CSRBOX – IBM SkillsBuild Applied AI Internship 2025

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Report

Title: CareerLens: An Agentic AI-Powered Career Counsellor

Introduction:

Choosing the right academic stream and career path is one of the most important decisions in a student's life. However, millions of students make these choices without proper guidance due to lack of access to trained counsellors, especially in developing regions. This often leads to poor academic performance, loss of interest, unemployment, or dissatisfaction in later life.

With the advancement of Artificial Intelligence, it is now possible to provide personalized, intelligent, and scalable career guidance to every learner. CareerLens is an Agentic AI-powered career counselling system that interacts with students like a human counsellor, understands their interests, thinking style, and skills, and then recommends suitable academic streams, degrees, and career paths.

The project directly supports **UN Sustainable Development Goal 4 - Quality Education** by ensuring that students receive equitable access to personalized career guidance regardless of their location or background.

Problem Statement:

Most students choose their academic streams and careers based on parental pressure, peer influence, or incomplete information rather than their true interests and abilities. In many schools and colleges, professional career counsellors are unavailable or too expensive, leaving students confused about their future.

This leads to:

- Wrong stream selection (e.g., science instead of commerce or arts)
- High dropout rates
- Skill mismatch with job market
- Unemployment or underemployment
- Loss of confidence and motivation

There is a strong need for an intelligent, affordable and personalized system that can guide students from school to college and beyond by understanding their unique strengths and interests.

Objectives:

The main objectives of CareerLens are:

1. **To provide personalized career guidance** by interacting with students through intelligent AI agents that analyze their interests, personality, and thinking style.
2. **To classify students based on their education stage** (school, senior secondary, college) and provide age-appropriate guidance.
3. **To recommend suitable academic streams, degrees and careers** based on the student's profile rather than generic advice.
4. **To identify skill gaps in college students** and suggest learning paths to help them become job-ready.
5. **To make quality career counselling accessible to all** using AI, thereby contributing to SDG-4 (Quality Education).

Why This Problem?

Choosing the right career is one of the most important and life-changing decisions a student makes, yet most students do not receive proper guidance while making it. In many schools and colleges, especially in developing countries, professional career counsellors are either unavailable, expensive, or limited to a small number of students. As a result, many learners choose their academic streams and careers based on parental pressure, social trends, or incomplete information.

This leads to serious long-term problems such as:

- Students entering fields that do not match their interests or abilities
- Poor academic performance and loss of motivation
- High dropout rates
- Skill mismatch with industry needs
- Unemployment or underemployment after graduation

These problems directly affect the quality of education and future workforce development, making it a critical issue related to **SDG-4: Quality Education**.

By solving this problem, we can help students make informed, interest-based, and skill-based decisions, leading to better learning outcomes, higher employability, and more fulfilled careers. CareerLens addresses this gap by using AI to provide personalized, affordable, and accessible career counselling to every student, regardless of their background or location.

Solution:

CareerLens provides an AI-powered career counselling platform that interacts with students in a conversational manner to understand their interests, thinking style, and academic background. Instead of using fixed questionnaires or generic advice, the system uses multiple intelligent AI agents that work together to analyze a student's profile and generate personalized recommendations.

The solution is designed to work for three types of learners:

- School students (up to 10th class): guided based on curiosity, interests, and thinking style
- Senior secondary students (11th–12th): guided based on subjects, strengths, and career inclination
- College students: guided based on interests, career goals, and current skills

By combining conversational AI with skill-gap analysis, CareerLens ensures that students not only receive a career suggestion but also understand what they need to learn next to reach that goal.

Technical Implementation:

CareerLens is implemented as a **multi-agent AI system** using Applied AI and Agentic AI concepts.

Key Technologies Used

- **Python** for backend logic
- **Google Gemini API** for intelligent language understanding and reasoning
- **Flask** for API-based backend communication
- **Google Colab** for development and testing

Multi-Agent Architecture

The system consists of five AI agents:

1. **User Classification Agent**: classifies the student based on age (school, senior secondary, or college).
2. **Conversation Agent**: asks adaptive questions to understand interests and thinking style.
3. **Personality Analysis Agent**: extracts cognitive traits such as analytical, creative, or logical.
4. **Career Recommendation Agent**: selects the most suitable career based on personality and interests.
5. **Skill Gap Agent**: for college students, identifies missing skills and suggests learning paths.

These agents communicate through structured prompts and outputs, making the system **dynamic and personalized** rather than rule-based.

Prototype Status:

The project has a **fully functional backend** implemented in Python using Flask and Gemini AI. The backend successfully:

- Conducts intelligent multi-turn conversations
- Analyzes personality traits
- Recommends careers
- Performs skill gap analysis

- Suggests relevant courses

However, the **frontend and deployment layer faced technical challenges** due to:

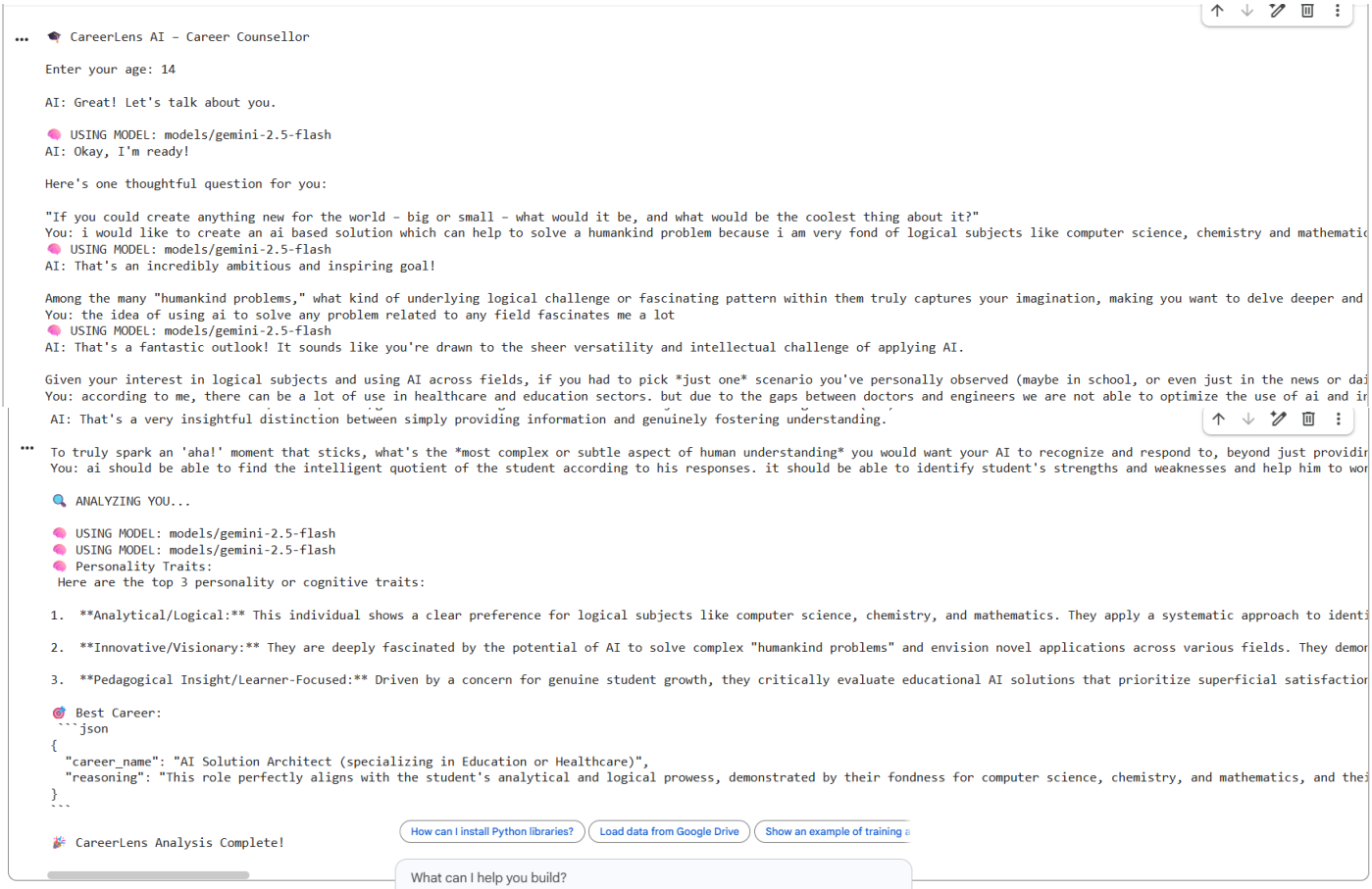
- Cloudflare and ngrok timeout limitations
- Long AI response times
- API rate limits

As a result, while the AI engine works reliably in the backend and command-line chatbot mode, the web-based interface and deployment require further optimization and hosting infrastructure to handle AI response times.

This indicates that the core intelligence of the system is successful and only the presentation and hosting layers need refinement.

Screenshots:

Output 1:



Output 2:

```
🎓 CareerLens AI - Career Counsellor

Enter your age: 22

AI: Great! Let's talk about you.

🧠 USING MODEL: models/gemini-2.5-flash
AI: Hello! To help me understand what might be a good fit for you, could you tell me a bit about any skills you've developed so far, whether from classes, hobbies, or part-time jobs
You: i am presently pursuing M.Tech in AI&DS and have done B.Tech in AI&DS so i have some knowledge about agentic AI . i have made some data analysis projects as well. i also made a
🧠 USING MODEL: models/gemini-2.5-flash
AI: Excellent! With your experience in both data analysis and deep learning, are you leaning more towards roles focused on building predictive models, or perhaps more on developing
You: in my b.tech days i was more inclined towards machine learning and data analysis projects but recently i started learning agentic ai and got fascinated to the concept of agenti
🧠 USING MODEL: models/gemini-2.5-flash
AI: That's a really interesting development! When you say you're fascinated by Agentic AI, are you picturing yourself more on the research and development side of building these age
You: as i am in my M.tech so i have to do some research as well because i like solving problems which are not solved before and also because it is part of my curriculum while if i t
🧠 USING MODEL: models/gemini-2.5-flash
ERROR:tornado.access:503 POST /v1beta/models/gemini-2.5-flash:generateContent?%24alt=json%3Benum-encoding%3Dint (::1) 3152.01ms
AI: That's a fantastic blend of interests! To clarify, do you envision your ideal career path leaning more towards pushing the theoretical boundaries of Agentic AI through research,
You: i want to develop agentic ai projects which can be used in real life and are based on real life applications but these application areas should be the ones which have been not
🧠 USING MODEL: models/gemini-2.5-flash
AI: That's a very specific and exciting niche! When you think about 'under-researched application areas' for Agentic AI, are there any particular industries or types of problems tha
You: i prefer to work more in education and healthcare areas

🔍 ANALYZING YOU...

🧠 USING MODEL: models/gemini-2.5-flash
🧠 USING MODEL: models/gemini-2.5-flash
🧠 Personality Traits:
 Here are the top 3 personality or cognitive traits:

1.  **Innovative:** This individual thrives on exploring uncharted territory and finding novel solutions. They are driven by the desire to tackle unsolved problems and research new

2.  **Impact-driven:** They are motivated to apply their technical skills to create tangible, real-world solutions. Their specific interest in developing Agentic AI projects for edu

3.  **Analytical/Logical:** Evident from their academic background in AI&DS, data analysis, deep learning, and data structures/algorithms, they possess strong analytical and logical

🎯 Best Career:
 ```json
{
  "career_name": "Applied Agentic AI Researcher",
  "reasoning": "This career path perfectly aligns with the student's core traits and interests. They are 'Innovative' and driven to 'tackle unsolved problems' and 'research new appl
}
```

Enter your current skills (comma separated): python, sql, agentic ai, dsa, data analysis
🧠 USING MODEL: models/gemini-2.5-flash
🧠 USING MODEL: models/gemini-2.5-flash

📌 Required Skills: ['Agentic Ai Expertise', 'Deep Learning & Ai/Ml Fundamentals', 'Research Methodology & Design', 'Software Development & Prototyping', 'Problem-Solving & Analytica
❌ Missing Skills: ['Agentic Ai Expertise', 'Deep Learning & Ai/Ml Fundamentals', 'Research Methodology & Design', 'Software Development & Prototyping', 'Problem-Solving & Analytica

📚 Courses to Learn:
 Here are beginner-friendly online course suggestions for each skill, focusing on foundational knowledge and practical introduction:

1. **Agentic AI Expertise**
    *   **Course Title:** LangChain for LLM Application Development
    *   **Platform:** Coursera (via DeepLearning.AI)
    *   *Why it's beginner-friendly:* This course introduces LangChain, a popular framework for building LLM-powered applications, including AI agents. It's practical and hands-on,

2. **Deep Learning & AI/ML Fundamentals**
    *   **Course Title:** Machine Learning Specialization
    *   **Platform:** Coursera (by Andrew Ng, Stanford University)
    *   *Why it's beginner-friendly:* Taught by a pioneer in AI, this specialization is widely regarded as one of the best introductions to machine learning. It starts with core con

3. **Research Methodology & Design**
    *   **Course Title:** Introduction to Research Methods
    *   **Platform:** Coursera (by University of London, SOAS University of London)
    *   *Why it's beginner-friendly:* This course is designed to introduce fundamental concepts of social science research, including different methodologies, ethical considerations

4. **Software Development & Prototyping**
    *   **Course Title:** Python for Everybody Specialization
    *   **Platform:** Coursera (by University of Michigan)
    *   *Why it's beginner-friendly:* This specialization is ideal for absolute beginners. It starts with the basics of Python programming, gradually building up to data structures,

5. **Problem-Solving & Analytical Thinking**
    *   **Course Title:** Creative Problem Solving
    *   **Platform:** Coursera (by University of Minnesota)
    *   *Why it's beginner-friendly:* This course introduces various frameworks and tools for approaching problems creatively and systematically. It moves beyond just logic, encoura

6. **Innovation & Creativity**
    *   **Course Title:** Design Thinking for Innovation
    *   **Platform:** Coursera (by University of Virginia)
    *   *Why it's beginner-friendly:* Design Thinking is a widely recognized methodology for fostering innovation and creativity. This course teaches the core principles - empathize

7. **Impact-Driven Mindset**
    *   **Course Title:** Social Impact: Business Strategies for a Better World
    *   **Platform:** Coursera (by University of Pennsylvania, Wharton)
    *   *Why it's beginner-friendly:* This course helps cultivate an impact-driven mindset by exploring how businesses and individuals can create positive social change. It covers v

🎉 CareerLens Analysis Complete!
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Conclusion:

CareerLens demonstrates how Agentic AI can be used to solve real-world educational challenges by providing personalized career guidance at scale. The system replaces generic counselling with an intelligent, adaptive AI that understands each student individually and guides them toward suitable academic and career paths.

By aligning with SDG-4 (Quality Education), CareerLens has the potential to:

- Reduce wrong career choices
- Improve student satisfaction and success
- Bridge skill gaps
- Support lifelong learning

The project proves that AI can act as a digital career counsellor, making quality guidance accessible to everyone, regardless of their background or location.