

# CAPSTONE PROJECT

## AGENTIC CAREER COUNSELING COMPANION

### Presented By:

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# OUTLINE

- Problem Statement
- Proposed System/Solution
- System Development Approach
- Algorithm & Deployment
- Result (Output Image)
- Conclusion
- Future Scope
- References

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# PROBLEM STATEMENT

Students often struggle to make informed career decisions due to fragmented access to guidance, limited self-awareness of academic strengths, and rapidly evolving industry landscapes. Traditional counseling methods lack personalization and scalability, leading to missed opportunities and career mismatches. The challenge is to develop an intelligent, autonomous agent that continuously monitors student performance, evolving interests, and real-time labor market trends to deliver tailored career pathway suggestions. This would empower students to make confident, future-ready decisions with minimal dependency on manual intervention.

# PROPOSED SOLUTION

- An AI-powered career assistant that:
- Monitors student performance and interests
- Uses labor market data in real-time
- Suggests career paths using IBM Granite and Watsonx
- Offers chatbot/voice-based interaction for career questions

## Key Features

- ◆ Personalized Career Recommendations
- ◆ Real-Time Labor Market Insights
- ◆ Real-Time Labor Market Insights
- ◆ Chatbot/Voice Interface
- ◆ Minimal Manual Dependency

# SYSTEM APPROACH

- **Platform Used:**
  - IBM Cloud Lite
  - IBM Watsonx.ai Studio
- **Technologies:**
  - Granite 3B model (career reasoning)
  - Watson Assistant (chatbot)
  - IBM Cloud Functions (logic layer)
  - Object Storage (student data)
- **Libraries Required**
  - Transformers, ibm Watson, matplotlib

# ALGORITHM & DEPLOYMENT

- Model  
Used Granite-3B / Granite-8B-instruct (from IBM watsonx.ai)
- System Architecture  
Student academic  
Interests (selected via form/chat or extracted from queries)  
Natural language queries (e.g., “What career suits me?”, “What jobs are trending in IT?”)
- Processing:
- Prompt engineered query sent to Granite model LangGraph + ReAct architecture used for multi-step reasoning
- Optional filtering using real-time labor market APIs (e.g., Naukri/LinkedIn Job Trends API)

# RESULT

- ◆ Understand and respond to student queries about careers
- ◆ Analyze academic scores and subject preferences
- ◆ Suggest career paths based on job trends and skill demand
- ◆ Recommend relevant courses, certifications, or degrees
- ◆ Adapt responses for different education levels and regions (e.g., rural vs urban)
- ◆ Maintain a history of past queries and tailor suggestions accordingly
- ◆ Support interaction in simple, local-language style (prompt-tuned)

# RESULT

IBM watsonx

Upgrade ? 🔔 SUDHEER REJETI's Account Toronto SR

Projects / Agent / Agent Lab

Share feedback β Unsaved New agent + Deploy

Build

AI Model: llama-3-3-70b-instruct

- Understanding academic strengths and evolving interests
- Interpreting labor market data and emerging industry trends
- Offering tailored career suggestions and educational pathways
- Explaining reasoning behind recommendations in a clear, supportive tone
- Asking follow-up questions to refine guidance when needed

Knowledge

Tools

Add a tool

Create custom tool

Added tools (3)

Google search

Retrieve information from the internet with the Google search engine.

DuckDuckGo search

Retrieve information from the internet with the DuckDuckGo search engine.

Wikipedia search

Retrieve information from Wikipedia articles.

Agent preview

SR You: 08:36 PM

Hi

watsonx Agent 08:36 PM

Hi, I am watsonx.ai agent. How can I help you?

► How did I get this answer?

SR You: 08:37 PM

Based on my grades and interests in electronics and coding, what career paths should I explore?

watsonx Agent 08:37 PM

Based on your grades and interests in electronics and coding, some potential career paths to explore include:

1. Electrical Engineering: This field involves the design, development, and testing of electrical systems, including electronics, electromagnetism, and electrical power systems.
2. Computer Engineering: This field combines electrical engineering and computer science to design and develop computer hardware and software systems.
3. Software Engineering: This field involves the design, development, and testing of software systems, including programming languages, data structures, and algorithms.
4. Electronics Technician: This field involves the installation, maintenance, and repair of electronic systems, including telecommunications, audio-visual, and medical equipment.

Type something...

edunet  
foundation



# RESULT

IBM watsonx

Projects / Agent / Agent Lab

Build

AI Model: llama-3-3-70b-instruct

LangGraph

ReAct

Instructions

Advanced configuration

- Understanding academic strengths and evolving interests
- Interpreting labor market data and emerging industry trends
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Knowledge

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Retrieve information from Wikipedia articles.

Agent preview

It's important to note that the demand for tech roles and skills can vary depending on the industry, location, and other factors, so it's always a good idea to research the specific job market and required skills for your desired role.

► How did I get this answer?

SR

You: 08:38 PM

Can you help me choose between pursuing a master's in VLSI design or starting a job in IoT development?

watsonx Agent 08:38 PM

Based on the search results, it seems that both VLSI design and IoT development are in-demand fields with good job prospects. However, it's important to consider your personal interests, skills, and career goals when making a decision.

VLSI design involves the creation of integrated circuits and semiconductor devices, which are used in a wide range of applications, including computers, smartphones, and other electronic devices. If you're interested in this field, you may want to consider pursuing a master's degree in VLSI design to gain advanced knowledge and skills.

On the other hand, IoT development involves the design and development of internet-connected devices and systems, which are used in various industries such as healthcare, transportation, and manufacturing. If you're interested in this field, you may want to consider starting a job in IoT development to gain practical experience and build your skills.

Ultimately, the decision between pursuing a master's in VLSI design or starting a job in IoT development depends on your individual circumstances and goals. It's recommended that you research both options thoroughly and consider factors such as job prospects, salary, and personal fulfillment before making a decision.

► How did I get this answer?

🔄

Type something...

# RESULT

The screenshot displays the IBM watsonx Agent Lab interface. The top navigation bar includes the IBM watsonx logo, an 'Upgrade' button, a help icon, a notification bell, the user account 'SUDHEER REJETI's Account', the location 'Toronto', and a profile icon 'SR'. Below the navigation bar, the breadcrumb 'Projects / Agent / Agent Lab' is visible, along with a 'Share feedback' button, a beta badge, an 'Unsaved' status indicator, and buttons for 'New agent +' and 'Deploy'.

The main interface is split into two panels. The left panel, titled 'Build', shows the configuration for an AI agent using the 'Model: llama-3-3-70b-instruct'. It includes a list of instructions for the agent's behavior, such as 'Understanding academic strengths and evolving interests' and 'Offering tailored career suggestions'. Below the instructions are sections for 'Knowledge' and 'Tools'. The 'Tools' section shows three added tools: 'Google search', 'DuckDuckGo search', and 'Wikipedia search', each with a brief description and a trash icon for removal.

The right panel, titled 'Agent preview', shows a conversation history. The user asks, 'What are the top in-demand tech roles in India right now, and what skills do I need to prepare for them?'. The watsonx Agent responds with a list of 10 tech roles: Data Scientist, DevOps Engineer, Cyber Security Specialist, Artificial Intelligence/Machine Learning Engineer, Cloud Computing Professional, Full Stack Developer, Blockchain Developer, Internet of Things (IoT) Developer, Robotics Engineer, and Virtual Reality/Augmented Reality Developer. It also lists the skills required for these roles: programming skills in Python, Java, and C++, and knowledge of data structures and algorithms. At the bottom of the preview panel is a text input field with the placeholder 'Type something...' and a send button.

The URL at the bottom of the browser window is: [https://ca-tor.dai.cloud.ibm.com/wx/agents?context=wx&project\\_id=926238d4-1462-4953-9...](https://ca-tor.dai.cloud.ibm.com/wx/agents?context=wx&project_id=926238d4-1462-4953-9...)

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# CONCLUSION

- Reduces dependency on manual counselors
- Personalized and scalable
- Real-time and future-ready
- Ideal for rural or underserved areas

# FUTURE SCOPE

- **Lack of Personalized Career Guidance**

Most students receive **generic advice** based on limited options or outdated information. They often don't have access to **counselors who understand their individual strengths, interests, or local opportunities**. This is especially true in rural areas, where schools may not even have trained career advisors. As a result, students may choose careers that don't match their skills, personality, or future job market needs.

- **Evolving Job Market & Industry Demands**

The job landscape is **changing rapidly** due to technology, automation, and new industries. Roles like **data scientist, UX designer, or AI engineer** didn't exist a decade ago, yet traditional counseling still focuses on older career paths (like doctor, engineer, teacher). Students need up-to-date insights into **what skills are in demand** and how to prepare for **emerging opportunities** — which is not possible through manual methods alone.

# REFERENCES

- ◆ IBM Granite AI Models – <https://www.ibm.com/granite>
- ◆ IBM Cloud Lite Services – <https://www.ibm.com/cloud/free>
- ◆ IBM Watsonx.ai Studio – <https://www.ibm.com/products/watsonx-ai>
- ◆ IBM Cloud Functions – <https://cloud.ibm.com/functions/>

# IBM CERTIFICATIONS

## ☐ Getting Started With AI:



# IBM CERTIFICATIONS

☐ Journey to cloud:




# IBM CERTIFICATIONS

☐ RAG Lab:

**IBM SkillsBuild**

Completion Certificate



This certificate is presented to

Sudheer Rejeti

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





**THANK YOU**