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# IBM AICTE PROJECT

## RESEARCH AGENT

**Presented By:**

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**Department : Artificial intelligence and Data science**

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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

Researchers, students, and professionals often struggle to stay updated with the rapidly growing volume of academic publications, technical articles, datasets, and evolving research trends. Manually reviewing, filtering, and synthesizing information across multiple domains is time-consuming and inefficient.

## Proposed Solution:

An AI Research Agent that uses Natural Language Processing (NLP), Retrieval-Augmented Generation (RAG), to assist users in conducting efficient literature reviews, generating summaries, identifying research gaps, and recommending relevant papers, datasets, or collaborators.

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# TECHNOLOGY USED

IBM cloud lite services

Natural Language Processing (NLP)

Retrieval Augmented Generation (RAG)

IBM Granite model

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## IBM CLOUD SERVICES USED

- ☐ IBM Cloud Watsonx AI Studio
- ☐ IBM Cloud Watson.x AI runtime
- ☐ IBM Cloud Agent Lab
- ☐ IBM Granite foundation model

# WOW FACTORS

This agent will significantly reduce research time, improve the quality of literature reviews, help early-stage researchers find direction, and foster interdisciplinary collaboration by making knowledge more accessible and actionable.

Unique features:

Semantic search across research papers, journals, and datasets

Auto-summarization of selected papers

Citation and reference analysis to trace influence

Recommendation of research papers based on a user's current topic

Trend analysis over time for specific keywords or domains.

Collaboration mapping: suggests potential co-authors or institutions based on similar research interests.

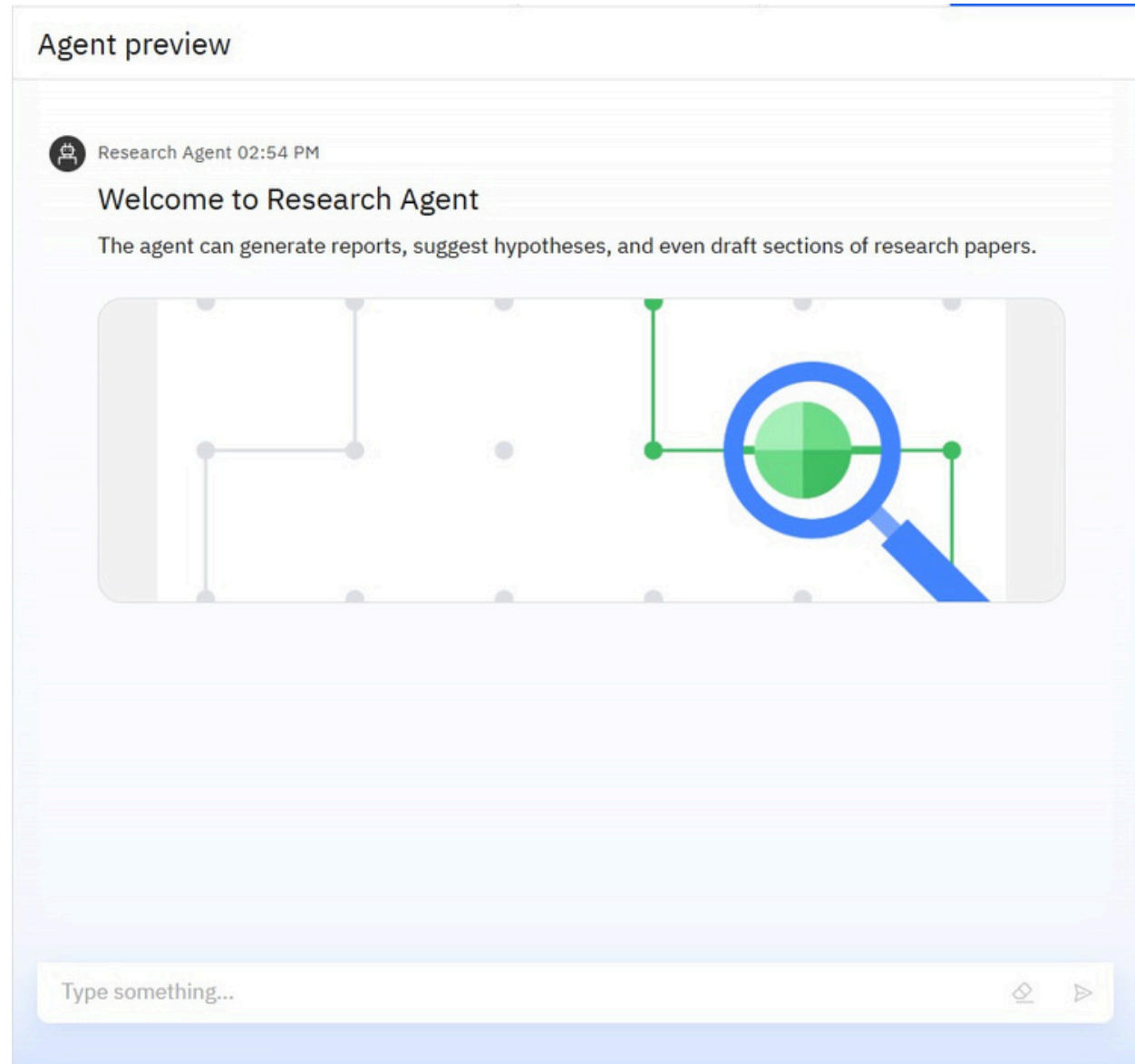
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## END USERS

- ☐ Academic Researchers
- ☐ Research Institutions and Universities
- ☐ Industry R&D Teams
- ☐ Educators

# RESULTS

- Topic:** Introduction to the Research Agent tool.
- Functionality of Research Agent:**
  - Can **generate research reports** based on queries.
  - Can **suggest hypotheses** for research work.
  - Can **draft sections of research papers**, helping in academic writing.
- Purpose:** Helps users streamline research tasks and document preparation.
- Visual Representation:** Shows an illustration symbolizing research and analysis (magnifying glass and connection nodes).





# RESULTS

- Topic:** Recent research articles and news on Artificial Intelligence (AI).
- Sources Mentioned:**
  - MIT News:** Research on identifying and addressing bias in large language models (LLMs).
  - arXiv:** Use of AI agents in research on refugee child mental health.
  - Stanford HAI:** AI advancements improving patient care and expanding research capacity.
  - Journal of Artificial Intelligence Research:** Focus on machine learning, natural language processing, robotics, vision, and AI uncertainty.
  - ScienceDaily:** Study showing quantum computers improving machine learning performance.
  - McKinsey:** AI adoption trends in organizations for better bottom-line impact.
  - Apple Machine Learning Research:** Overview of the latest developments in AI and machine learning.
- Result Type:** A summarized list of recent research updates and publications on AI.

## Agent preview



You: 02:55 PM

Show me recent research on artificial intelligence.



Research Agent 02:55 PM

Here are some recent research articles and news on artificial intelligence:

1. **MIT News:** In a new study, researchers discover the root cause of a type of bias in LLMs, paving the way for more accurate and reliable AI systems. [Read more](#)
2. **arXiv:** Harnessing AI Agents to Advance Research on Refugee Child Mental Health. [Read more](#)
3. **Stanford HAI:** News on how artificial intelligence improves patient care and expands research capacity. [Read more](#)
4. **Journal of Artificial Intelligence Research:** Current Issue on machine learning, natural language, planning and scheduling, robotics and vision, and uncertainty in AI. [Read more](#)
5. **ScienceDaily:** A team of researchers has shown that even small-scale quantum computers can enhance machine learning performance. [Read more](#)
6. **McKinsey:** The latest McKinsey Global Survey on AI finds that organizations are beginning to take steps that drive bottom-line impact. [Read more](#)
7. **Apple Machine Learning Research:** Overview of the latest advancements in machine learning and artificial intelligence. [Read more](#)

Type something...



# RESULTS

- User Request:** Asked for help in writing an introduction for a paper on electric vehicles.
- Research Agent Response:** Provided a list of recent research articles and news related to artificial intelligence (not electric vehicles), including:
  - MIT News:** Discovery of the root cause of bias in large language models (LLMs).
  - arXiv:** Use of AI agents for advancing research on refugee child mental health.
  - Stanford HAI:** How AI improves patient care and expands research capacity.
  - Journal of Artificial Intelligence Research:** Topics include machine learning, NLP, robotics, vision, and uncertainty in AI.
  - ScienceDaily:** Research showing small-scale quantum computers enhancing machine learning performance.
  - McKinsey:** Global survey on AI showing its impact on business outcomes.
  - Apple Machine Learning Research:** Latest advancements in machine learning and AI.
  - Mismatch:** The research results were related to AI, not electric vehicles, which was the user's original request.

## Agent preview



You: 02:56 PM

Help me write an introduction for a paper on electric vehicles.



Research Agent 02:56 PM

Here are some recent research articles and news on artificial intelligence:

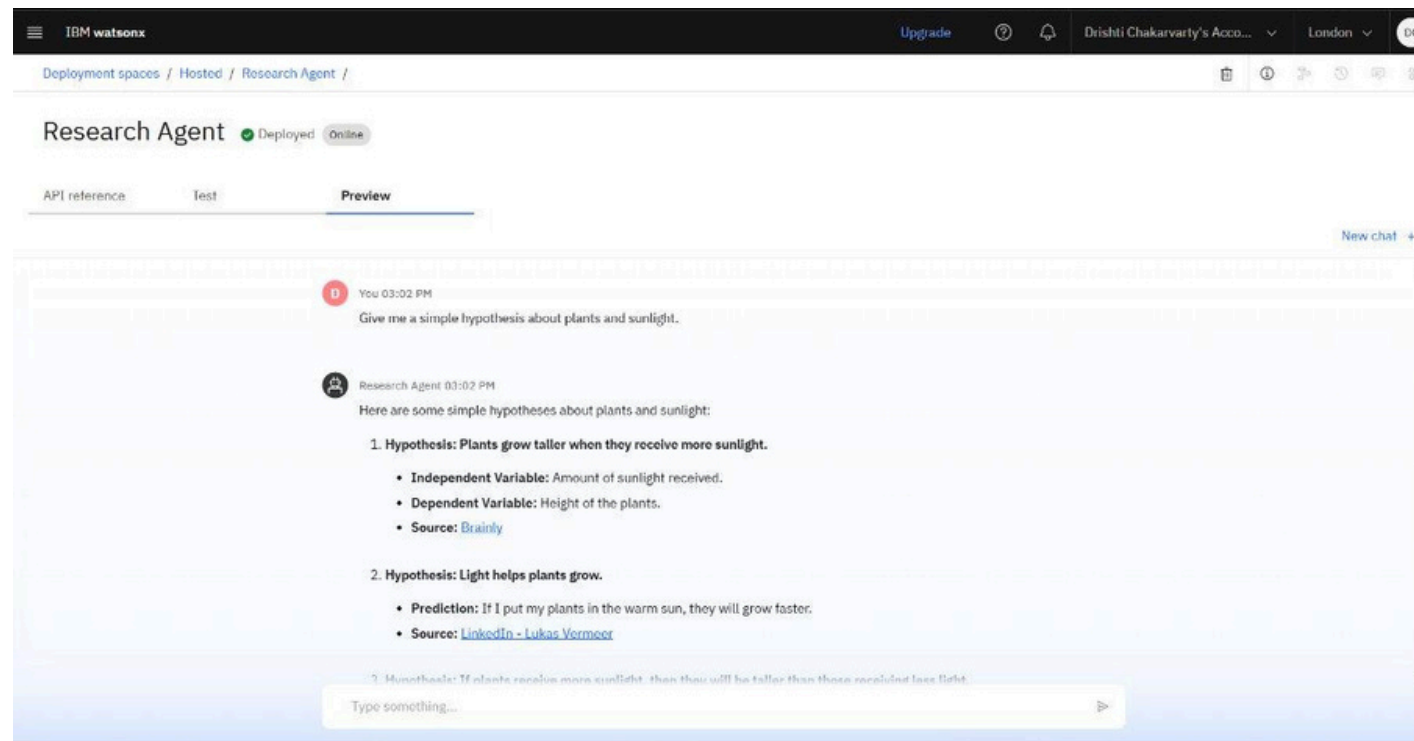
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Type something...



# RESULTS

## Deployed AI Agent



## CONCLUSION

- 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.

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## GITHUB LINK

□ [https://github.com/Sowmya1431/Research\\_agent](https://github.com/Sowmya1431/Research_agent)

# FUTURE SCOPE

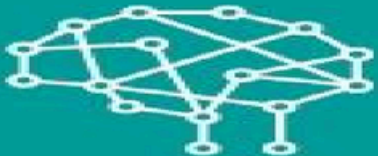
- ☐ Multilingual Research Support
- ☐ Voice-Activated Research Assistant
- ☐ Real-Time Collaboration Features
- ☐ Research Gap and Novel Topic Identification
- ☐ Integration with Publishing Platforms
- ☐ AI-Assisted Paper Drafting

# IBM CERTIFICATIONS

certificate(gettingstartedwith AI)

## Getting Started with Artificial Intelligence

**IBM SkillsBuild**



**IBM**

RAG LAB certificate

IBM **SkillsBuild**

Completion Certificate



This certificate is presented to

Sowmya Mahanthi

for the completion of

**Lab: Retrieval Augmented Generation with  
LangChain**

(ALM-COURSE\_3824998)

According to the Adobe Learning Manager system of record





# THANK YOU