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COAST
JOURNAL OF THE SCHOOL OF SCIENCE
Special Issue 1, September, 2025 ISSN: 2714-3716
Coast, J. Sch. Sci. 7 (2): 1442 - 1451

DEVELOPMENT OF AN ARTIFICIAL INTELLIGENCE-POWERED CAREER SYSTEM

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https://dx.doi.org/10.4314/coast.v7i2.19s

Abstract

The AI-Powered Career System is designed to help students discover suitable career paths based on their interests, skills, and academic background, utilizing artificial intelligence to generate personalized recommendations that align students' potential with real-world opportunities. Many students face uncertainty when making career choices due to limited access to accurate, timely, and customized guidance, while traditional counseling methods often remain manual, generic, and outdated. This system addresses those challenges by offering an intelligent, automated, and interactive platform that adapts to individual user inputs and delivers relevant career suggestions in real time. Developed using PHP for backend logic and standard web technologies such as HTML, CSS, and JavaScript for the frontend, the system integrates the OpenAI API to generate AI-based recommendations based on structured assessment inputs from users. Core modules include user authentication, career assessment, dynamic recommendation generation, and a career exploration interface. The system was tested through simulated user interactions and feedback sessions to evaluate its usability, accuracy, and performance. Results showed that the system consistently provided insightful and personalized career suggestions, with users reporting a smooth navigation experience, fast response times, and high relevance in the AI-generated outcomes. These results indicate that the system enhances user engagement and improves the decision-making process for career planning. In conclusion, the AI-Powered Career System demonstrates that combining PHP with AI technology can create a powerful and scalable tool for modern educational guidance, simplifying career decisions and empowering students with tailored support to pursue fulfilling career paths.

Keywords: Psychometric Analysis, Natural Language Processing (NLP), Scalability, User-centric Design.

Introduction

Career guidance plays a vital role in shaping students' academic and professional futures, especially in low-middle and middle-income countries where traditional counseling systems remain generic, manual, and under-resourced. As Mohammad and Al Saiyd (2024) emphasize, traditional career counseling approaches often rely on static rule-based logic and manual processes, limiting their ability to offer flexible, personalized support for diverse

student needs in a dynamic labor market. Artificial Intelligence (AI) offers a scalable and intelligent alternative by enabling data-driven recommendations tailored to individual users. In particular, Natural Language Processing (NLP) has significantly improved engagement and accessibility in career guidance platforms. Deshpande et al. (2024) demonstrated the effectiveness of NLP-driven chatbots in automating interactions and delivering timely support to users. Recent developments have also embraced cloud-based, modular architectures that support real-time processing and system scalability. Alfadda and Mahmmod (2020) emphasized that such implementations enhance accessibility, making the AI-powered career system more practical for varied educational environments.

This study introduces an AI-powered career system developed using PHP and standard web technologies. It leverages the OpenAI API to generate personalized recommendations based on structured assessments. The platform includes features such as job listing integration, chatbot interaction, feedback modules, and administrator tools for managing bulk emails and newsletters. This study explores how Artificial Intelligence (AI) can automate and scale career guidance using academic and psychometric data. As demonstrated by Nasir, Ghani, and Yusof (2019), personalized e-counseling systems, particularly those incorporating fuzzy logic, can enhance relevance and accessibility. By integrating psychometric analysis, Natural Language Processing (NLP), and AI-driven recommendations, the system addresses critical gaps in vocational support across low-resource settings. As highlighted by Faruque, Khushbu, and Akter (2024), NLP-based models can effectively interpret student profiles to deliver tailored career insights. This approach offers a scalable, automated framework that aligns student potential with labour market demands, thereby supporting lifelong learning and informed decision-making.

Its adaptable, user-focused design and real-time insights make it suitable for diverse educational environments, and the findings provide valuable direction for policymakers and educators seeking to implement inclusive, AI-powered career systems that bridge the gap between education and employability, particularly for students in disadvantaged communities.

Accordingly, this research aims to develop and evaluate an AI-powered career guidance system tailored to educational contexts in low-resource environments. It seeks to examine the effectiveness of artificial intelligence and natural language processing in delivering personalized career recommendations and to assess the system's usability, scalability, and impact on informed decision-making among students and young professionals.

Materials and Methods

The AI-powered career system was developed using a modular, service-oriented architecture, enabling scalability and ease of maintenance. An incremental development model was adopted to facilitate step-by-step integration of core modules, including user assessment, AI-based recommendations, career exploration, and resource linkage. Additional modules for user feedback, newsletter subscription, and admin-managed bulk email distribution were also implemented to enhance communication and support continuous engagement.

To ensure ethical compliance, only minimal user data, specifically full name, email address, and password, was collected during registration. The system does not collect sensitive personal data, and all stored information is secured using standard

encryption protocols. Access to user information is restricted to authorized administrators, and data is used solely for account management. These procedures align with ethical standards for privacy, user autonomy, and responsible data handling in educational technology applications.

Technological Framework

The frontend was built with HTML, CSS, and JavaScript to ensure responsiveness and usability, while PHP handled backend logic and data flow. MySQL was used for structured data storage. The recommendation engine was powered by the OpenAI API, generating personalized career paths based on user profiles. The Jooble API was integrated to retrieve real-time job listings relevant to the recommended careers. Feedback and newsletter functionalities were built as standalone components. The system's design reflects AI-driven approaches to career prediction that have shown promising results in recent studies. Nguyen et al. (2023) demonstrated that decision tree–based ensemble models, such as XGBoost, can significantly improve the accuracy and personalization of career guidance systems. Furthermore, the recommendation logic aligns with established patterns in job recommender systems that emphasize relevance matching and user profiling, as outlined by De Ruijt and Bhulai (2021).

User Profiling and AI Recommendation

A structured questionnaire, guided by the MBTI and Big Five personality frameworks, was used to assess user interests, academic background, and cognitive styles. Responses were processed into profiles, which were then passed to the OpenAI model for career suggestion generation. Rule-based filters validated outputs to ensure alignment with academic qualifications and personality indicators.

The Architectural Design: The architecture illustrates the core components and data flow of the AI-powered career system. It includes user input mechanisms, psychometric data processing, AI-driven recommendation logic, integration with APIs for job and learning resources, and output modules that present results to both users and administrators, as in Figure 1.

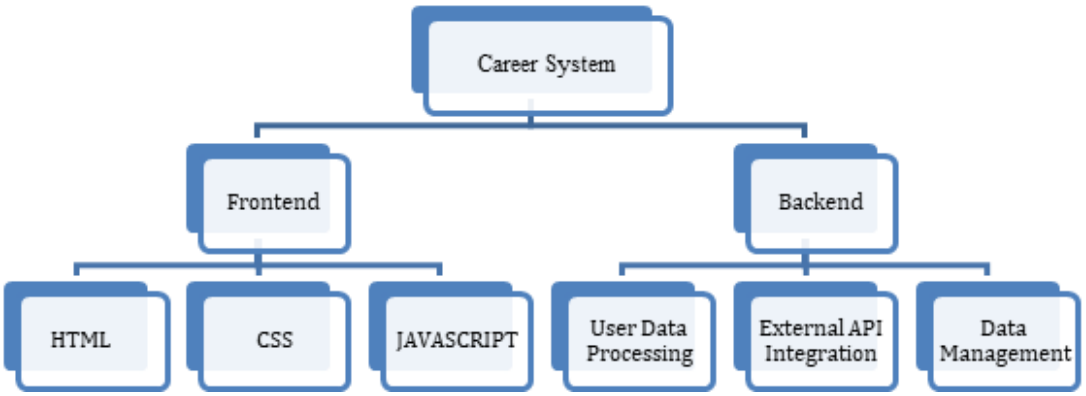

Figure 1: The Architecture

The user flow diagram in Figure 2 illustrates the sequential steps a student undertakes within the system, beginning with secure login and continuing through the psychometric assessment process, AI-driven career recommendation generation, and access to relevant job listings and learning resources tailored to their profile.

Figure 2: The User Flow Diagram

Figure 3: The Admin Flow Diagram

The Admin Flow diagram in Figure 3 highlights the series of processes administrators follow within the system, including managing registered users, accessing, responding to submitted feedback, and composing bulk email updates through the dashboard. It provides a clear overview of the administrative control and communication functions built into the platform.

Implementation

Psychometric evaluation is a key to effective career guidance, helping assess students' aptitudes, interests, personality traits, and cognitive abilities. With AI integration, these assessments have become more dynamic, adaptive, and accurate. AI-driven tools analyze large sets of behavioral data in real time, creating personalized student profiles that go beyond raw scores to include learning styles and motivation. Machine learning enhances reliability by detecting response patterns and adapting questions, while Natural Language Processing (NLP) extracts insights from open-ended answers, such as emotional tone and decision-making style. This adds qualitative depth to traditional assessments. AI also reduces bias through standardized scoring, ensuring fairness across diverse users. Feedback modules allow students to reflect on their results, while administrators can monitor trends and communicate at scale via dashboards and bulk messaging. In this study, psychometric data form the core of intelligent career recommendations, aligning students' strengths and goals with meaningful career paths.

Results and Discussions

The AI-powered career guidance system was

evaluated through a pilot study involving over 50 undergraduate students across different disciplines. The evaluation focused on the system's recommendation accuracy, usability, technical performance, and the impact of its interactive features. Usability tests were conducted with students to evaluate recommendation accuracy, job-course relevance, interface experience, and performance. Feedback and system logs guided improvements. All evaluations followed ethical guidelines with informed user consent. Additional evaluations were conducted to test the responsiveness of the feedback module and the accuracy of newsletter targeting via the bulk email system.

Recommendation Accuracy: Over 80% of participants reported that the system's career suggestions closely matched their interests, academic background, and personality traits. The recommendations were especially relevant for students in science and technology fields, with users commending the clarity and personalization of the results.

User Experience and Interface Design: On a 5-point Likert scale, the system's interface received an average rating of 4.3, indicating strong user satisfaction. Students found the platform intuitive, with a clear structure for assessments and easily understandable outputs. The seamless navigation contributed to a smooth user journey.

Performance and Reliability: The system demonstrated consistent speed and stability, with average processing time for assessments under seven (7) seconds. No downtimes or system crashes were reported during testing, affirming the reliability of its backend structure and API integration.

External Integrations: The Jooble API successfully provided real-time job listings that aligned with users' recommended career paths. This feature added practical value and helped students connect career suggestions with actual labor market opportunities.

Chatbot Assistance: The Elfsight-powered chatbot enhanced interactivity by offering on-demand support during the career exploration process. Users were able to ask questions, clarify recommendations, and explore related career paths in real time.

Feedback: The newly integrated feedback module allowed students to submit comments and improvement suggestions directly through the platform. Over 65% of test participants used this feature, and responses helped refine system performance.

The newsletter subscription tool was also well received, with more than 40 users opting in during the pilot phase. Additionally, the bulk email feature enabled administrators to send platform updates and announcements to all subscribers, ensuring timely and consistent communication.

The user's dashboard in Figure 4 serves as the primary interface for students within the AI-powered career system, providing organized access to essential features including psychometric career assessment, exploration tools, personalized course recommendations, real-time job listings, and a dedicated section for feedback submission.

Figure 5 is an interface that presents students with a structured set of psychometric questions designed to evaluate personality traits, interests, and cognitive preferences. The assessment framework draws from established models, including the Myers-Briggs Type Indicator (MBTI) and Big Five personality dimensions, to generate accurate and personalized career insights.

In Figure 6, this section showcases a curated list of career recommendations generated by Artificial Intelligence, drawing on detailed analysis of each user's psychometric profile, academic performance, interests, and personality indicators. The goal is to provide

tailored guidance that aligns with the user's strengths, values, and long-term professional goals for more informed career decision-making.

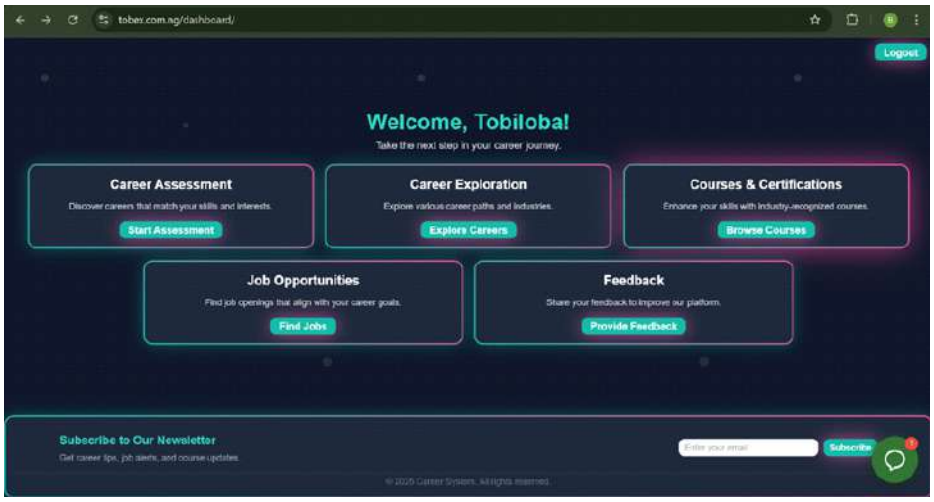

Figure 4: The User's Dashboard

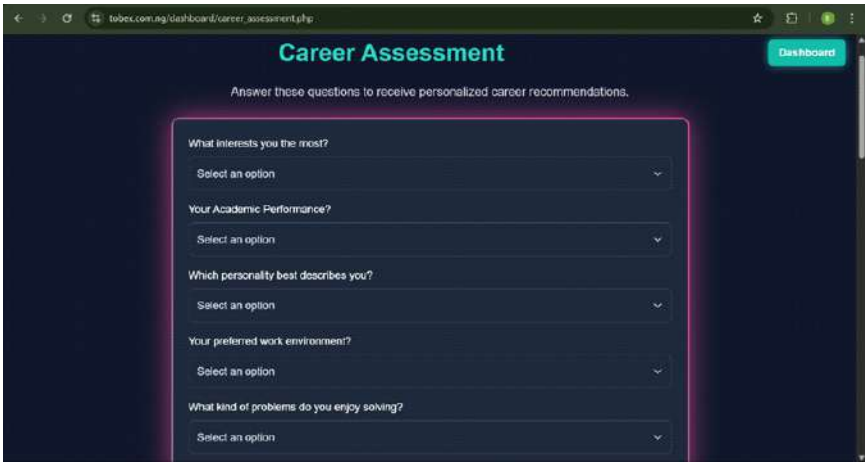

Figure 5: The Framework Interface

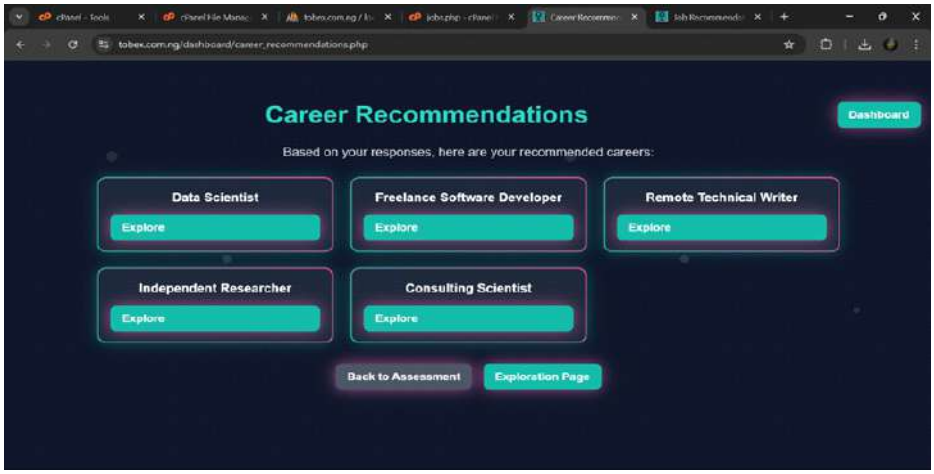

Figure 6: Career Recommendation Page

Figure 7 is a proposed page that fetches real-time job opportunities using external APIs and displays relevant roles that align with the user's recommended career path.

Admin Dashboard: The admin dashboard provides authorized administrators with tools to manage users, review feedback submissions, and send bulk email updates to newsletter subscribers. It supports streamlined oversight and communication within the system effectively. It allows for monitoring total registered users, tracking the number of newsletter subscribers, and reviewing user feedback for continuous platform improvement and communication oversight. In Figure 9, this panel enables administrators to access, review, and respond to feedback submitted by users across the platform. By organizing user input in a centralized interface, it fully supports continuous improvement of system features, enhances user satisfaction, and fosters responsive communication between users

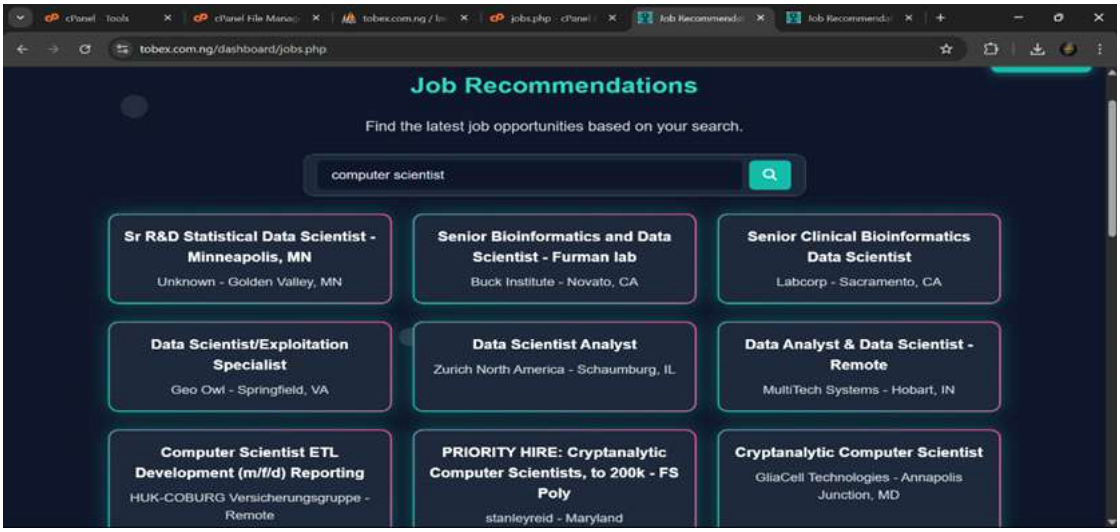

Figure 7: Job Recommendation Page

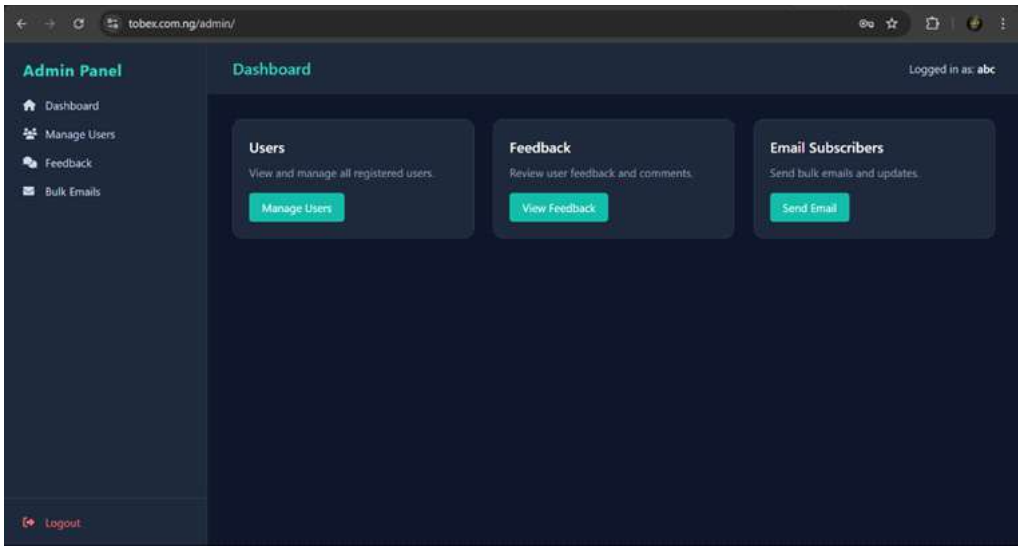

Figure 8: The Admin Dashboard Page

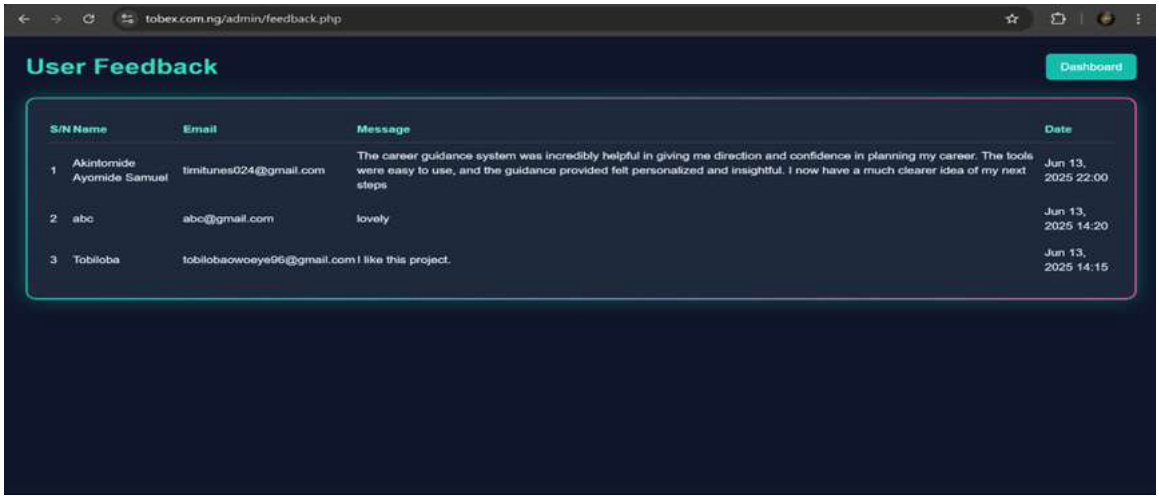

Figure 9: The Feedback Page

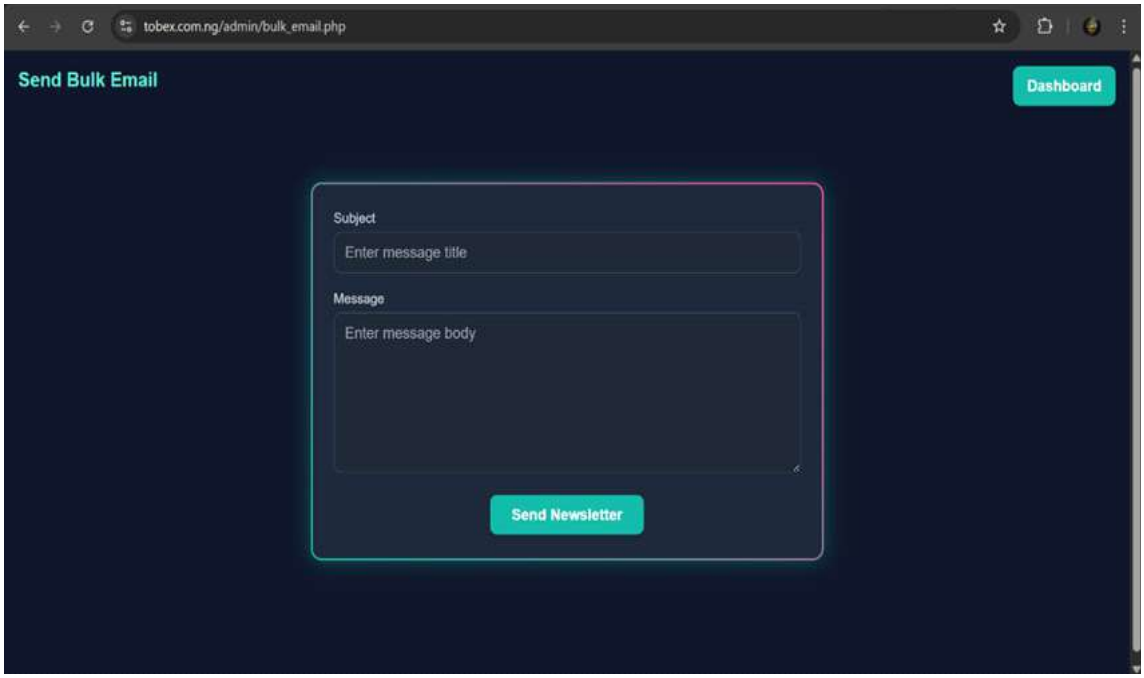

Figure 10: Newsletter Page

In Figure 10, this page provides administrators with a dedicated interface to compose and send bulk newsletters to users subscribed to the platform's mailing list. It streamlines communication, promotes user engagement, and ensures students remain informed about career opportunities, platform updates, and relevant academic resources.

The database schema in Figure 11 is structured to efficiently organize and manage key components of the system, including user registration data, submitted feedback, and newsletter subscriptions. This structured organization ensures the system functions smoothly, enables dependable data retrieval, and allows for future scalability as additional features are implemented.

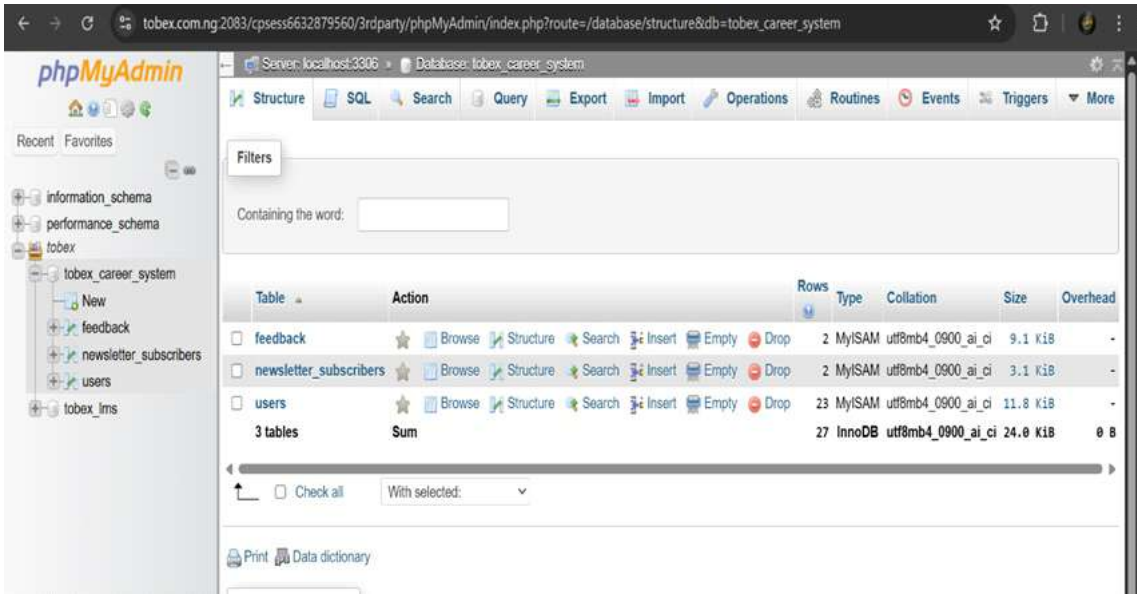

Figure 11: The Database Schema

Conclusion

The AI-powered career system represents a significant advancement at the intersection of education, artificial intelligence, and personalized career development. By integrating psychometric profiling, machine learning, and natural language processing, the system automates and personalizes career assessments, recommendations, and exploration. This reduces the reliance on manual guidance methods while providing students with data-driven insights aligned with their unique profiles and current labor market trends. Beyond its core recommendation engine, the system incorporates essential features such as real-time job listings, personalized learning resources, a feedback module, newsletter subscription, and a bulk email tool for administrators. These tools enhance user engagement, promote continuous system improvement, and facilitate effective communication. Importantly, the system is designed not to replace human advisors, but to augment their efforts by handling routine evaluations and large-scale data analysis. This allows educators and administrators to focus on mentorship and strategic planning. As the system evolves, ethical considerations—such as data privacy, transparency, and fairness—remain central, requiring collaborative oversight from developers, educators, students, and policymakers.

Despite the system's promising capabilities and user-centered design, some limitations remain. While the platform is designed for broad applicability, its real-world performance across diverse institutional contexts and user demographics has yet to be extensively validated. Additionally, the system currently supports only English language interactions, which may affect accessibility in multilingual environments. The integration of third-party APIs, such as OpenAI and Jooble, introduces dependency on external services for critical functionality. Future enhancements should focus on multi-language support, offline accessibility options, the incorporation of localized datasets, and long-term studies to assess their impact and adaptability across varied

educational ecosystems.

In conclusion, the AI-powered career system offers a robust, scalable framework for supporting personalized academic and career guidance, positioning itself as a vital tool in bridging the gap between education and employability in an increasingly complex and digital world.

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