
CAPSTONE PROJECT

Interview Trainer Agent

(Problem Statement No.22)

Presented By

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PROBLEM STATEMENT

The core challenge is to assist job candidates in their interview preparation with a personalized and intelligent tool. The goal is to build an **Interview Trainer Agent powered by Retrieval-Augmented Generation (RAG)**. This agent must prepare users for job interviews by generating tailored question sets and preparation strategies based on their profile name, experience level, and job role. It needs to retrieve role-specific interview questions, industry expectations, behavioral scenarios, and HR guidelines from a curated knowledge base. The system should allow users to input their job title or resume and receive targeted questions, model answers, and improvement tips, supporting both technical and soft skill assessment. Ultimately, this AI-driven assistant aims to build user confidence, sharpen responses, and increase success rates in competitive hiring environments.

PROPOSED SOLUTION

The proposed solution is a conversational AI agent, the "**Technical Interview Trainer Agent**," developed and hosted on the **IBM watsonx platform**. This agent acts as a personal interview coach. When a user specifies a job role (e.g., "Data Scientist," "Software Engineer at Google"), the agent provides a detailed, structured preparation roadmap. It leverages a powerful **Large Language Model (LLM)** grounded with a custom knowledge base of interview questions. This ensures the generated advice is not only intelligent but also highly relevant and specific to the user's needs, covering technical concepts, coding practice, behavioral questions, and company research.

SYSTEM DEVELOPMENT APPROACH (TECHNOLOGY USED)

The agent was built using IBM's integrated AI and data platform.

- **Cloud Platform:** IBM Cloud was the foundational environment for accessing all services.
- **AI Studio:** IBM watsonx.ai served as the central hub for building, testing, and managing the AI agent.
- **Core Component:** The **Agent Lab (Beta)** within watsonx provided the user interface and framework for configuring the agent's behavior, instructions, and tools.
- **Foundation Models (LLMs):** The system utilized state-of-the-art models like **mistral-large** as the core reasoning engine for understanding user queries and generating human-like responses.
- **Agent Architecture:** A **ReAct (Reasoning and Acting)** framework was employed, allowing the LLM to reason through a problem and decide on a sequence of actions, such as querying the knowledge base before formulating a final answer

ALGORITHM & DEPLOYMENT

Algorithm: Retrieval-Augmented Generation (RAG)

The agent's intelligence is powered by the RAG algorithm, which grounds the LLM in factual, domain-specific data.

Vectorization: A custom knowledge base (e.g., mixed_interview_qa_large.docx) containing interview questions was uploaded to watsonx. The platform automatically chunked the document and converted each chunk into a numerical vector embedding, storing them in an in-memory vector database.

Retrieval: When a user sends a query (e.g., "provide a roadmap for SWE role"), the system converts this query into a vector. It then performs a similarity search to find the most relevant chunks from the vectorized knowledge base.

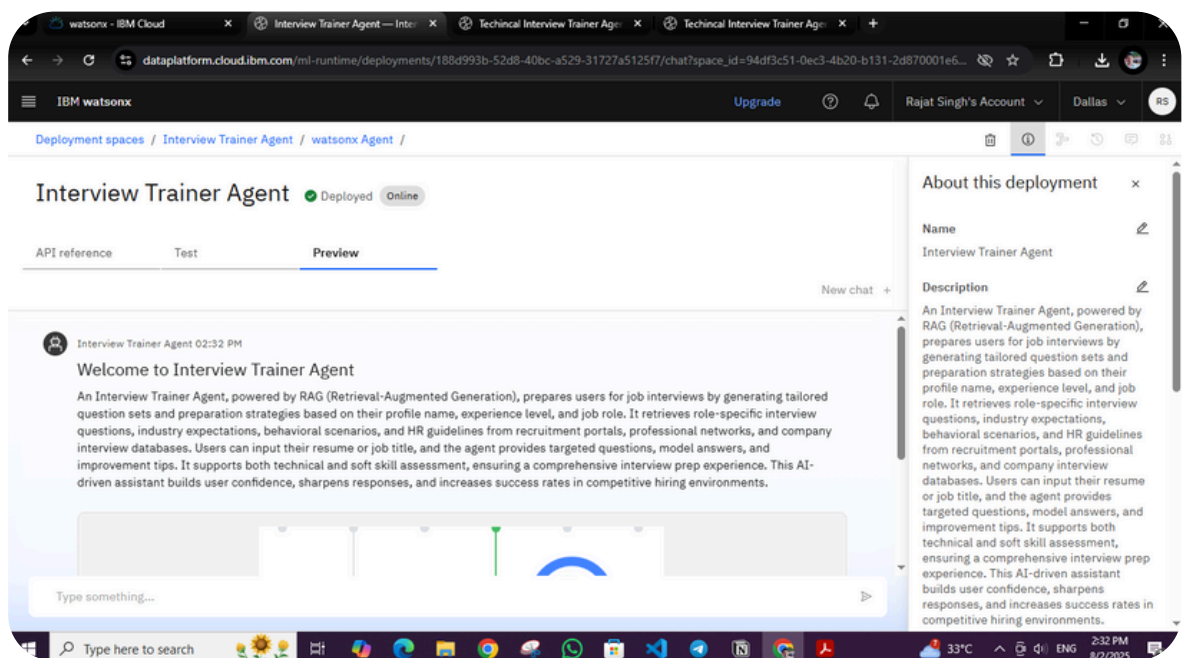
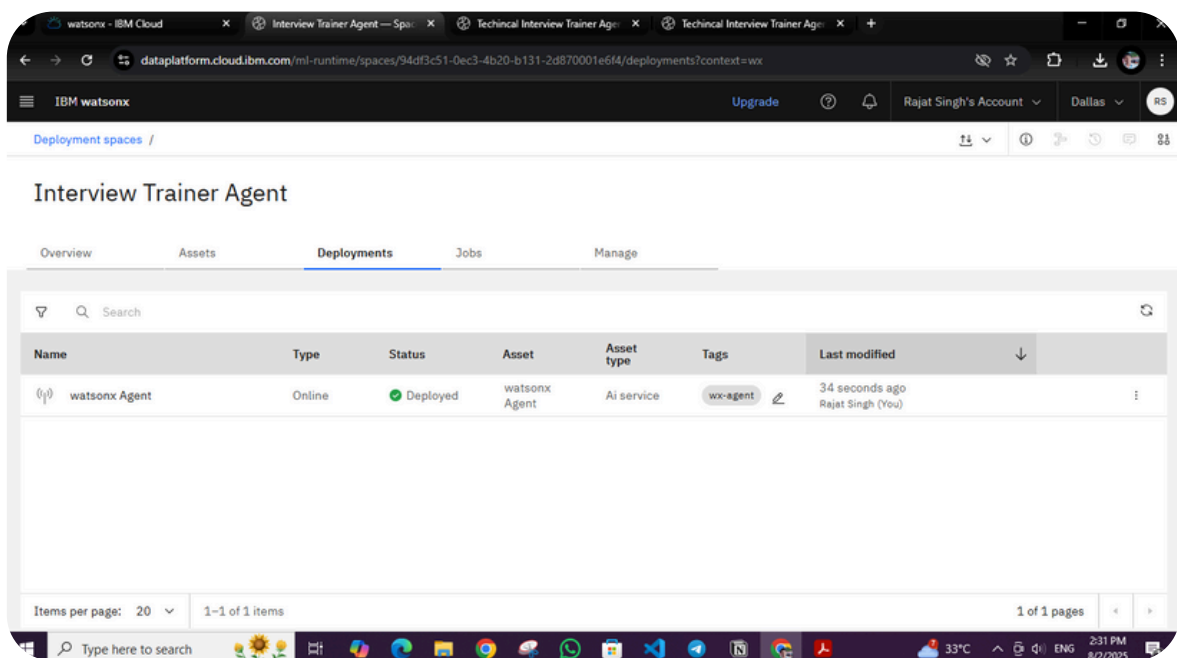
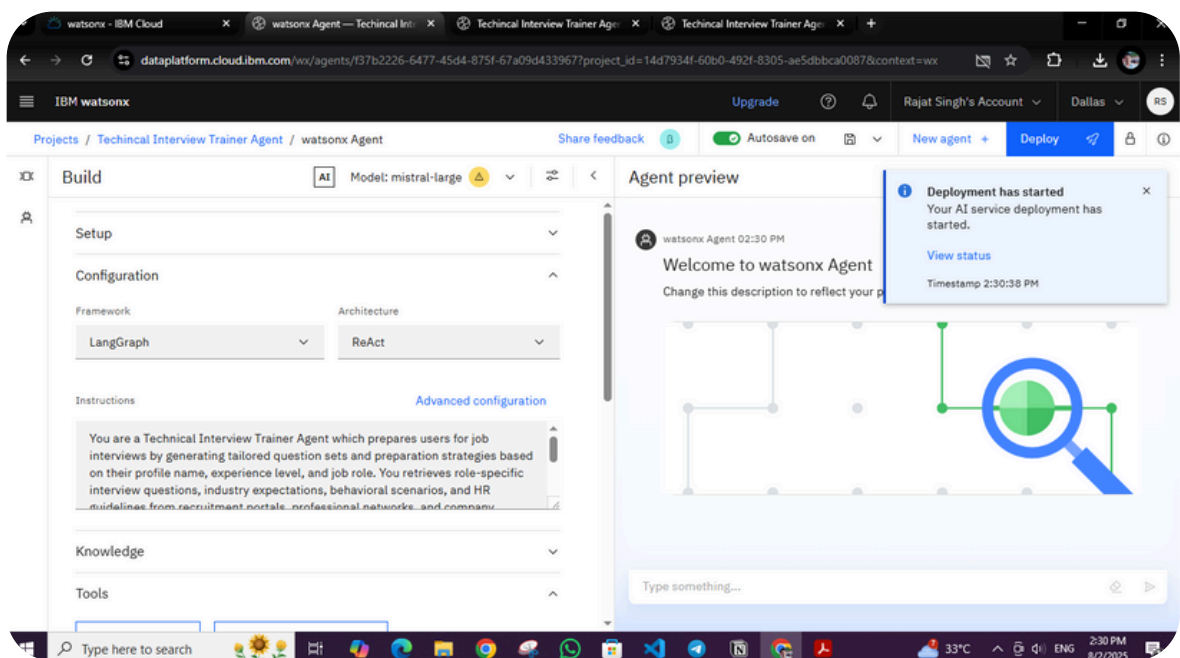
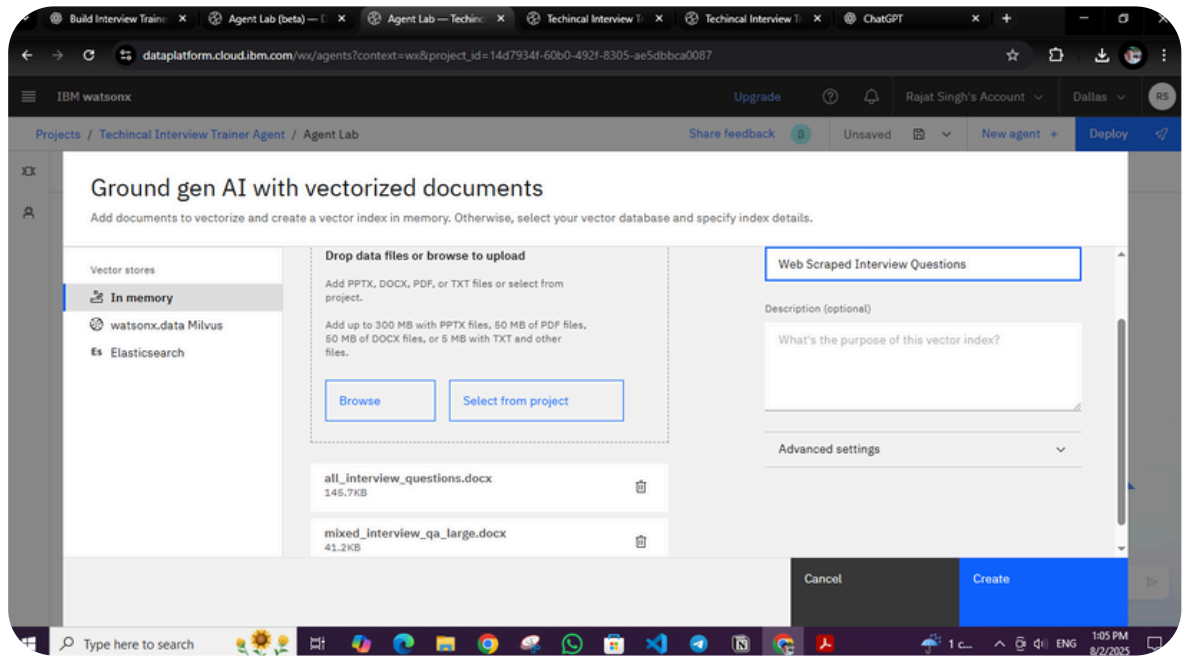
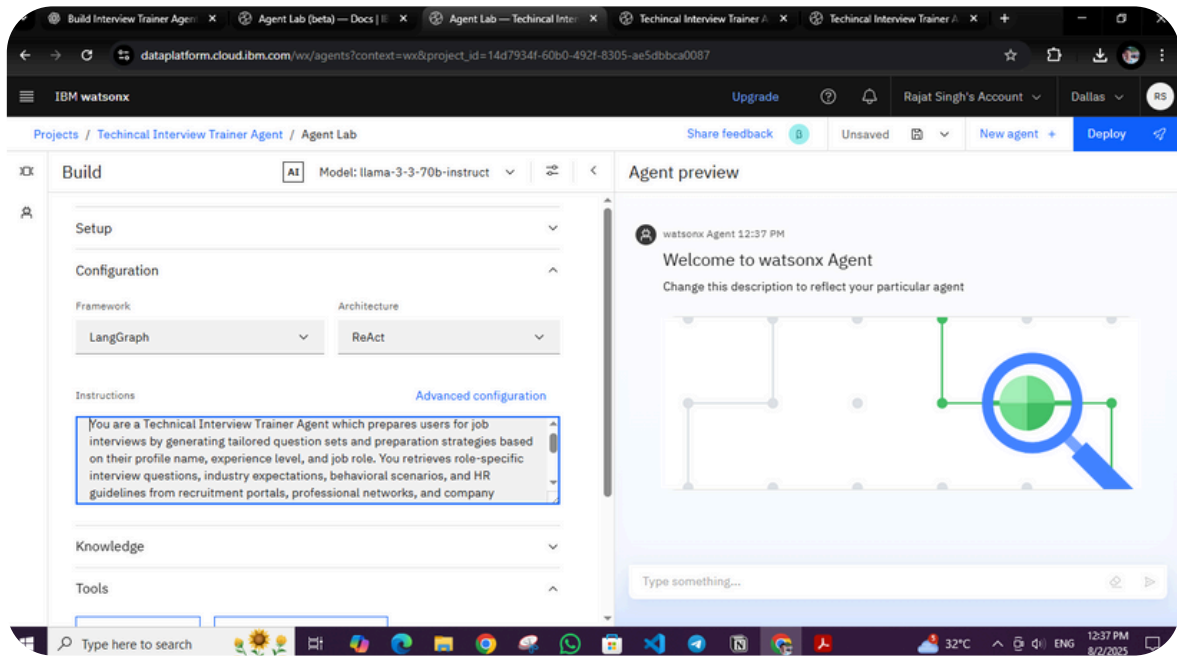
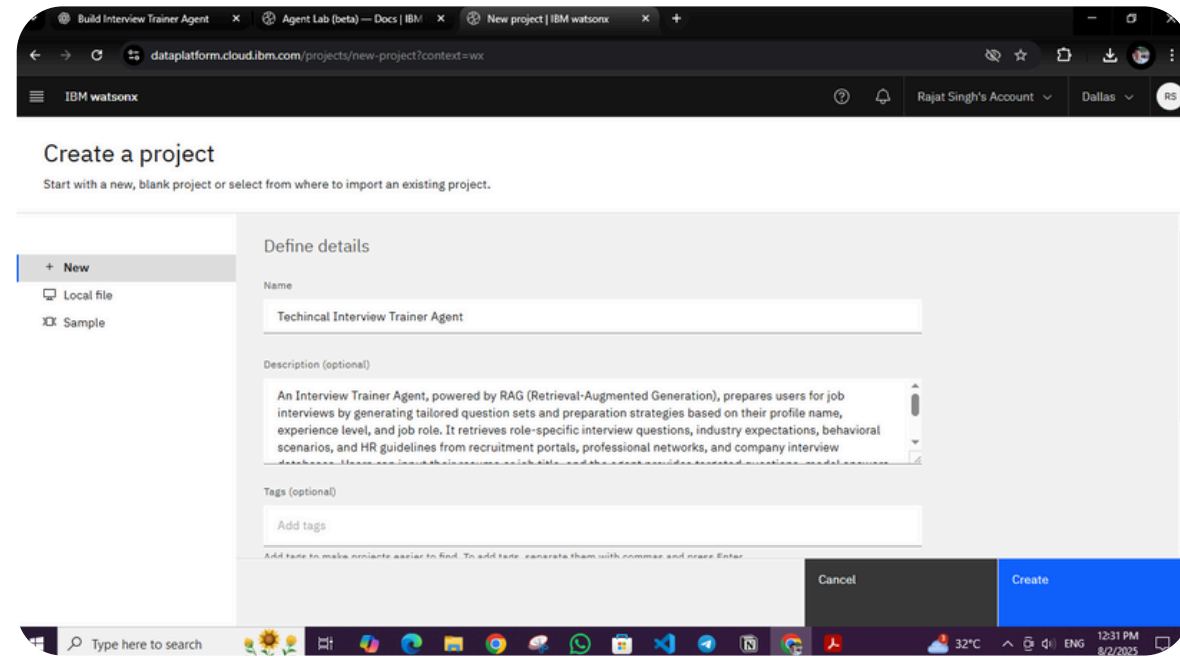
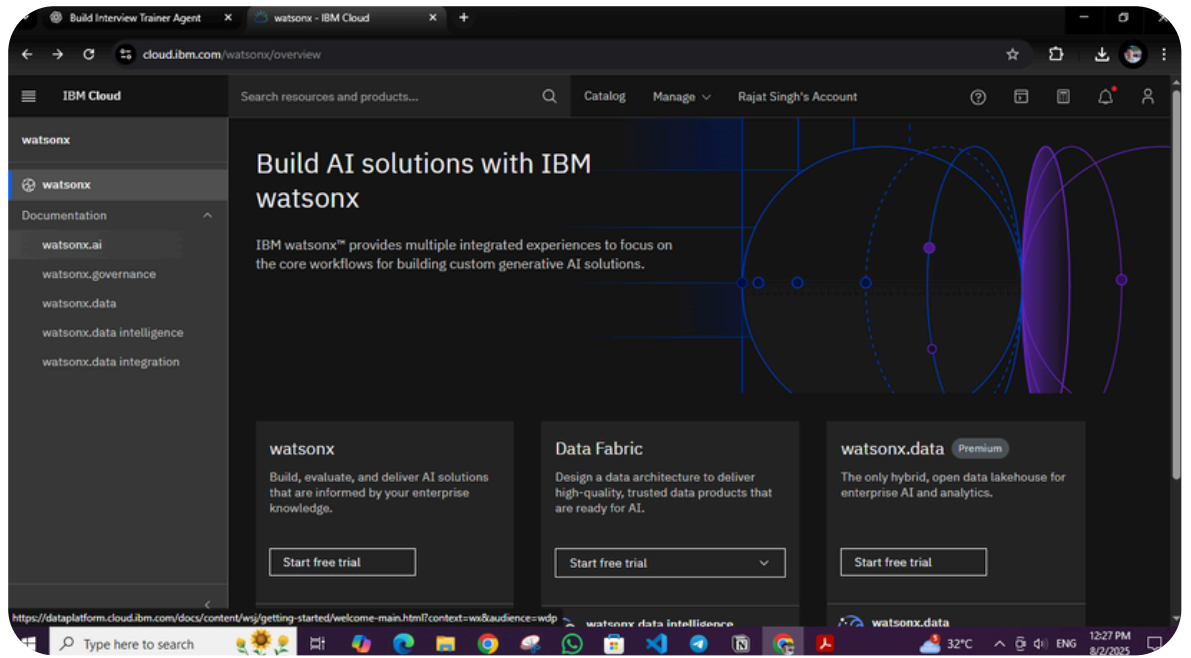
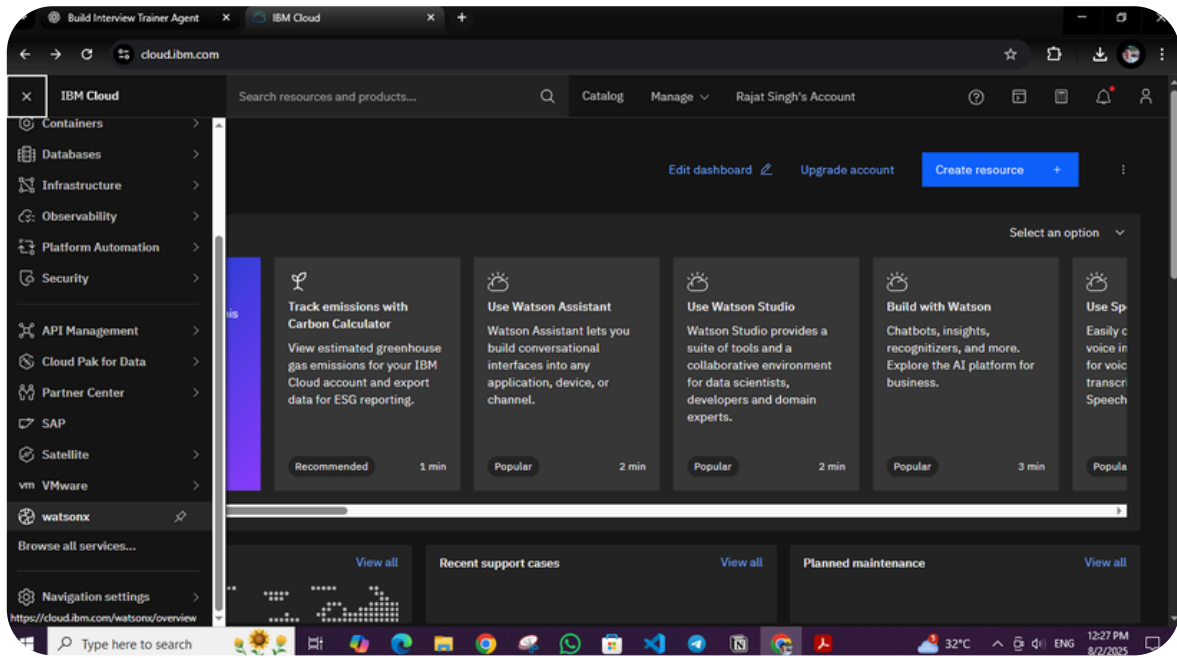
Augmentation: The retrieved, relevant text chunks are prepended to the user's original query. This combined text forms an "augmented prompt."

Generation: The augmented prompt is sent to the selected LLM (e.g., mistral-large). The LLM uses both the user's query and the provided context to generate a comprehensive, accurate, and contextually-aware response.

Deployment

The agent is built and previewed within the watsonx Agent Lab. The platform provides a "Deploy" button, which allows the agent to be published as a web chat or an API endpoint. This makes it easily integrable into web applications, mobile apps, or other third-party services for end-user access.

STEPS



RESULT

The agent successfully generated detailed and relevant preparation plans

Interview Tr x Technical Interview Tr x ChatGPT x +

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Share feedback beta Unsaved New agent + Deploy

Agent preview

You: 01:20 PM
Provide roadmap to prepare for Data Science interview in 2 Days

watsonx Agent: 01:20 PM
Sure, here is a comprehensive roadmap to prepare for a Data Science interview in 2 days:

Day 1: Core Concepts and Technical Skills

Morning Session:

- Review Core Concepts:
 - Statistics and Probability:
 - Mean, Median, Mode
 - Standard Deviation, Variance
 - Probability Distributions (Normal, Binomial, Poisson)

Type something...

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Agent preview

Afternoon: 3. Finalize System Design:

- Review and practice more system design questions.
- Focus on scalability, performance, and trade-offs.

4. Behavioral Questions:

- Refine your responses to behavioral questions.
- Practice common scenarios and prepare examples from your experience.

Evening: 5. Final Mock Interviews:

- Conduct final mock interviews to solidify your preparation.
- Get feedback and make necessary adjustments.

6. Relax and Review:

- Take some time to relax and clear your mind.
- Do a final review of key concepts and your prepared responses.

Type something...

Interview Trainer Agent

Deployed Online

API reference Test Preview

New chat +

You: 02:35 PM
Provide structured roadmap to prepare for SWE role

Interview Trainer Agent: 02:35 PM

Structured Roadmap to Prepare for a Software Engineer (SWE) Interview

Preparing for a Software Engineer (SWE) interview requires a combination of technical knowledge, problem-solving skills, and understanding of software engineering principles. Here's a structured roadmap to help you prepare effectively over two days.

Day 1: Technical Preparation

Morning Session: Core Concepts and Data Structures

- Review Core Concepts
 - Understand the basics of programming languages (e.g., Python, Java, C++).
 - Brush up on object-oriented programming (OOP) principles.
 - Review algorithms and data structures (arrays, linked lists, stacks, queues, trees, graphs, hash tables).
- Practice Coding Problems
 - Solve problems on platforms like LeetCode, HackerRank, or CodeSignal.
 - Focus on common interview questions related to arrays, strings, linked lists, and trees.

Afternoon Session: System Design and Architecture

- System Design Principles
 - Study system design principles and patterns.
 - Understand scalability, load balancing, caching, and database design.

CONCLUSION

This project successfully demonstrates the creation of a powerful and practical AI-powered Interview Trainer Agent using IBM watsonx. By combining a high-quality LLM with a RAG architecture, the agent effectively addresses the problem statement, providing personalized, relevant, and structured interview preparation guidance. The intuitive tools within the watsonx platform enabled rapid development and testing, proving the viability of the solution for enhancing a candidate's readiness for competitive job interviews.

GitHub Repo Link- <https://github.com/Rajat2774/Interview-Trainer-Agent>

FUTURE SCOPE

The agent has significant potential for future enhancements:

- **Interactive Mock Interviews:** Develop a turn-by-turn conversational mode where the agent asks a question, evaluates the user's text or voice response, and provides immediate feedback.
- **Resume Parsing:** Allow users to upload their resume directly. The agent would parse the document to automatically extract skills, experience, and role preferences for hyper-personalized guidance.
- **Dynamic Knowledge Base:** Integrate the agent with APIs to pull real-time interview questions and insights from platforms like Glassdoor, LinkedIn, or tech blogs.
- **Performance Tracking:** Add a feature for users to track their progress, save their answers, and review their performance over time.

REFERENCES

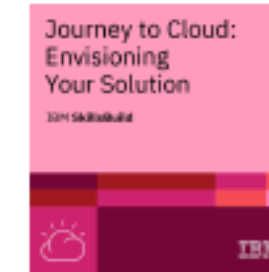
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IBM CERTIFICATIONS



IBM CERTIFICATIONS

In recognition of the commitment to achieve
professional excellence



rajat singh

Has successfully satisfied the requirements for:

Journey to Cloud: Envisioning Your Solution



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Completion Certificate



This certificate is presented to

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for the completion of

**Lab: Retrieval Augmented Generation with
LangChain**

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 24 Jul 2025 (GMT)

Learning hours: 20 mins

THANK YOU