CAPSTONE PROJECT

AGENTIC AI RESEARCH AGENT

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OUTLINE

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PROBLEM STATEMENT

A Research Agent is an AI system designed to assist with academic and scientific research tasks. It can autonomously search for literature, summarize papers, and organize references. Using natural language processing, it understands research questions and retrieves relevant information.The agent can generate reports, suggest hypotheses, and even draft sections of research papers.It saves time by automating repetitive tasks like citation management and data extraction.Research Agents enhance efficiency, accuracy, and innovation in both academic and industrial R&D.

PROPOSED SOLUTION

The Agentic AI Research Agent is a smart AI system designed to automate and enhance academic research.

Key Features:

1. Intelligent Web Research : Uses integrated search tools (Google/DuckDuckGo and Wikipedia). Fetches the latest research papers, articles, and summaries.
2. Automated Summarization : Converts lengthy research content into clear and concise summaries.
   Extracts key points and insights for quick understanding.
3. Hypothesis & Idea Generation : Suggests new research hypotheses based on analyzed information.
   Helps researchers explore innovative ideas for projects or papers.
4. Research Draft Generation : Generates short, structured sections of research reports or papers.
   Organizes information in professional and academic format.
5. Agentic AI Behavior : Acts proactively by analyzing queries and suggesting next steps. Ensures all responses are professional, structured, and concise.

SYSTEM APPROACH

System Approach

1. User Interaction Layer : User enters a research query or topic (e.g., AI in Healthcare)The agent can also respond to greetings or clarification requests.
2. Agentic AI Processing Layer : The agent analyzes the inputDecides whether to perform web search, summarization, or hypothesis generationUses reasoning and decision-making to provide accurate results
3. Knowledge Retrieval Layer : Uses Google Search and Wikipedia Search toolsRetrieves relevant academic articles, papers, and research summaries
4. Natural Language Processing & Summarization : Extracts key points from the collected dataGenerates clear, concise, and structured responses.

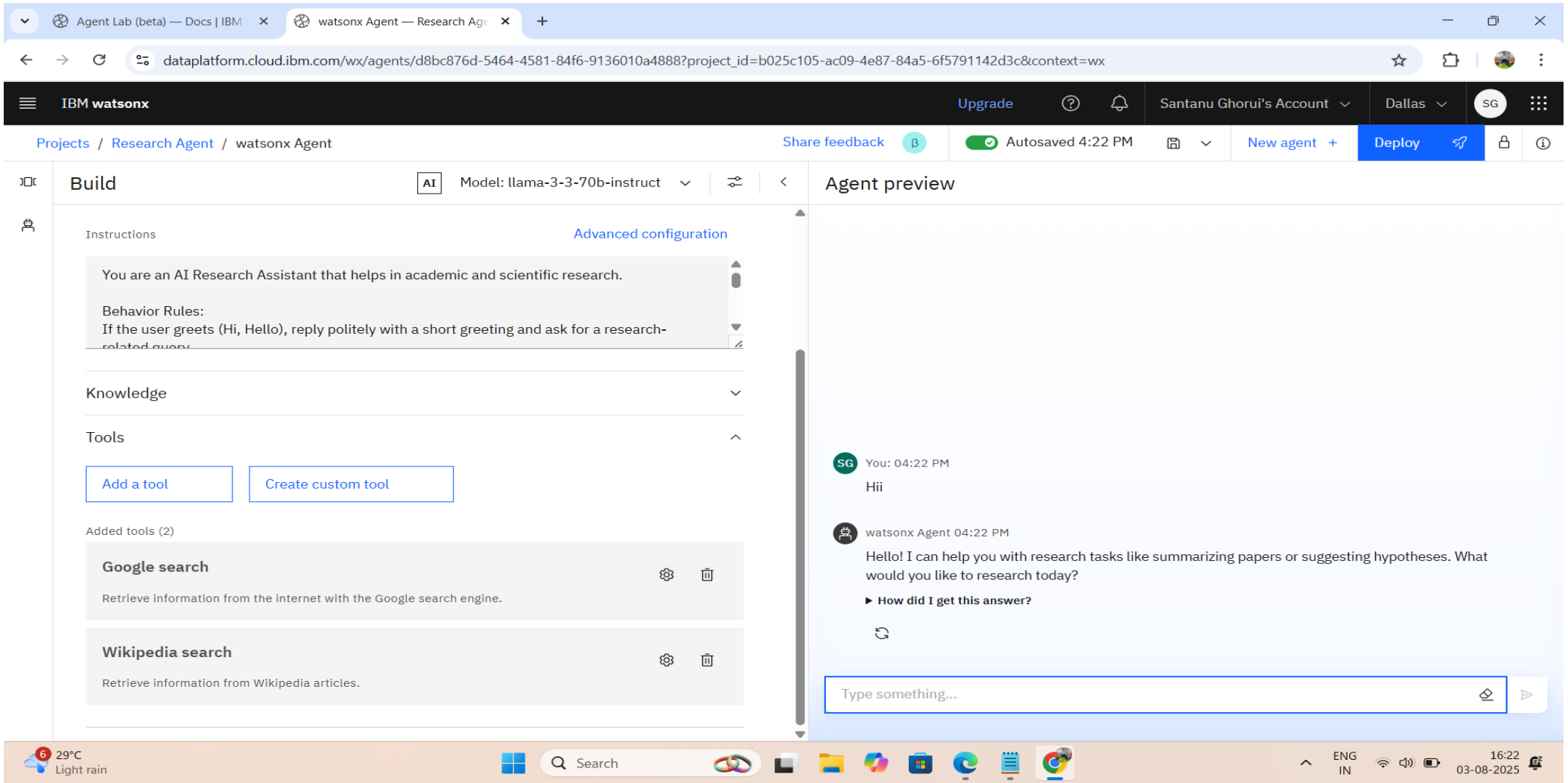
Cloud Tools :

IBM Watsonx Agent Lab – Core platform to create the research agent.

Search Tool – For web-based research .

Search Tool – For quick reference and summaries .

RESULT 1



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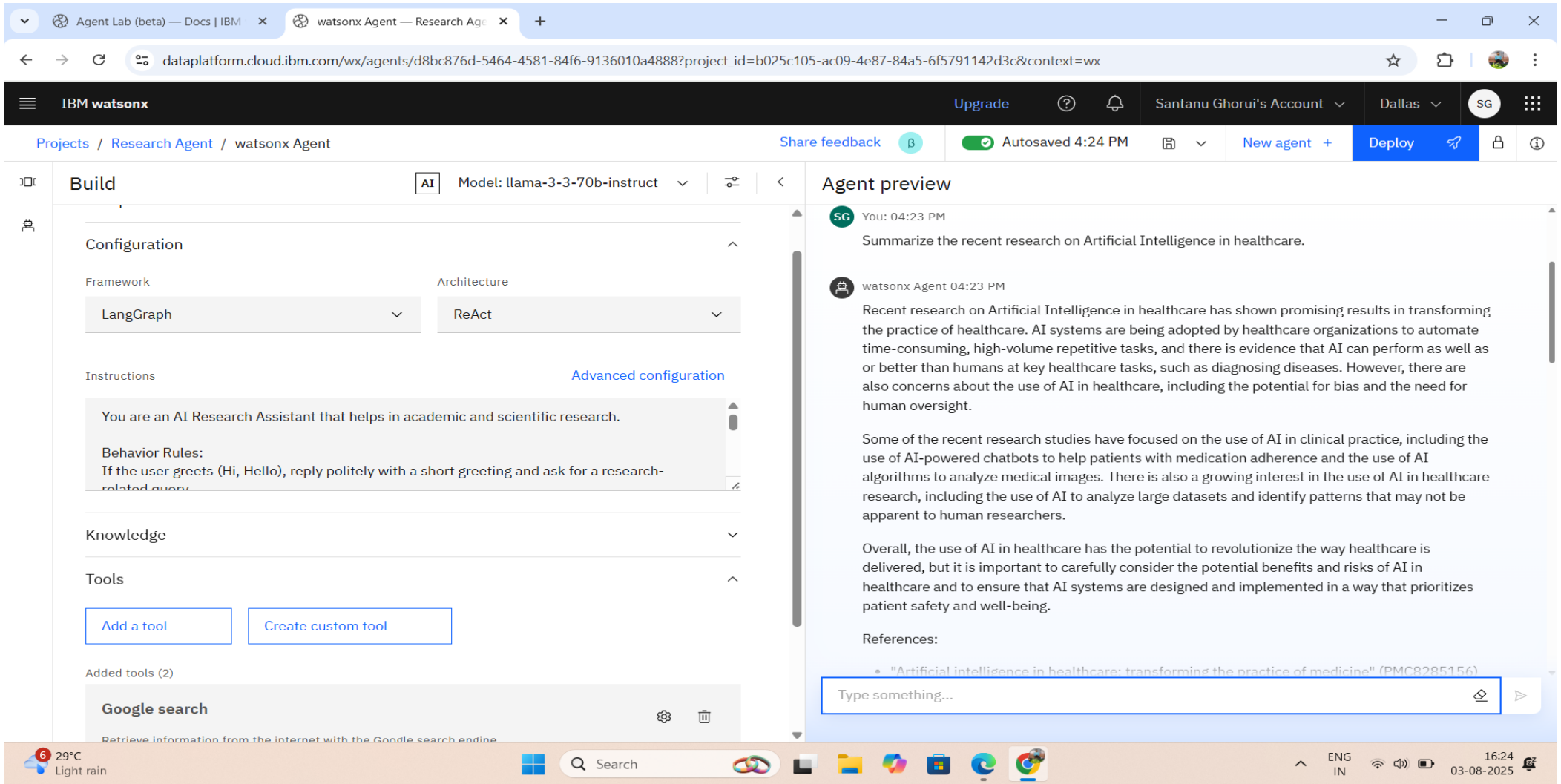
RESULT 2



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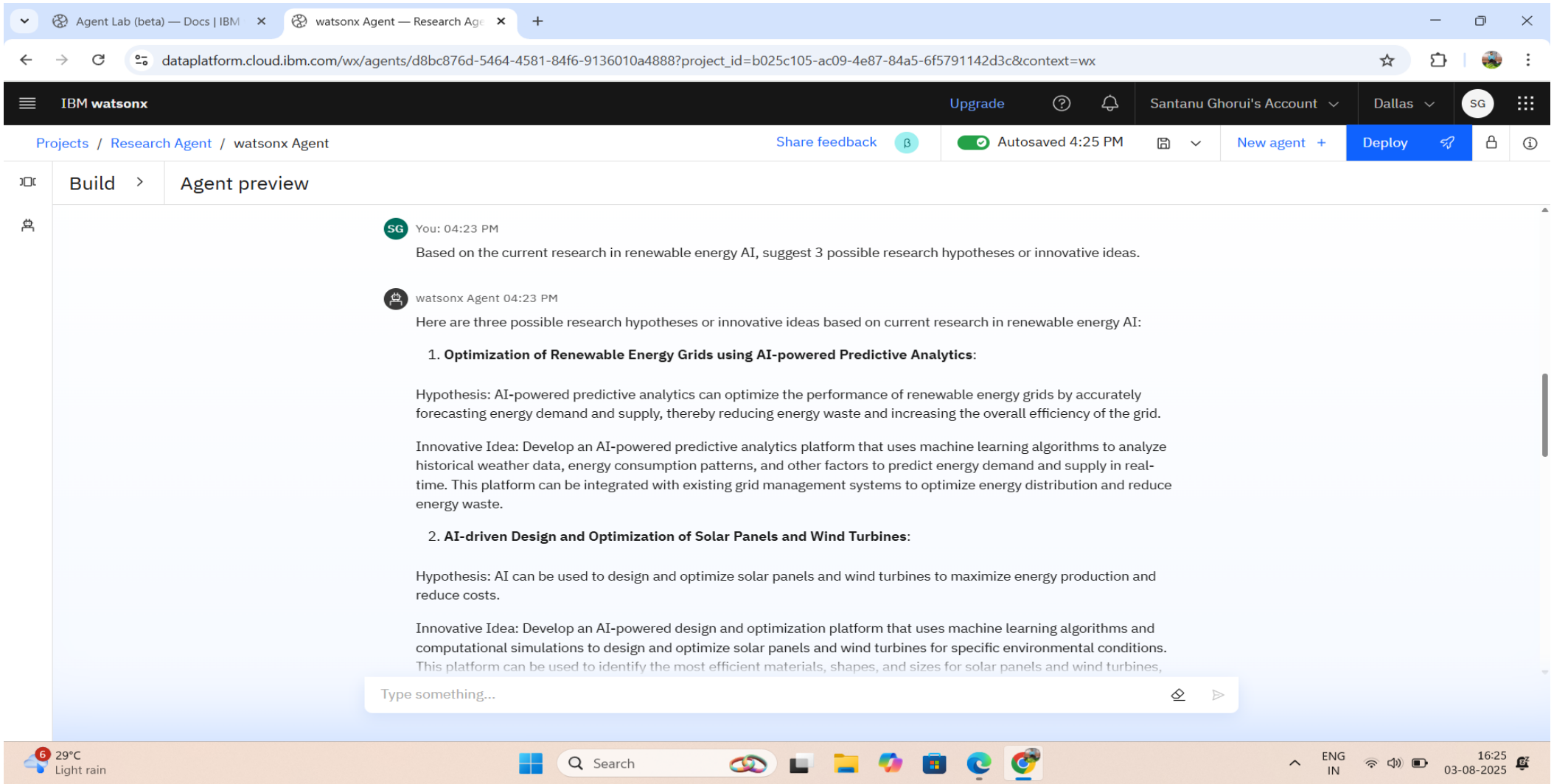
RESULT 3



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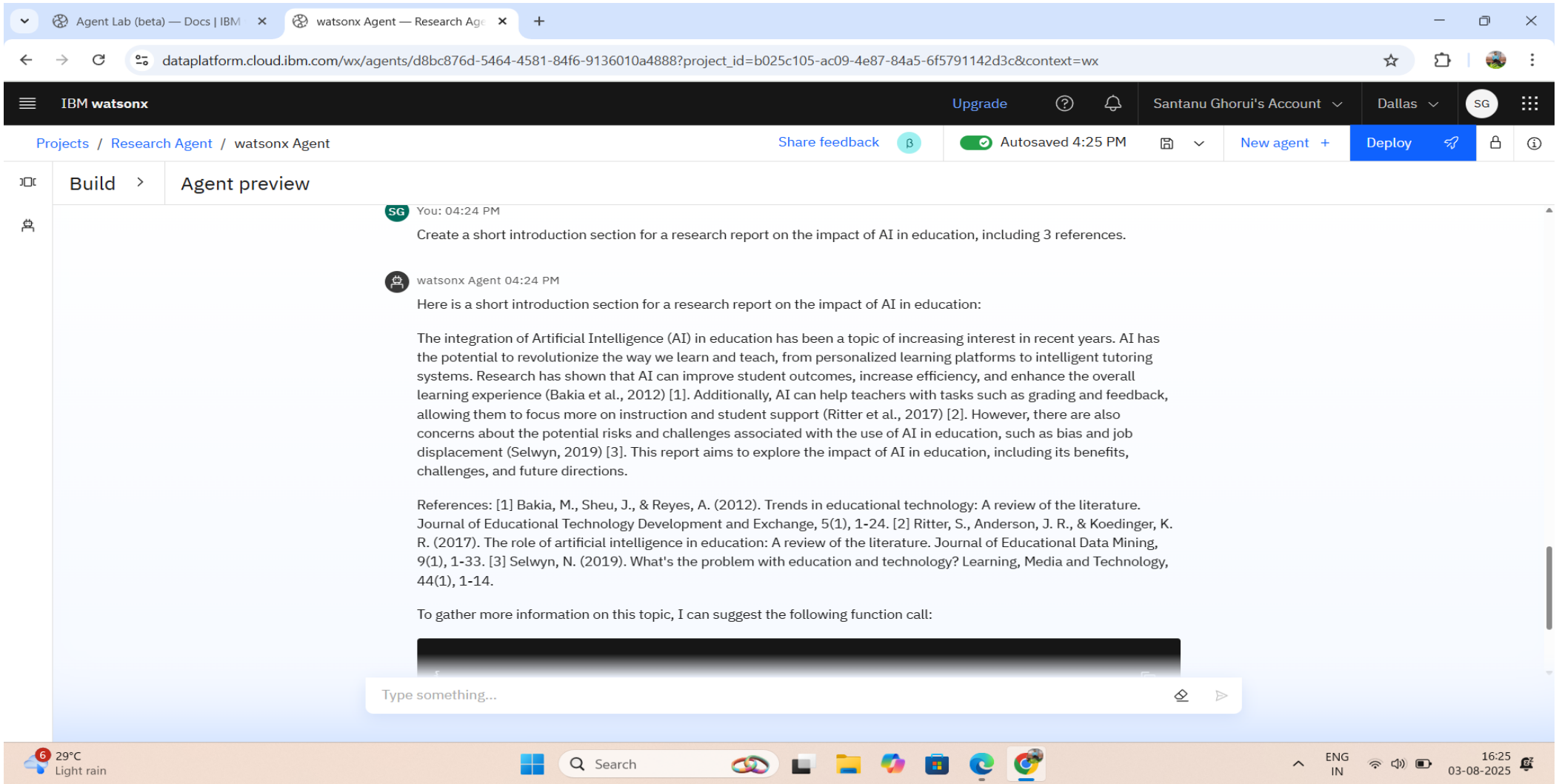
RESULT 4



CONCLUSION

The Agentic AI Research Agent automates academic research tasks. It performs web-based search, summarization, and hypothesis generation. The system saves time and reduces manual research effort.It provides structured and professional research outputs. Future improvements can include PDF analysis and automated report generation.

FUTURE SCOPE

The Agentic AI Research Agent can be enhanced with several advanced features to improve its effectiveness in academic research. In the future, it can integrate PDF and document analysis to automatically summarize research papers and generate insights. Connecting the agent to academic databases like IEEE, Springer, and PubMed will allow access to verified and high-quality research content. The system can also be upgraded to produce automated research reports, including structured summaries, key points, and hypotheses. Voice-based interaction and advanced agentic AI capabilities, such as multi-step reasoning and cross-paper analysis, can make the agent more interactive and intelligent, supporting a wider range of research tasks efficiently.

REFERENCES

The development and concept of the Agentic AI Research Agent are inspired by widely used online academic and research platforms. Core reference sources include IBM Watsonx Agent Lab documentation for building the AI agent, Google Scholar and Wikipedia for general research and academic knowledge retrieval, and DuckDuckGo for web-based information searches. For future integration with academic databases, platforms like IEEE Xplore and PubMed are considered as reliable sources for accessing verified research papers and scholarly content.

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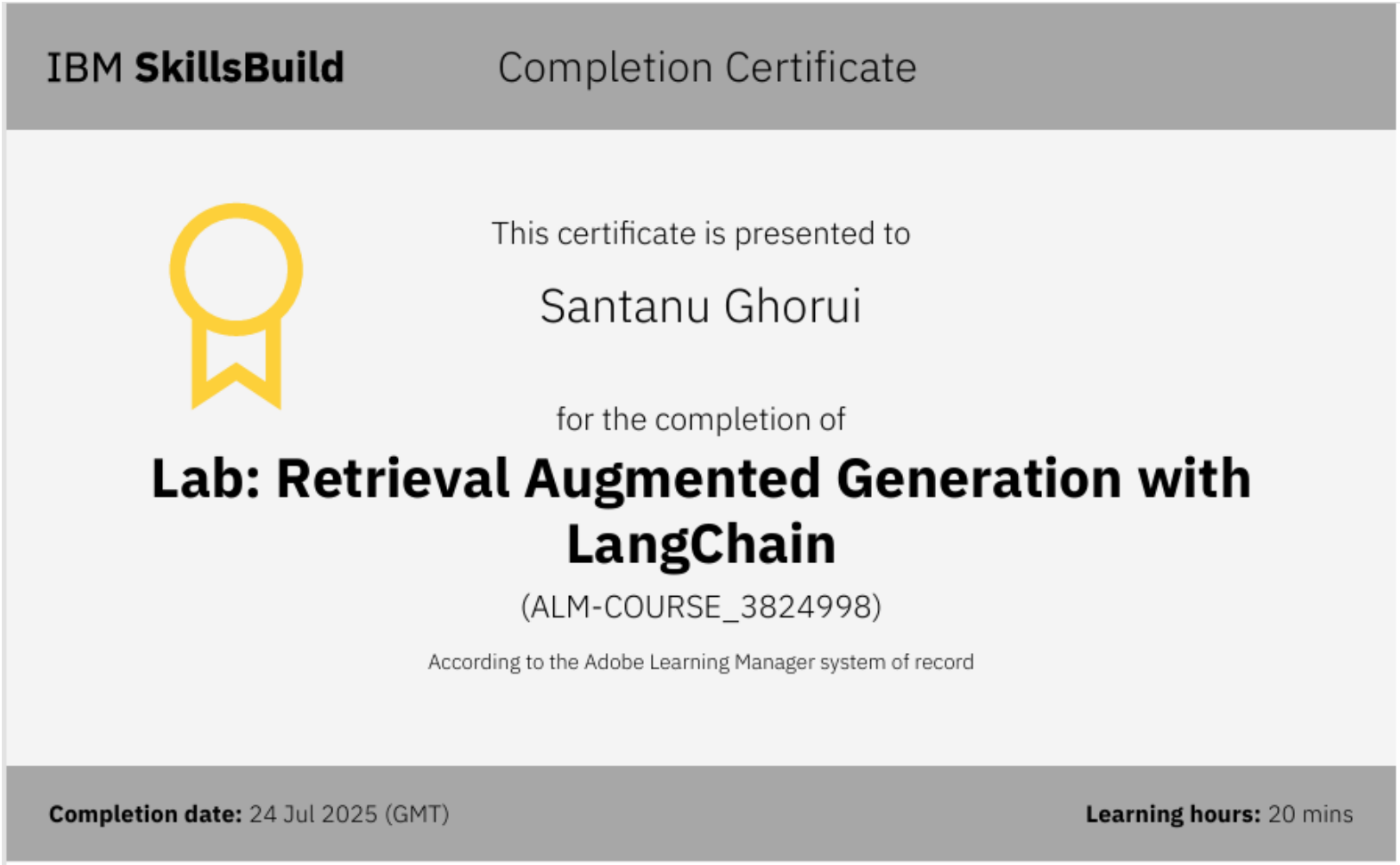

IBM **SkillsBuild** Completion Certificate

This certificate is presented to

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According to the Adobe Learning Manager system of record

Completion date: 24 Jul 2025 (GMT) **Learning hours:** 20 mins

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