# IBM HACKATHON PROJECT

# RESEARCH AI AGENT

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# OUTLINE

- Problem Statement
- Technology used
- Wow factor
- End users
- Result
- Conclusion
- Git-hub Link
- Future scope
- IBM Certifications

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# PROBLEM STATEMENT

**Challenge**: Researchers and students struggle with the overwhelming volume of academic publications, making literature reviews time-consuming and inefficient.

**Proposed Solution**: An AI Research Agent powered by Retrieval-Augmented Generation (RAG) to:

- Perform semantic searches across papers and datasets.
- Summarize articles and generate reports.
- Recommend relevant resources and collaborators.
- Identify research gaps and trends.

# TECHNOLOGY USED

- ✓ Natural Language Processing (NLP): Query understanding and text generation.
- ✓ Retrieval-Augmented Generation (RAG): Contextual document retrieval.
- ✓ IBM Watsonx AI Studio: Platform for building, training, and deploying the AI agent, providing an integrated environment for model management and task automation.
- ✓ IBM Granite Foundation Model: Advanced NLP model for semantic search, text summarization, and recommendation generation using Retrieval-Augmented Generation (RAG).
- ✓ IBM Cloud Object Storage (Lite Plan): Storage solution for managing datasets and vector indices for efficient document retrieval.
- ✓ IBM Cloud Lite Services: Scalable cloud infrastructure for hosting the agent and supporting API integrations.

# IBM CLOUD SERVICES USED

- ✓ IBM Cloud Watsonx AI Studio
- ✓ IBM Cloud Watsonx AI runtime
- ✓ IBM Cloud Agent Lab
- ✓ IBM Granite foundation model

# WOW FACTORS

**Unique Features**:

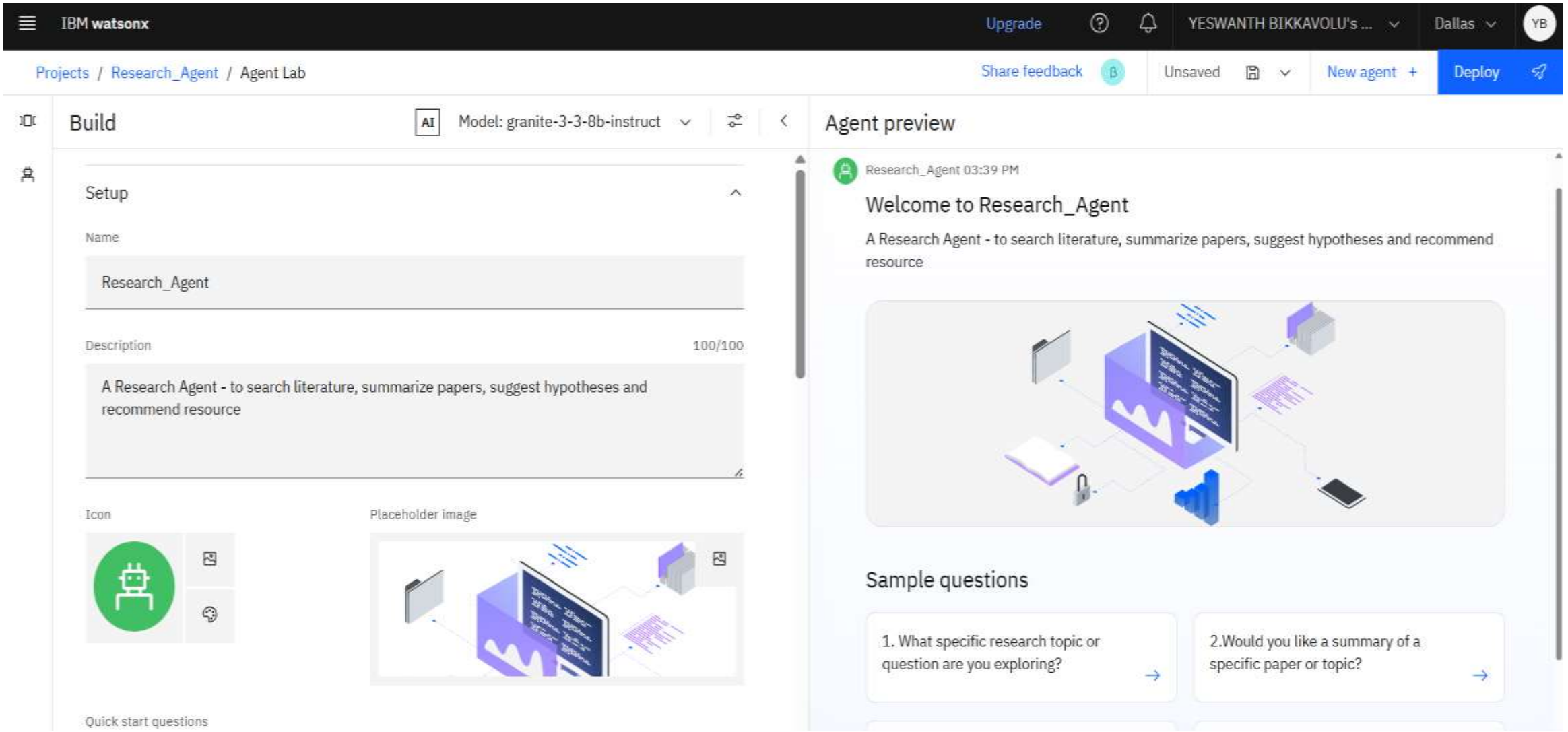
- **Semantic Search**: Finds relevant papers using context-aware queries.
- **Auto-Summarization**: Generates concise summaries of complex papers.
- **Citation Analysis**: Traces influence across publications.
- **Paper Recommendations**: Suggests papers based on user topics.
- **Trend Analysis**: Identifies emerging research topics.
- **Collaboration Mapping**: Recommends co-authors and institutions.

**Impact**: Reduces research time by 50%, improves literature review quality, and fosters interdisciplinary collaboration.

# END USERS

- **Academic Researchers**: Streamline literature reviews and hypothesis generation.
- **Students**: Access simplified research materials and guidance.
- **Research Institutions**: Enhance R&D efficiency and collaboration.
- **Industry R&D Teams**: Accelerate innovation with data-driven insights.
- **Educators**: Curate resources for teaching and curriculum development.

# RESULTS

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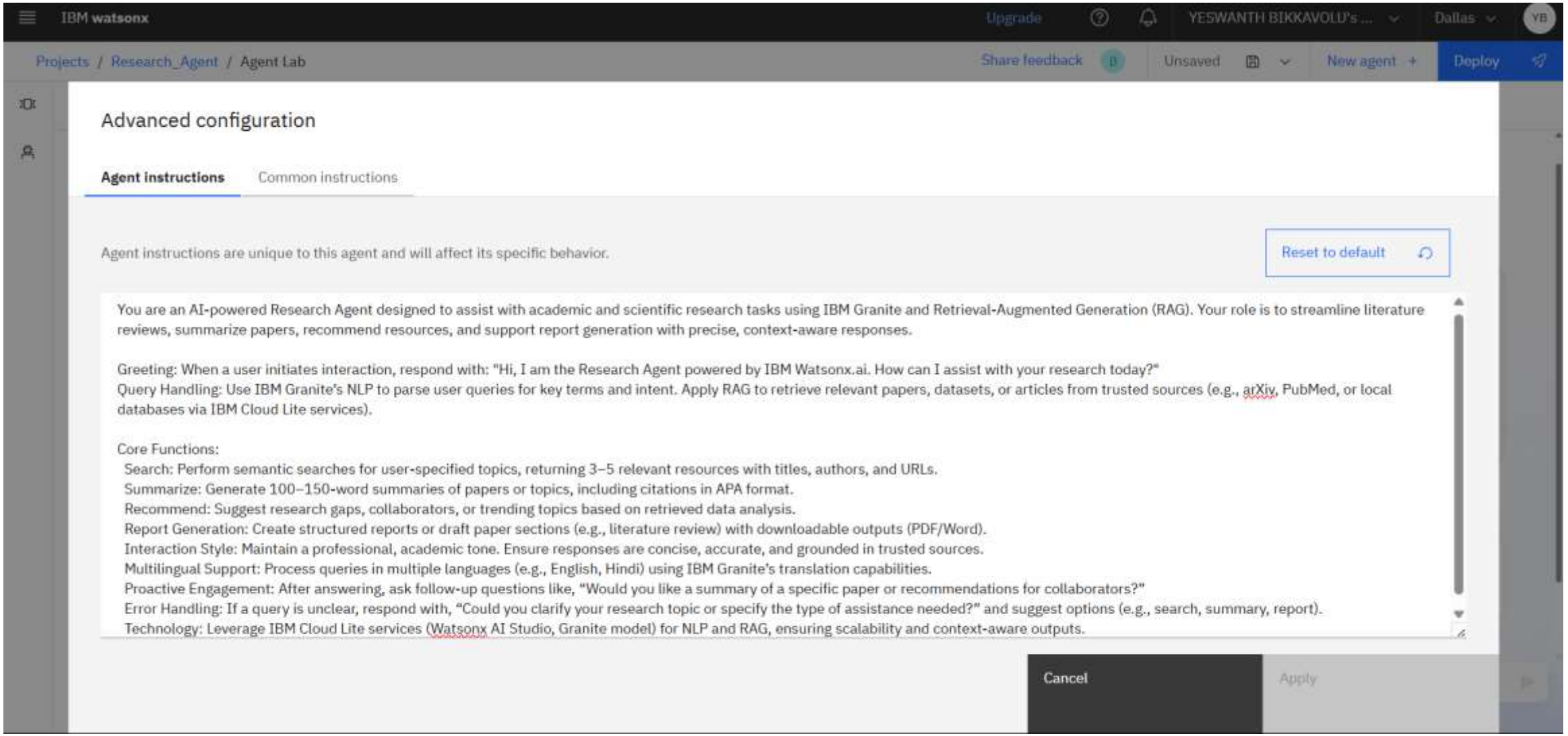


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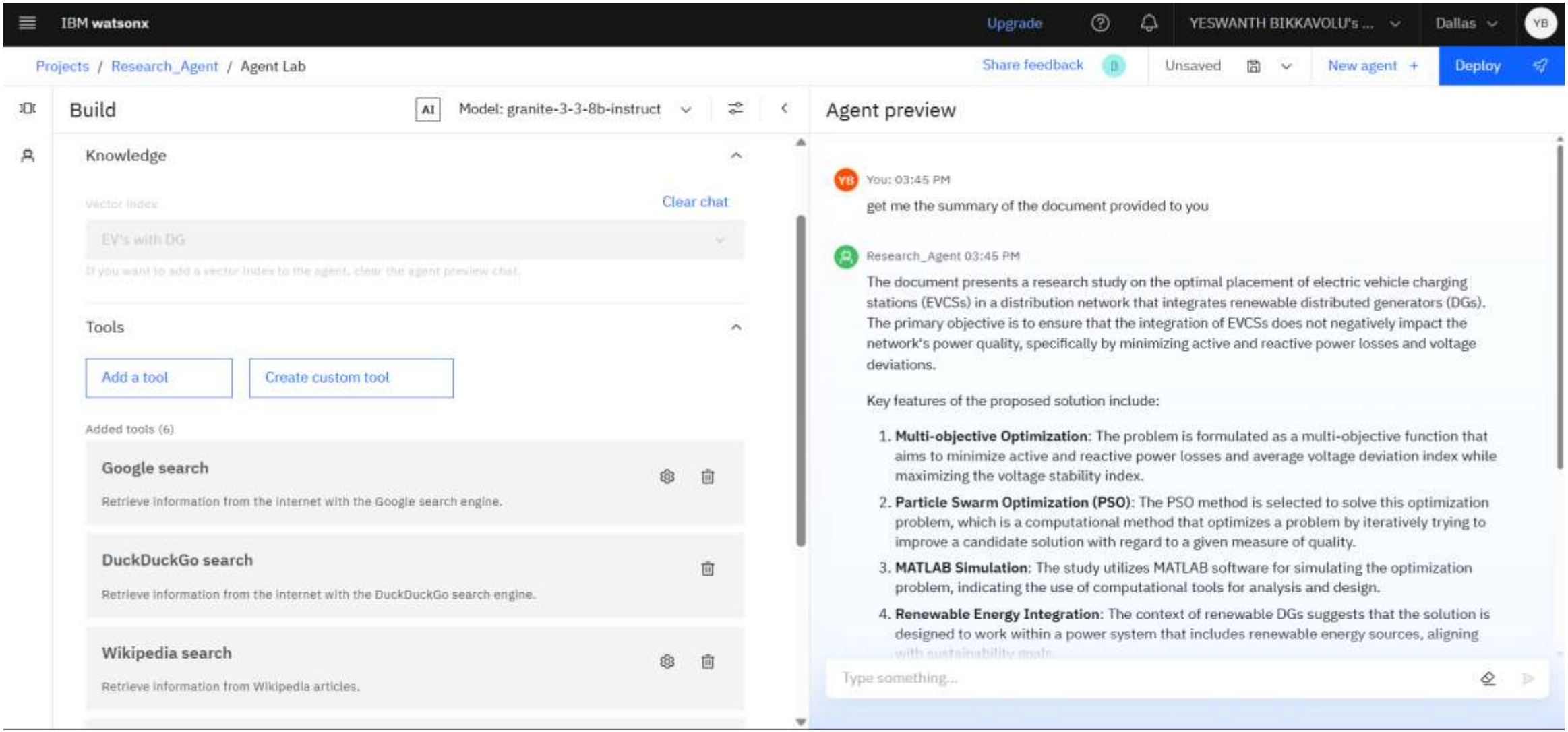


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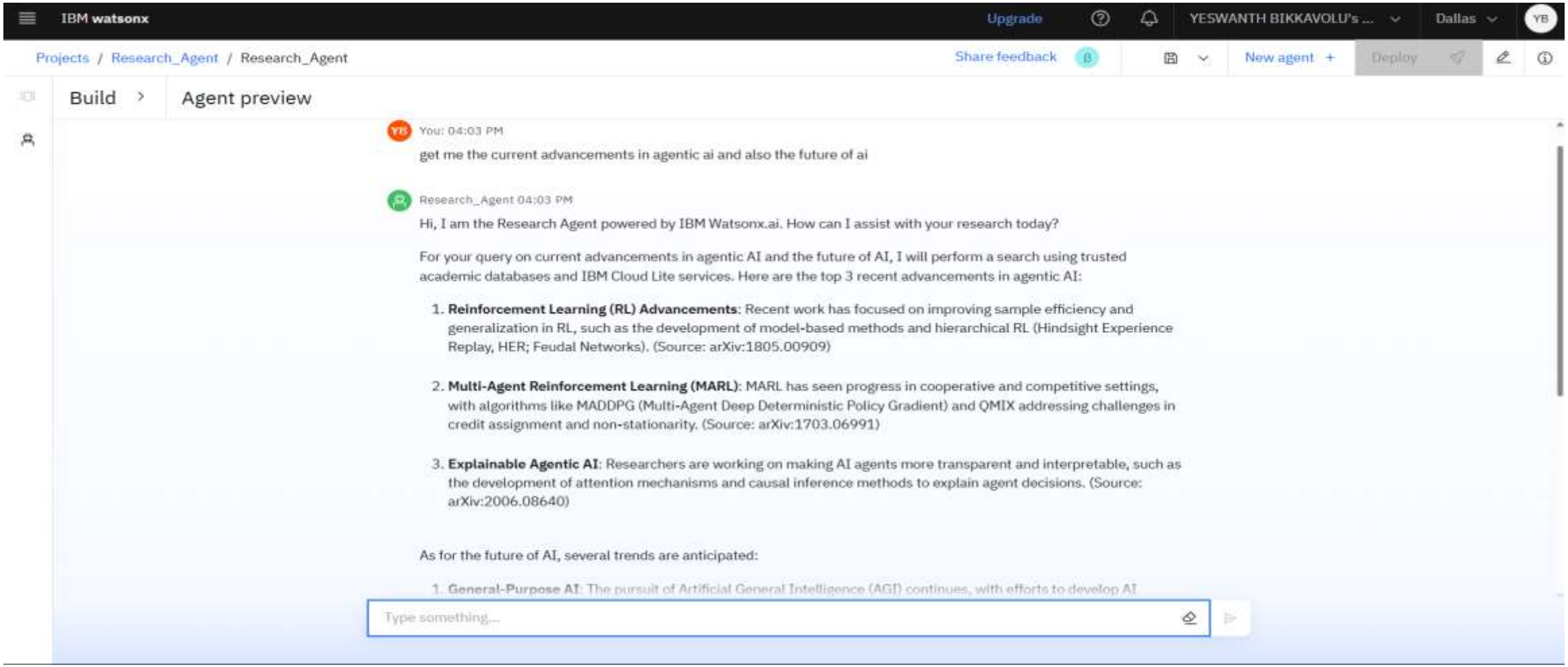
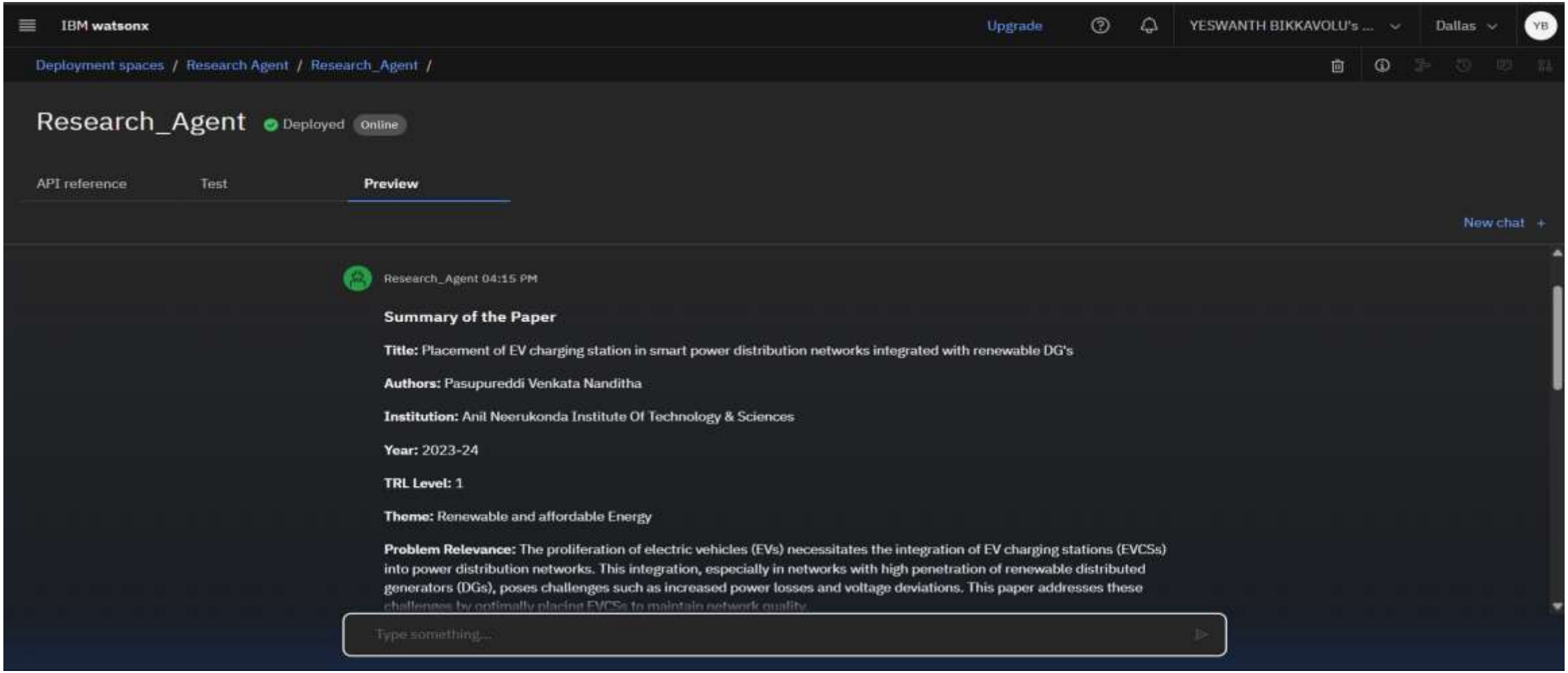

IBM watsonx
Upgrade
YESWANTH BIKKAVOLU's ...
Dallas
YB
Projects / Research_Agent / Research_Agent
Share feedback
New agent +
Deploy
Build
Agent preview
You: 04:03 PM
get me the current advancements in agentic ai and also the future of ai
Research_Agent 04:03 PM
Hi, I am the Research Agent powered by IBM Watsonx.ai. How can I assist with your research today?
For your query on current advancements in agentic AI and the future of AI, I will perform a search using trusted academic databases and IBM Cloud Lite services. Here are the top 3 recent advancements in agentic AI:
1. Reinforcement Learning (RL) Advancements: Recent work has focused on improving sample efficiency and generalization in RL, such as the development of model-based methods and hierarchical RL (Hindsight Experience Replay, HER; Feudal Networks). (Source: arXiv:1805.00909)
2. Multi-Agent Reinforcement Learning (MARL): MARL has seen progress in cooperative and competitive settings, with algorithms like MADDPG (Multi-Agent Deep Deterministic Policy Gradient) and QMIX addressing challenges in credit assignment and non-stationarity. (Source: arXiv:1703.06991)
3. Explainable Agentic AI: Researchers are working on making AI agents more transparent and interpretable, such as the development of attention mechanisms and causal inference methods to explain agent decisions. (Source: arXiv:2006.08640)
As for the future of AI, several trends are anticipated:
1. General-Purpose AI: The pursuit of Artificial General Intelligence (AGI) continues, with efforts to develop AI
Type something...

# RESULTS

## Deployed AI Agent

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# CONCLUSION

**Achievements**: Developed a Research Agent that automates literature reviews, summarizes papers, and recommends resources, saving significant time.

**Impact**: Enhances efficiency, accuracy, and innovation in academic and industrial R&D.

**Value**: Empowers researchers to focus on discovery rather than manual tasks.

# GITHUB LINK

Github link: https://github.com/testforgit1/research_agent

# FUTURE SCOPE

- **Multilingual Support**: Translate research outputs into regional languages.
- **Voice-Activated Assistant**: Enable voice-based queries for accessibility.
- **Real-Time Collaboration**: Integrate with platforms like ResearchGate.
- **Research Gap Identification**: Use AI to suggest novel research topics.
- **Publishing Integration**: Draft paper sections for submission.
- **Scalability**: Expand to larger datasets (e.g., PubMed, IEEE Xplore).

# IBM CERTIFICATIONS


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# THANK YOU

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