Agentic Career Counselor: AI-powered Career Guidance System

Using IBM Watsonx & Granite

1. Introduction

Career guidance is a crucial part of academic and professional development, especially for students who are at a crossroad in choosing a career path that aligns with their skills and interests. This project introduces 'CareerBot', an intelligent agent developed using IBM Watsonx and Granite 8x8B models. It is designed to provide personalized, scalable, and accessible career counseling for students.

2. Project Aim

To develop an AI-powered career counseling agent using IBM Watsonx and Granite models that provides personalized, real-time career guidance to students based on their academic background, interests, and evolving job market trends.

3. Problem Statement

Students often lack access to timely, accurate, and personalized career guidance. Traditional counseling methods are limited by human availability and cannot scale to meet the diverse needs of every student. CareerBot solves this problem using AI to deliver instant, reliable guidance based on user input and trusted data sources.

4. Technologies Used

- IBM Watsonx.ai
- Granite 8x8B Model
- Retrieval-Augmented Generation (RAG)
- IBM Cloud Foundry / Code Engine
- React.js (Frontend)
- Node.js / Flask (Backend)
- Python (ML integration)
- IBM Cloudant / Db2 (Database)

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5. System Architecture

The system consists of a user interface built using React.js, backed by APIs developed in Flask or Node.js. These APIs interact with IBM Watsonx.ai and RAG pipeline integrated with the Granite 8x8B model to fetch and generate contextual responses. All data and logs are securely stored in IBM Cloudant or Db2.

6. Features

- Personalized career suggestions
- Multilingual support
- Real-time chatbot interaction
- Certification and course recommendations
- Resume preparation tips
- Career path visualizations

7. Quick Start Questions

- What career options do I have after B.Tech IT?
- Which skills are trending for software jobs?
- Suggest certifications for data science careers.
- How can I prepare for product-based company interviews?

8. User Instructions

1. Open the chatbot interface.
2. Type your career-related question in simple language.
3. Mention your interests or academic background.
4. Receive personalized recommendations and ask follow-up questions.

9. End Users

- College students
- Fresh graduates
- Rural or first-generation learners
- Educational institutions and training centers

10. Backend Logic

The backend applies user inputs to query a RAG-based AI pipeline, combining dynamic search from trusted data sources with the generative abilities of Granite models. It then delivers a context-aware response to the frontend.

11. Implementation on IBM Cloud

The system was deployed using IBM Cloud services including Watsonx, Code Engine for backend deployment, and Cloudant as the database. Watsonx AI governance tools were used to monitor and manage responsible AI use.

12. Evaluation Metrics

User engagement time, recommendation accuracy, relevance of suggestions, and user satisfaction scores were used to evaluate the performance of CareerBot.

13. Challenges Faced

- Designing personalized yet scalable responses
- Handling diverse user input formats
- Ensuring AI-generated answers are contextually accurate
- Deployment & scaling on IBM Cloud

14. Future Scope

- Add voice-based interaction
- Resume analyzer integration
- API integration with LinkedIn and job portals
- Career quizzes and analytics dashboard

15. Conclusion

CareerBot bridges the gap between students and professional counseling by leveraging AI. With its use of Watsonx and Granite, it provides timely, trustworthy, and scalable guidance that empowers students to confidently plan their careers.