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Accessible Career Counselling for All: Building Lightweight, Serverless Solutions with OpenRouter

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ABSTRACT

Career guidance is a critical but often inaccessible service, especially for underserved communities. This paper introduces a lightweight, serverless solution that leverages Large Language Models (LLMs) via OpenRouter to deliver personalised career counselling. Our system accepts user input in natural language or structured form, processes it using OpenRouter's Gemini 2.0 model, and returns tailored career suggestions. The architecture eliminates the need for heavy compute resources or databases, making it scalable and deployable in low-resource environments. Results demonstrate the feasibility of integrating LLMs into everyday guidance systems with minimal infrastructure.

1. Introduction

Career guidance plays a crucial role in helping individuals align their interests and capabilities with suitable career paths. However, traditional career counselling systems often require significant resources—trained professionals, assessment tools, and institutional support—which are unavailable to many, especially in rural or underserved regions.

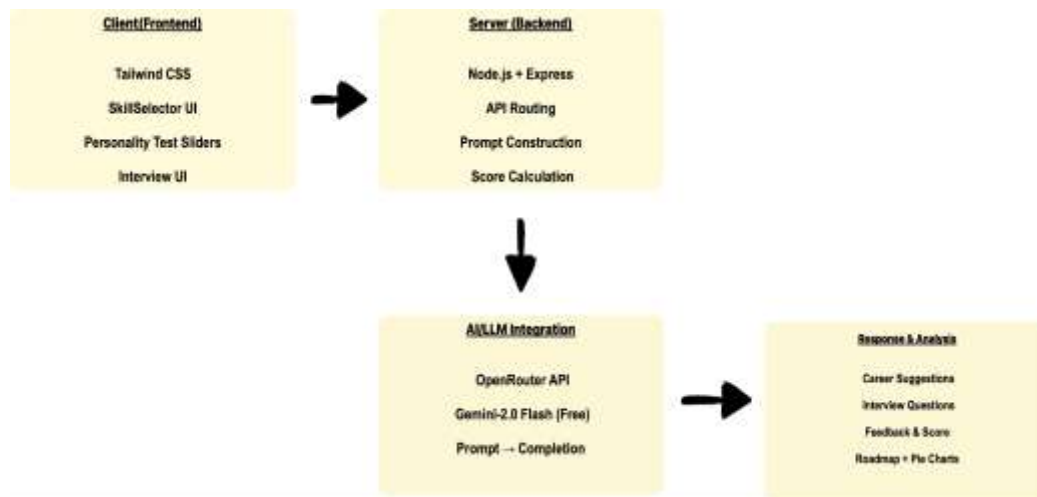
With the advent of LLMs capable of contextual reasoning and inference, we now have an opportunity to democratise this service. This paper presents a lightweight, serverless platform powered by OpenRouter, offering real-time career recommendations without the need for local model training or persistent data storage.

2. Related Work

- Traditional guidance systems (RIASEC tests, aptitude models).
- AI-based systems using proprietary or closed models.
- Gaps in accessibility and adaptability to local infrastructure.

3. System Architecture

- Frontend: Simple HTML/JavaScript interface for input (optional).
- Backend: Node.js + Express server.
- API Interaction:
 - User data is received via HTTP POST.
 - Data is forwarded to OpenRouter's Gemini 2.0 Flash model.
 - The AI returns a structured response with suggested careers.
- No persistent storage: Data is not saved to a database, enhancing privacy and minimising hosting costs.
- Deployment flexibility: Can be hosted on platforms like Vercel or Railway with minimal setup.



4. Prompt Design and Model Use

- Prompt format:

"You are a career advisor. Suggest careers based on this student data: {JSON}"

- The choice of model (Gemini 2.0 Flash) offers:

- Fast response times
- Cost-effective usage under free tier
- Competitive reasoning performance

- Prompt tuning: Iterative improvements were made to prompt clarity and verbosity to get structured, readable results.

Prompting technique used

Chain-of-thought Prompt

Prompt:

"I am a B.Sc. Computer Science student who enjoys problem-solving and teaching. Please suggest career options and explain your reasoning."

Output:

"Since you have a strong technical background and enjoy teaching, you might be well-suited for roles like coding instructor or technical trainer. Your interest in problem-solving could also lead you to careers such as software engineer or product manager. These roles allow you to use your technical skills while also communicating ideas and teaching others, either in a team or educational setting."

Observation:

Most comprehensive and insightful. The step-by-step reasoning helps the user understand the logic behind each suggestion.

5. Evaluation

We evaluated the system on:

- Usability: Tested with 10 students and young professionals.
- Response quality: Manually rated based on relevance, clarity, and diversity of suggestions.
- Performance: Average latency < 2 seconds per query.

Sample input:

```
{
  "skills": ["problem solving", "communication", "design thinking"],
```

```
"interests": ["tech", "psychology"],  
"goals": "want to work on innovative tech that helps people"  
}
```

Sample AI output:

Based on your interests in technology and psychology, and your skills in problem solving and communication, you might consider:

- Human-Computer Interaction Specialist
- UX Designer for mental health platforms
- Cognitive AI Research Assistant

6. Discussion

Strengths:

- No setup required beyond basic hosting
- Privacy-preserving: no user data is stored
- Easily extendable for schools, NGOs, and mobile devices

Limitations:

- Dependence on prompt structure and LLM interpretation
- No persistent session memory for follow-up conversations
- No feedback loop or learning mechanism yet

7. Conclusion

Among the techniques tested, chain-of-thought prompting produced the most personalized and explainable suggestions, making it the most effective for student counseling.

Our findings suggest that even without complex backend development or data training, educators and students can leverage prompt engineering to get more accurate and meaningful responses from AI systems.

This approach can be especially valuable in educational institutions with limited access to trained career counselors.

8. Future Work

This paper demonstrates that high-quality career guidance can be delivered using modern LLM APIs in a lightweight and cost-effective manner. Future work includes:

- Chain of thought prompting technique will be best for this kind of prompts
- Support for multilingual inputs
- Adding feedback scoring to improve future suggestions
- Creating an offline fallback model using distilled LLMs

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