



Interstellar Intelligence: AI Interview Prep Tool

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Interstellar Intelligence: AI Interview Prep Tool Concept Paper: ReX – AI-Driven Interview Preparation Tool for Data Analysts 📊

Executive Summary 📝

ReX is offering an advanced and immersive, AI-powered interview tool designed to aid aspiring data analysts in their interviewing skills. This tool aims to simulate a real interview experience, providing users with a rich array of technical questions, case studies, and data manipulation tasks.

ReX's interactive platform will guide users through a personalized journey, adapting to their learning curve and offering detailed feedback to hone their skills for actual interviews

Background 🎈

In the current job market, data analysts must exhibit a blend of technical proficiency and sharp problem-solving skills. ReX's mission is to prepare candidates for this demanding landscape, equipping them with the necessary tools to demonstrate their expertise confidently and efficiently.

🌟 Group: P8 Orion Observers 🌟

- **Members:**

- Jay(Jie) Huang
- Kuntal Pal
- Hasan Nassar
- Jenny Nguyen

- 📚 **Resources:**

- <https://vercel.com/templates/next.js/chatbot-ui>
- <https://vercel.com/templates/next.js/nextjs-ai-chatbot>
- <https://platform.openai.com/api-keys>
- <https://huggingface.co/settings/tokens>
- <https://console.cloud.google.com/>
- <https://www.kaggle.com/>
- <https://geekflare.com/ai-powered-interview-preparation-platforms/>
- <https://www.stratascratch.com>

Mission Scenario

As an AI engineer at RadicalX, you're tasked with creating ReX, an AI-powered interview prep tool tailored for data analyst aspirants. You must demonstrate ReX's ability to bridge the gap between theoretical knowledge and practical interview prowess, enabling users to navigate the complexities of data analyst interviews confidently.

Mission Goal

Assemble a dynamic AI tool, ReX, that will revolutionize the way users prepare for Data Analyst interviews, combining technical rigor with real-world scenario training.

Features

- **Technical Questions Module:**
 - Questions on data structures, algorithms, SQL, and programming concepts tailored for data analysts. There are no sample answers for these questions since they can be implemented in multiple ways. Solutions will be judged by an AI agent or run on online IDE.
 - Interactive quizzes on data warehousing, ETL processes, and database design with instant feedback. An example is the question in the AWS machine-learning specialist certification test.
- **Behavioral Question Module:**
 - Simulated scenarios where the AI presents hypothetical situations, and the user must select or propose solutions.
 - ReX evaluates the reasoning behind the user's decisions and provides insights into the effectiveness of their approach.

- Behavioral questions gauge the user's soft skills, teamwork, and problem-solving approach.
- Prompts users with behavioral questions to which they can respond using the STAR method.
- Sample answers in STAR method will be provided for reference. AI agent will provide suggestions based on the similarity between sample answers and user's answers.
- **Concept Explanation Practice:**
 - Rex will extract information from user's resume and ask users to explain some concepts on their resume.
 - Interactive sessions where users explain complex data concepts in simplified terms.
 - ReX offers real-time feedback on the clarity and simplicity of the explanations, with suggestions for improvement.
- **Personality Assessment:**
 - Evaluating user's personality in two ways. One is assessing personality by analyzing the chat history. The way how people express themselves and the words they used will reflect their personality. The other one is asking user a series of questions. An example is questionnaire.
 - ReX provides an analysis of the user's answers, highlighting traits that align with a data analyst's role.
- **Team Collaboration Scenarios:**
 - Virtual group exercises that simulate team collaboration and leadership situations.
 - Feedback on conflict resolution and team dynamics, with the AI assessing group interaction and the user's role.
- **Communication Skill Assessment:**
 - Analysis of the user's explanation of technical concepts to non-technical stakeholders.
 - Feedback on clarity, conciseness, and the use of jargon.

Relevant Comparisons:

- <https://www.testgorilla.com/>
 - Assessment questions on character(Myers Briggs personality assessment)
 - General developer questions on algorithms and data structures
 - Specialty questions specific to technical role
 - 30 minutes coding challenge
- <https://learn.interviewkickstart.com/>
 - Individualized teaching and 1:1 help and personalized feedback on your response
 - Constructive, structured, and actionable insights for improved interview performance
- <https://www.adzuna.com/prepper>

- Has tailored AI questions for the actual job and company
- Provides feedback and model answers(show example button) tailored to the job role
- https://interviewgpt.ai/?ref=taaft&utm_source=taaft&utm_medium=referral
 - An AI chatbot provides feedback on interview questions.
 - Questions are asked based on positions and companies.
- https://interviewgpt.ai/?ref=taaft&utm_source=taaft&utm_medium=referral
 - An AI chatbot provides feedback on interview questions.
 - Questions are asked based on positions and companies.
 - Users need to type answers to chatbot. However, some questions can be in form of choice questions. It would make user's life easier.

Process of data science interview:

The first round:

SQL

python easy level

the second round:

take home test, machine learning problem, <https://www.stratascratch.com> leetcode for data science.
system design

The third round:

BQ

Solution(Jenny, Hassan, Kuntal)

- Sourcing the interview questions:
 - Web scraping
 - Specifically filter quality data analyst relevant role questions from GlassDoor, Strata Scratch, LinkedIn Business, etc.
 - Public datasets from Kaggle, Huggingface or GitHub specific to data analyst roles
 - Categorizing the questions from beginner to junior roles and classifying them by topic and question type.
 - Interview Question Bank Overview:
 - **Interview Question Bank .jsonl draft(Need to remove advanced level questions)(300-400 questions in the dataset)**

- <https://docs.google.com/document/d/1m0xu3k6W933A4IQSE3L5owJCslPVa1yyEfui8nVSr-c/edit>
- Kaggle dataset: <https://www.kaggle.com/datasets/gzipchrist/leetcode-problem-dataset>

▼ Topics Covered:

- ▼ Machine Learning concepts and applications
 - Data Preprocessing and Cleaning
 - SQL Programming and Database Management
 - Statistical Analysis and Interpretation
 - Data Visualization and Reporting
 - Python Programming for Data Analysis
 - R Programming and its libraries
 - Julia for high-performance computing
 - Optimization Algorithms and Techniques
 - Deployment and Scaling of ML Models
 - Cloud Platforms for Data Analytics
 - Model Interpretability in Complex Models
 - IoT Device Integration with ML
 - Disaster Recovery and Data Breach Handling
 - Advanced ML Concepts (GANs, Reinforcement Learning, Transformers)
 - NLP for Domain-Specific Applications
 - Streaming Data and Real-Time Analytics
 - Cross-Disciplinary Collaboration in ML Projects
 - Data Analysis for Public Policy and Social Good
 - Ethical Implications of Automated Decision-Making Systems
 - Continuous Learning in Data Science
 - Advanced Visualization Techniques for Complex Datasets

▼ Classification of Questions:

- ▼ Technical: specific technical skills and knowledge
 - Behavioral: past experiences and behaviors in various scenarios.
 - Soft Skills: interpersonal and collaborative abilities
 - Communication: candidate's ability to explain technical concepts to various audiences

▼ Question Types:

- Scenario-Based: questions that present a situation and ask the candidate to describe their approach or solution.
- Experience Reflection: questions that ask the candidate to reflect on past work experiences and learnings.
- Problem-Solving: questions that probe the candidate's ability to address and solve complex problems.
- Knowledge Assessment: questions that evaluate the candidate's understanding of advanced concepts and their applications.
- Skill Demonstration: questions that provide an opportunity for the candidate to demonstrate their proficiency in specific skills.

▼ Dataset Sources:

▼ <https://www.hackerrank.com/roles-directory/data-analyst/>

- <https://intellipaat.com/blog/interview-question/data-analyst-interview-questions/>
- https://platform.stratascratch.com/technical?job_positions=4
- <https://www.coursera.org/articles/data-analyst-interview-questions-and-answers>
- <https://www.mlstack.cafe/blog/julia-interview-questions>
- <https://codesignal.com/blog/tech-recruiting/technical-interviews-a-guide-for-interviewers-candidates/>
- https://www.glassdoor.com/Interview/data-analyst-interview-questions-SRCH_KO0,12.htm
- <https://capd.mit.edu/resources/the-star-method-for-behavioral-interviews/>
- https://www.glassdoor.com/Interview/entry-level-data-analyst-interview-questions-SRCH_KO0,24.htm
- <https://www.simplilearn.com/tutorials/data-analytics-tutorial/data-analyst-interview-questions>
- <https://365datascience.com/career-advice/job-interview-tips/data-analyst-interview-questions/>
- <https://brainstation.io/career-guides/data-analyst-interview-questions>

• NLP-based Analyzation:

- Implementing an NLP-based system to evaluate interview responses
- Rule based systems for our starting point
- Plan to use a combination of cosine similarity or semantic analysis to evaluate the content of the response and a classification model to assess the overall quality

- Gradually incorporate more complex NLP techniques over time
- Semantic and sentiment analysis
- Feedback loops
- Prompting
 - Need to make clear and specific instructions on the behavioral or technical portion of the interviews.
 - Include relevant context such as the interview scenario, the role and specific skills being assessed.
 - Make the chatbot focus on specific behavioral or technical skills that are desired.
 - Design prompts that include a range of scenarios to ensure that the chatbot can provide feedback for different styles of interviews.
 - Frame prompts in professional language that is indicative of real interview situations
 - Provide specific examples of critiques in interviews to ensure the chatbot knows how to properly give feedback.
 - Balancing the strengths and weaknesses of the response to avoid overly negative feedback and provide a realistic assessment.
 - Ensure that the chatbot's responses are culturally sensitive and avoid bias.
 - Examples of prompts:
 - "You are ReX, an advanced AI-powered interview preparation assistant designed to help data analysts hone their technical and behavioral interview skills. Your capabilities include providing a database of technical questions, offering interactive quizzes on data analytics topics, giving feedback on problem-solving approaches, assisting with behavioral interview preparation using the STAR method, and conducting personality and communication assessments. Use your training to deliver personalized and constructive feedback, simulate real-world scenarios, and adapt to each user's learning progress to effectively prepare them for data analyst interviews."
 - "Critique the candidate's response to a behavioral question asking about a challenging situation they faced in a previous role. Pay special attention to the STAR (Situation, Task, Action, Result) framework."
 - "Evaluate the candidate's explanation of a complex technical concept related to [specific technology/programming language]. Provide feedback on clarity, depth of understanding, and the ability to communicate technical details."
 - "Assess the candidate's problem-solving skills by critiquing their approach to a hypothetical technical scenario. Look for logical reasoning, attention to detail, and the ability to handle ambiguity."
- Chatbot UI: Vercel
- Database for questions and sample answers: MongoDB
- Chat history: an object storing the conversation log between AI agent and user.

User Experience and Journey

- **Onboarding:** Users are greeted and guided through a preliminary skills assessment.
 - **Learning Path Customization:** Based on the assessment, a personalized learning path is generated.
 - **Interactive Learning Modules:** Users engage with various modules, each focused on different skill sets.
 - **Feedback and Adaptation:** Users receive immediate feedback to their interview question responses, and ReX adapts to focus on areas needing improvement.
 - **Progress Tracking:** Users can track their growth through a dashboard reflecting their performance and areas mastered.
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Interaction Flow

1. Introduction:

- Greet the user and introduce the chatbot's purpose.
- Provide a brief overview of the interview preparation process.

2. User Profile:

- Collect basic information about the user's background, such as name and resume.

3. Skill Assessment:

- Evaluate the user's current skill level by asking about specific topics or skills relevant to their interview preparation.

4. Practice Session:

- Engage the user in a simulated interview scenario. Ask questions or present challenges related to the chosen topics. Allow the user to respond as they would in a real interview.

5. Feedback and Tips:

- Provide constructive feedback on the user's responses. Highlight strengths and offer suggestions for improvement. Share general tips on effective interview techniques.

6. Progress Tracking:

- Keep track of the user's progress over time. Provide a summary of areas where they have improved and areas that may still need attention.
- Reporting user's personality.

7. Additional Resources:

- Offer additional resources, such as articles, videos, or sample questions, to help the user further enhance their interview skills.

8. Closing:

- Summarize the session, thank the user for their time, and encourage them to return for more practice.
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