (per 1M tokens)
GPT-4o (Azure OpenAI)	Converts semantic intent into SQL using schema-aware prompting	Up to 128K context window	Schema YAML, temperature, top-p	**Input:** $2.50 **Output:** $10.00
Semantic Kernel + Azure SQL	Uses plugins to convert natural language to SQL and execute queries	Modular pipeline	Plugin config, schema mapping	Cost depends on Azure SQL + OpenAI usage
AI-in-a-Box (Azure Sample)	Speech-to-SQL chatbot using Semantic Kernel, Azure OpenAI, and Speech Services	Full speech + text pipeline	Speech config, prompt templates	Varies by services used (OpenAI + Speech + SQL)

Prepared By Sai Revanth Gannavarapu

Available frame works in Azure Platform:

LangChain on Azure

Feature	Details
Availability	Supported via Azure AI Foundry, Azure OpenAI, Azure ML, and Azure Container Apps
Integration Options	- Use langchain-azure-ai for Azure AI Foundry - Use langchain-openai for Azure OpenAI - Use langchain-community for Azure AI Search
Deployment Methods	- Azure ML Notebooks - Azure Functions - Azure Container Apps - Azure AI Studio
Use Cases	Prompt chaining, semantic search, agent workflows, SQL generation
Setup	Install via pip: pip install langchain langchain-azure-ai Configure endpoint and API key from Azure portal

LlamaIndex on Azure

Feature	Details
Availability	Supported via Azure AI Foundry, Azure OpenAI, Azure Container Apps, and Azure App Templates
Integration Options	- Use llama-index-llms-azure-inference for LLMs - Use llama-index-embeddings-azure-inference for embeddings
Deployment Methods	- Azure ML - Azure Container Apps - Azure App Templates - GitHub Codespaces
Use Cases	Retrieval-Augmented Generation (RAG), semantic search, document agents, SQL query generation
Setup	Install via pip: pip install llama-index llama-index-llms-azure-inference Configure endpoint and credentials from Azure AI Foundry