IBM HACKATHON PROJECT

AI-POWERED LATEX DIAGRAM GENERATOR FOR ACADEMIC RESEARCH

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OUTLINE

- Problem Statement
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- Wow factor
- End users
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- Future scope
- IBM Certifications

PROBLEM STATEMENT

- Manual creation of LaTeX TikZ diagrams is:
  - Time-consuming
  - Error-prone
  - Requires specialized coding knowledge
- Researchers struggle with transforming ideas/sketches into professional diagrams
- There is a need for a tool that converts **natural language or rough sketches into LaTeX code** for seamless publication

TECHNOLOGY USED

- **IBM Watson Studio**
- **IBM Granite Models**
- **Other Tools:**
- Python for backend processing

IBM CLOUD SERVICES USED

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

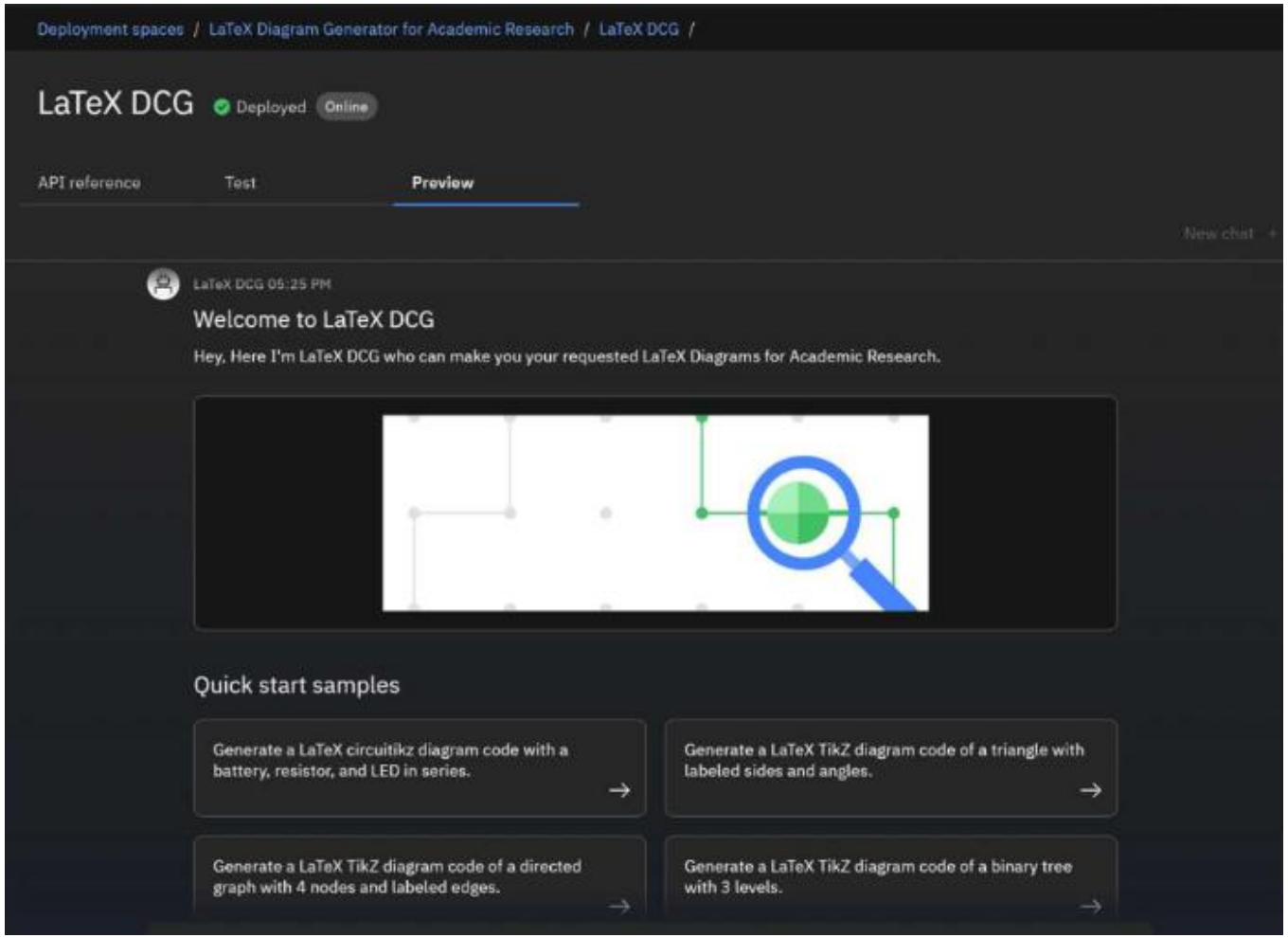
WOW FACTORS

- Converts **natural language or sketches** into TikZ code
- Offers **real-time feedback and refinement** in plain English
- Eliminates LaTeX coding complexity
- Provides **publication-ready, professional diagrams**
- Reduces time and effort spent on academic writing

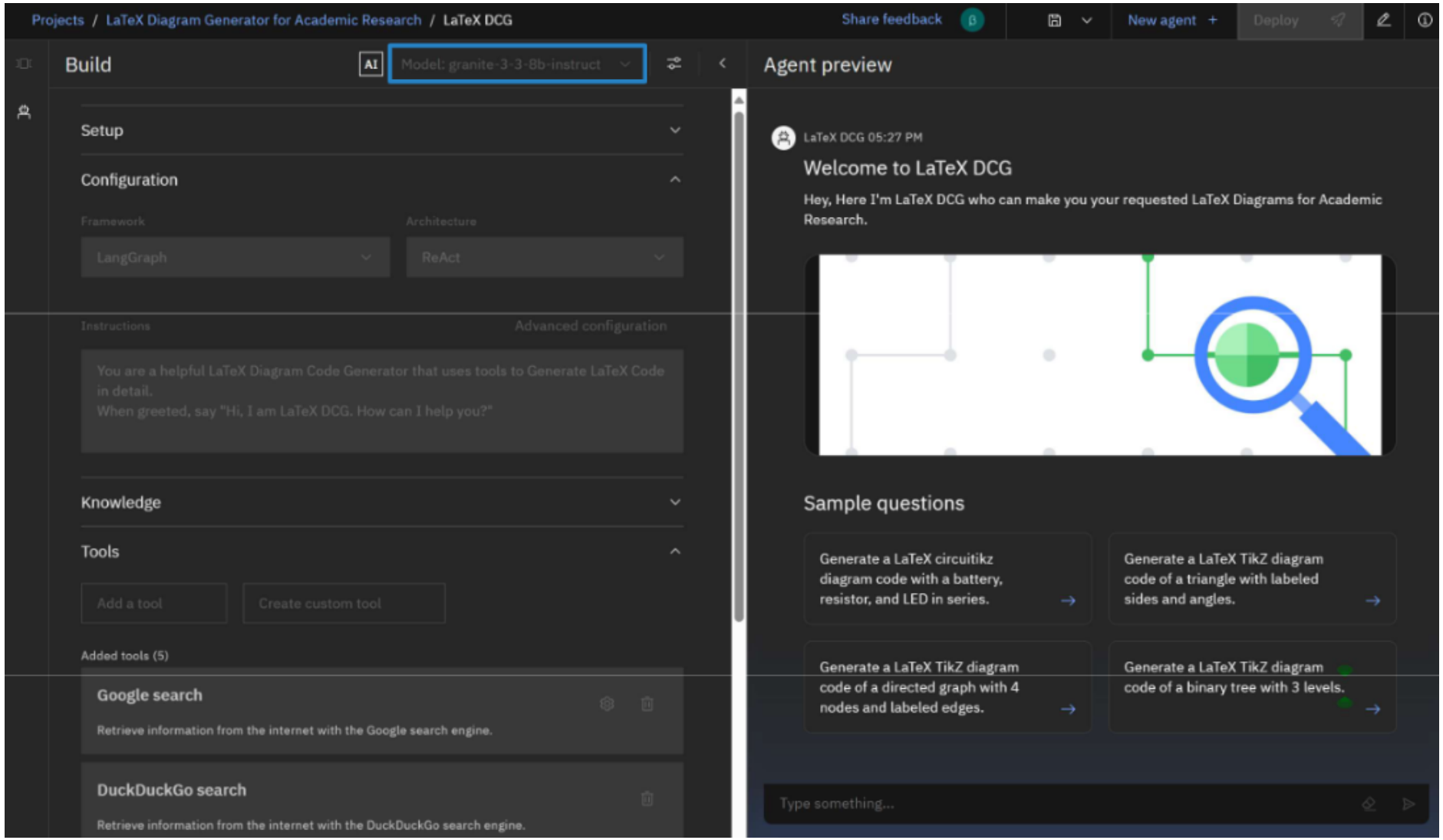
END USERS

- **Primary Users:**
  - Academic researchers and professors
  - PhD scholars
  - Scientific paper writers
- **Secondary Users:**
  - Students using LaTeX for thesis/presentations
  - Technical content creators

RESULTS


Deployment spaces / LaTeX Diagram Generator for Academic Research / LaTeX DCG /
LaTeX DCG
Deployed
Online
API reference
Test
Preview
New chat
LaTeX DCG 05:25 PM
Welcome to LaTeX DCG
Hey, Here I'm LaTeX DCG who can make you your requested LaTeX Diagrams for Academic Research.
Quick start samples
Generate a LaTeX circuitikz diagram code with a battery, resistor, and LED in series.
Generate a LaTeX TikZ diagram code of a triangle with labeled sides and angles.
Generate a LaTeX TikZ diagram code of a directed graph with 4 nodes and labeled edges.
Generate a LaTeX TikZ diagram code of a binary tree with 3 levels.

RESULTS


Projects / LaTeX Diagram Generator for Academic Research / LaTeX DCG
Share feedback
New agent +
Deploy
Build
Model: granite-3-3-8b-instruct
Setup
Configuration
Framework
LangGraph
Architecture
ReAct
Instructions
Advanced configuration
You are a helpful LaTeX Diagram Code Generator that uses tools to Generate LaTeX Code in detail.
When greeted, say "Hi, I am LaTeX DCG. How can I help you?"
Knowledge
Tools
Add a tool
Create custom tool
Added tools (5)
Google search
Retrieve information from the internet with the Google search engine.
DuckDuckGo search
Retrieve information from the internet with the DuckDuckGo search engine.
Agent preview
LaTeX DCG 05:27 PM
Welcome to LaTeX DCG
Hey, Here I'm LaTeX DCG who can make you your requested LaTeX Diagrams for Academic Research.
Sample questions
Generate a LaTeX circuitikz diagram code with a battery, resistor, and LED in series.
Generate a LaTeX TikZ diagram code of a triangle with labeled sides and angles.
Generate a LaTeX TikZ diagram code of a directed graph with 4 nodes and labeled edges.
Generate a LaTeX TikZ diagram code of a binary tree with 3 levels.
Type something...

CONCLUSION

- This project **bridges the gap between ideas and diagrams** for researchers
- Reduces dependency on LaTeX expertise
- Increases productivity and quality of academic writing
- Contributes to AI-assisted research workflows

FUTURE SCOPE

- Extend support for more diagram types: flowcharts, circuit diagrams
- Voice input support
- Integration as a plugin in Overleaf and VS Code
- Support for collaborative diagram generation
- AI model fine-tuning for domain-specific diagrams (Math, Physics, etc.)

IBM CERTIFICATIONS

In recognition of the commitment to achieve professional excellence

Getting Started with Artificial Intelligence

IBM SkillsBuild

IBM

Anisha R

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence

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IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Anisha Rengarajan

for the completion of

Lab: Retrieval Augmented Generation with LangChain

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

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

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THANK YOU

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