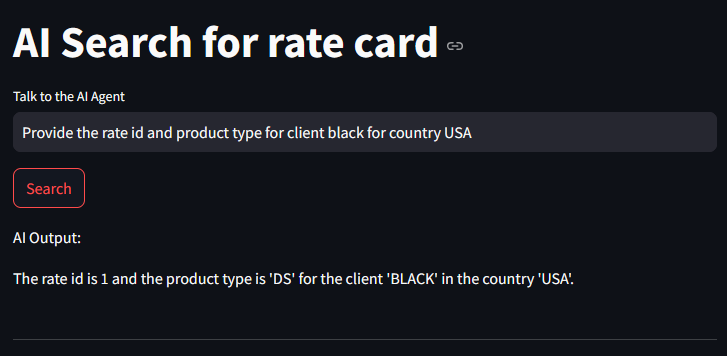
We developed a high-level Proof of Concept (PoC) utilizing the OpenAI GPT-4o model with mock data to achieve results close to the desired output. This exercise provided valuable insights into the key components of AI architecture and increased our confidence in implementing the solution for the given use case.

During our evaluation, we tested multiple models for response accuracy and found that OpenAI and Mistral AI models performed well. For the PoC, we used Python along with AI libraries such as LangChain, OpenAI, and SentenceTransformers for embeddings, ElasticSearch for RAG lookup, and Streamlit for visualization.

As the next step, once we receive approval for the use case, we plan to develop the solution formally on Citi’s Stellar platform, ensuring alignment with Citi’s technology stack and security guidelines.

The following screenshot captures the AI output generated for the given natural language input.



The following log provides a behind-the-scenes view of the process, where the given query is translated into SQL using the OpenAI model and then executed on the database to retrieve the answer.

|  |
| --- |
| User: ADMIN, Connection String: (description= (retry\_count=20)(retry\_delay=3)(address=(protocol=tcps)(port=1522)(host=adb.ca-toronto-1.oraclecloud.com))(connect\_data=(service\_name=ge99bd63596f620\_sajioragenai\_medium.adb.oraclecloud.com))(security=(ssl\_server\_dn\_match=yes)))  oracle  ['client', 'dbtools$execution\_history', 'deal', 'old\_table\_dont\_use', 'rates', 'trade']  oracle  ['client', 'dbtools$execution\_history', 'deal', 'old\_table\_dont\_use', 'rates', 'trade']  ================================ Human Message =================================  Provide the rate id and product type for client black for country USA  ================================== Ai Message ==================================  Tool Calls:  sql\_db\_query (call\_IJ4G0oPQBULYy43gcXWJgcsF)  Call ID: call\_IJ4G0oPQBULYy43gcXWJgcsF  Args:  query: SELECT R.RATE\_ID, R.PRODUCT\_TYPE FROM RATES R JOIN DEAL D ON R.DEAL\_ID = D.DEAL\_ID JOIN CLIENT C ON D.CLIENT\_ID = C.CLIENT\_ID WHERE UPPER(C.CLIENT\_NAME) = 'BLACK' AND UPPER(R.COUNTRY) = 'USA' AND R.RATE\_ID != -1 AND R.PRODUCT\_TYPE != -1 AND R.PRODUCT\_TYPE IS NOT NULL AND R.RATE\_ID IS NOT NULL AND ROWNUM <= 5  ================================= Tool Message =================================  Name: sql\_db\_query  Error: (oracledb.exceptions.DatabaseError) ORA-12801: error signaled in parallel query server P000, instance 2  ORA-01722: invalid number  Help: https://docs.oracle.com/error-help/db/ora-12801/  [SQL: SELECT R.RATE\_ID, R.PRODUCT\_TYPE FROM RATES R JOIN DEAL D ON R.DEAL\_ID = D.DEAL\_ID JOIN CLIENT C ON D.CLIENT\_ID = C.CLIENT\_ID WHERE UPPER(C.CLIENT\_NAME) = 'BLACK' AND UPPER(R.COUNTRY) = 'USA' AND R.RATE\_ID != -1 AND R.PRODUCT\_TYPE != -1 AND R.PRODUCT\_TYPE IS NOT NULL AND R.RATE\_ID IS NOT NULL AND ROWNUM <= 5]  (Background on this error at: https://sqlalche.me/e/20/4xp6)  ================================== Ai Message ==================================  It seems there was an error in executing the query. Let me try to rewrite the query and execute it again.  Tool Calls:  sql\_db\_query (call\_8d52E3QCZBf0n2bX83RJwemf)  Call ID: call\_8d52E3QCZBf0n2bX83RJwemf  Args:  query: SELECT R.RATE\_ID, R.PRODUCT\_TYPE FROM RATES R JOIN DEAL D ON R.DEAL\_ID = D.DEAL\_ID JOIN CLIENT C ON D.CLIENT\_ID = C.CLIENT\_ID WHERE UPPER(C.CLIENT\_NAME) = 'BLACK' AND UPPER(R.COUNTRY) = 'USA' AND R.RATE\_ID > 0 AND R.PRODUCT\_TYPE IS NOT NULL AND ROWNUM <= 5  ================================= Tool Message =================================  Name: sql\_db\_query  [(1, 'DS')]  ================================== Ai Message ==================================  The rate id is 1 and the product type is 'DS' for the client 'BLACK' in the country 'USA'. |