

AI Mentor for Career Guidance Based on Student Profile

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Abstract— Career guidance systems often provide static recommendations that fail to adapt to changing job markets and individual learner profiles. This work presents an AI-assisted Career Mentor platform that combines profile-based analytics with large language model (LLM) augmentation to generate personalized career pathways. The system uses structured user attributes—interests, skills, education level, preferred domains, location, and assessment outcomes—to produce ranked career suggestions, learning resources, and gap-based guidance. A hybrid recommendation pipeline is employed: deterministic local scoring ensures reliability, while optional LLM-based enrichment expands career options and improves contextual relevance. The platform also supports dynamic skill assessments, profile-driven category generation, and mentor-style conversational guidance. By integrating explainable matching logic with AI-generated alternatives and live-trend-aware ranking (when available), the system balances transparency, robustness, and adaptability. The proposed architecture is suitable for students and early professionals seeking data-informed career exploration, and can be extended toward multilingual, region-aware, and labor-market-grounded decision support.

Keywords— AI career mentorship, Career recommendation system, Next.js web application, User onboarding, OTP authentication, Skill assessment, Personalized guidance, Career matching algorithm.

INTRODUCTION

Choosing a career has become increasingly complex due to rapid technological change, interdisciplinary roles, and shifting labor market demand. Traditional guidance methods—manual counseling, static aptitude tests, and generic job lists—often lack personalization, scalability, and real-time relevance. Existing recommendation systems typically struggle with one of two extremes: either they are explainable but rigid, or flexible but opaque.

This research proposes a hybrid Career Mentor system that addresses these limitations through a profile-centric and AI-augmented approach. The platform captures structured user context (interests, skills, educational stage, domain preference, and location), combines it with assessment signals, and computes career fit through transparent scoring. Alongside this, an optional LLM component broadens recommendation diversity and provides context-rich suggestions, enabling users to discover roles beyond fixed catalog boundaries.

The core objective is not only to suggest careers, but to support informed progression through:

- fit-based ranking,
- identified skill gaps,
- recommended pathways and resources,
- conversational mentoring.

The system is designed with graceful degradation: if external AI services are unavailable, local deterministic recommendations remain functional. This design principle improves reliability for real-world deployment while preserving the benefits of AI-assisted personalization.

II. RESEARCH METHODOLOGY

1) Research Design

- Mixed-methods approach combining system design analysis and qualitative evaluation.
- Focus on developing a working prototype, then studying its functionality and potential impact.

2) Data Collection

- Use system logs and demo interactions to collect:
 - user authentication flows
 - onboarding and profile completion
 - assessment results
 - career recommendation outputs
 - chat mentor conversations
- Capture admin statistics for platform usage and user engagement.

3) System Development

- Implement the web application using Next.js with API routes for backend logic.
- Use Prisma ORM for database modeling and persistence.
- Develop modular services for:
 - authentication and OTP
 - career recommendation
 - AI chat mentor
 - profile and assessment management

4) Validation

- Evaluate the system by reviewing:
 - user journey completeness
 - correctness of career suggestions
 - responsiveness of chat interactions
- Compare outcomes against expected functionality and design goals.

5) Analysis

- Analyze system behavior through:
 - workflow mapping
 - architecture review
 - feature coverage
- Identify strengths, limitations, and opportunities for improvement.

6) Ethical Considerations

- Ensure user data privacy by limiting profile and chat storage to necessary fields.
- Consider fairness in recommendations by using transparent career-matching rules.

III. SYSTEM ARCHITECTURE

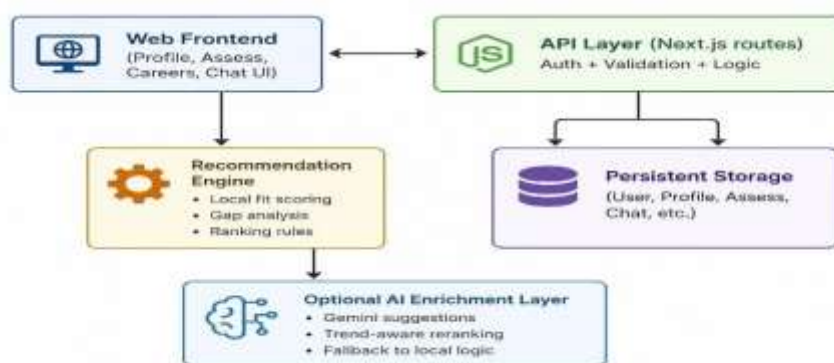


Fig. 1 AI Mentor for Career Guidance

A flowchart represents a mobile application developed for Android devices that focuses on personal safety and security. The system is designed with multiple sections, including user input, data processing, application features, decision-making, GPS usage, and data transmission. These components work together to ensure quick and effective response during emergency situations.

In the user input stage, users are required to enter their email address and password to access the application. Alternatively, the application also allows users to activate emergency features by shaking their phones, making it easier to use in critical situations. The entered information is then processed and verified to ensure authenticity before granting access to the application's features.

The application includes important functionalities such as finding the user's current location using GPS technology. Once the location is identified, the system provides multiple options to the user, such as calling for help, indicating an unsafe situation, or enabling location tracking. These options are part of the decision-making process, allowing users to choose the appropriate action based on their situation.

After the user selects an action, the system uses GPS technology to execute the chosen function. It sends the user's location details to emergency contacts or nearby authorities such as the police. Overall, the flowchart demonstrates how the application enables users to quickly alert relevant authorities and share their location during dangerous situations, ensuring faster assistance and improved safety.

IV. RESULTS AND DISCUSSION



Fig. 2 Login Page

The login page serves as the entry point to the Career Mentor system, allowing users to securely access their accounts using their email and password. It also provides an option for new users to create an account, ensuring easy onboarding. The interface is kept simple and user-friendly to enhance accessibility. Additionally, demo credentials are available for testing purposes, making it convenient for developers or evaluators to explore the system. This page ensures that only authenticated users can access personalized career recommendations and data.

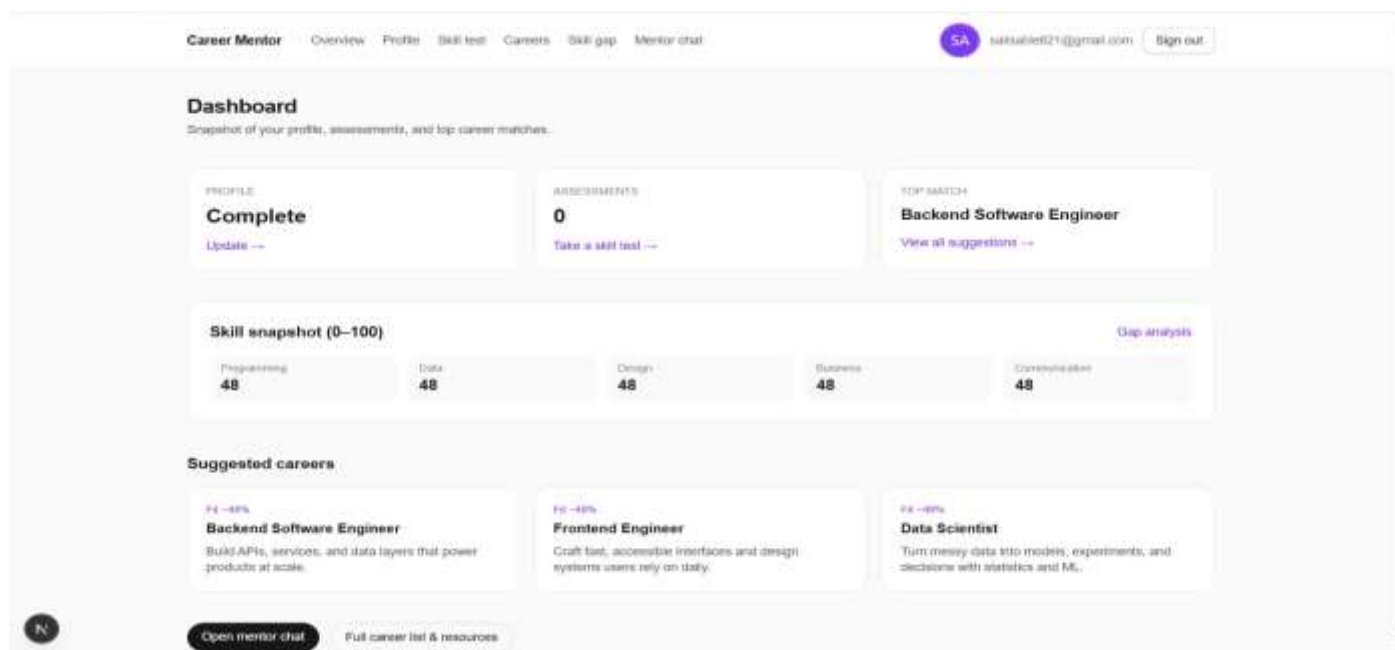


Fig. 3 Dashboard

The dashboard provides a comprehensive overview of the user's progress within the system. It displays important information such as profile completion status, the number of assessments taken, and the top career match based on current data. A skill snapshot section presents the user's abilities across different domains on a scale of 0 to 100. It also highlights suggested careers along with their fit percentages, helping users quickly understand their potential paths. The dashboard acts as a central hub, enabling users to navigate to other features like mentor chat and career resources efficiently.



The profile page collects detailed information about the user, which is essential for generating accurate career recommendations. Users can input their interests, skills, education level, location, and career goals. The system supports flexible input formats, such as multi-select options for interests and text entries for skills. This data forms the foundation of the recommendation engine, allowing it to personalize suggestions based on the user's background and preferences. A well-filled profile improves the quality and relevance of career guidance provided by the system.

Fig. 4 Profile Page

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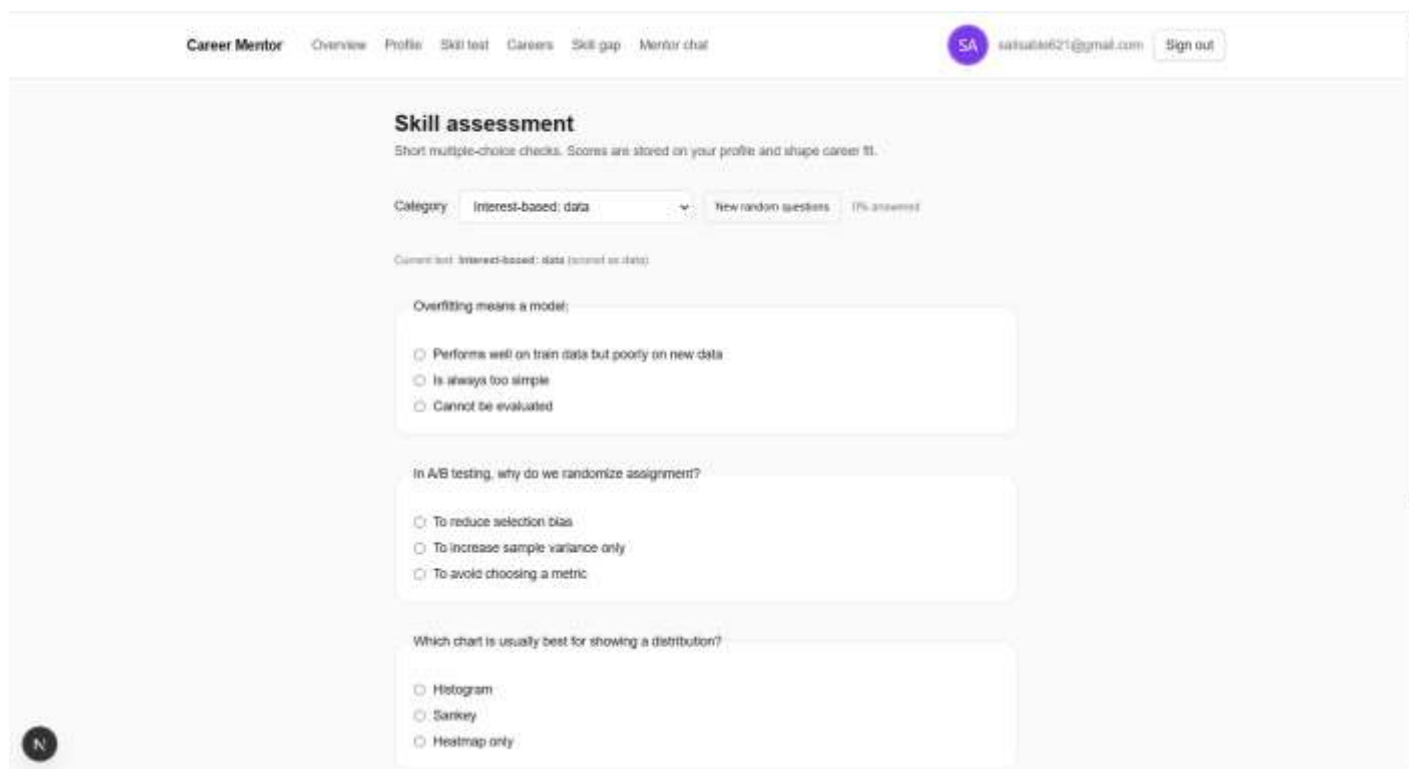


Fig. 5 Skill Assessment

The skill assessment page allows users to evaluate their knowledge through multiple-choice questions. These assessments are categorized based on interests or domains, such as data or programming. The scores obtained are stored and used to refine career recommendations. The system may generate random questions to ensure fairness and variety. This feature helps in identifying the user's strengths and weaknesses, making the recommendations more data-driven and accurate

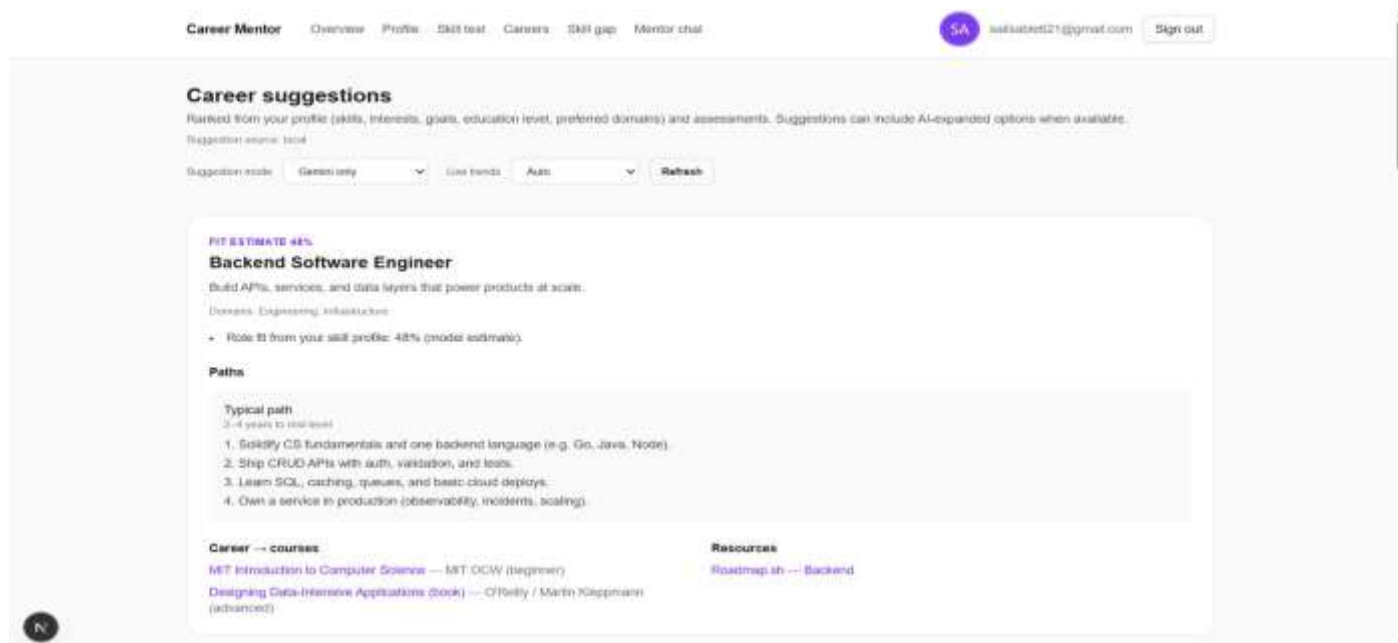


Fig. 6 Career Suggestions Page

The career suggestions page presents a list of recommended career options tailored to the user's profile and assessment results. Each career is ranked based on a fit percentage, indicating how well it matches the user's skills and interests. The page also provides detailed information such as role descriptions, required domains, and explanations for the match. Additionally, it includes structured learning paths, recommended courses, and useful resources to guide users toward achieving their career goals. This makes the system not only suggest careers but also provide actionable steps to reach them.

V. FUTURE SCOPE

- **Labor Market Grounding at Scale**
Integrate verified job-market datasets (government labor stats, job-board trends, salary APIs) for evidence-backed recommendations and demand forecasting.
- **Fine-Grained Regional Intelligence**
Add state/district-specific opportunities, language requirements, local institute mapping, and region-wise career viability scores.
- **Personalized Learning Path Optimization**
Use reinforcement or adaptive planning to generate month-wise, milestone-driven roadmaps based on user progress and assessment deltas.
- **Explainable AI Layer**
Provide confidence intervals, contribution scores per feature (skills, interest, education, etc.), and “why not this career” contrastive explanations.
- **Longitudinal Outcome Tracking**
Measure recommendation effectiveness via user outcomes (course completion, internships, interviews, placements) and continuously refine ranking logic.
- **Multilingual and Accessibility Expansion**
Support Indian regional languages, voice interaction, low-bandwidth modes, and inclusive UX for wider adoption.
- **Institutional Integration**
Build counselor dashboards, cohort-level analytics, and curriculum alignment tools for schools, colleges, and skilling centers.

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