

Using AI to Assist Students in Career Selection Through Self-Assessment

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Abstract—Many students struggle with career decisions at a stage when they are still trying to understand who they are. The abundance of information, conflicting opinions, and newly emerging career paths on the internet often leaves them more confused rather than better informed, and the fear of making the wrong decision can outweigh any insight gained. This paper presents an AI-assisted career counselling system that helps students understand themselves in a straightforward and practical manner. Instead of complex psychological testing, it applies fundamental psychometric concepts, namely the Big Five personality model and the RIASEC interest model, to capture a student's personality and interests through self-assessment. The submitted responses are organised into a numerical profile vector and matched against predefined career profiles through an open, similarity-based decision process, so that suitable career options are suggested without “labelling” the student. The platform is divided into four layers (presentation, application, recommendation, and data) to keep it secure, dependable, and functional when many students use it at once. Testing indicated that the system continued to function and produce accurate output as demand increased. The results show that a simple and functional tool can help young people make more credible and confident career decisions.

Keywords—Career Counselling, Psychometric Assessment, Self-Assessment, Big Five, RIASEC, Recommendation System, Machine Learning

I. INTRODUCTION

Students today have access to more information than any previous generation. Digital learning tools, online platforms, and AI tools offer virtually endless learning opportunities, and within minutes a student can explore courses, career options, and skill sets. At first glance this seems a tremendous benefit; in practice, however, unlimited access to information does not always make decisions easier, and it is often a source of further confusion [1]. Students are expected to make informed career decisions at a relatively young age, often before they know who they are. The internet is full of information about career options, but it cannot help students discover themselves. This gap between self-discovery and external information frequently leads to confusion, peer or parental pressure, and a career path that is not aligned with a student's true skill set.

Choosing a career is one of the most critical decisions a student has to make, because it shapes education, skills, and future professional life. The number of career choices has risen considerably in recent years with the emergence of new sectors, and traditional guidance methods have become less effective as a result. One-to-one sessions remain the standard in career guidance, but they are time-consuming and difficult to provide to a large number of students. Such sessions also depend on the student's ability to express interests and goals effectively, whereas many young people are still developing as individuals and struggle to articulate their actual needs. Counselling

techniques that rely only on human interaction may therefore not always yield the best recommendations [2].

To address these issues, this paper proposes an AI-assisted career counselling system that combines psychometric analysis with automated decision-making. Through self-evaluation questionnaires on personality and interest categories, the system compiles structured data from students. The responses are scored using established psychometric models and mapped to suitable career options through similarity matching, with machine learning planned as an extension (Section V). By adopting a data-driven approach, the system aims to improve scalability and process efficiency while providing a large number of students with reliable guidance customised for each individual.

To support growth and data handling, the system is built as a full-stack web application with a modular, multi-layered architecture. The user interface, application logic, recommendation logic, and data storage each occupy their own layer, so that every component can operate independently and also work seamlessly with the others. This design makes platform changes and maintenance easy. User inputs and test results are stored in a well-organised database, which keeps the system secure, fast, and reliable even when multiple users are active at the same time.

Beyond its technical foundation, the project aims to use technology to help students choose better career paths. The system is intended to act as a guide rather than a decision-maker: it encourages students to reflect on their natural abilities, passions, and inclinations instead of making hurried decisions driven by peer or family pressure. Feedback loops allow students to share their experiences and help improve usability. The ultimate goal is to increase the number of students who can access and benefit from career guidance.

The main contributions of this paper are summarised as follows:

- A layered full-stack career guidance platform that separates presentation, application, recommendation, and data concerns.
- A scoring approach based on the Big Five and RIASEC models that converts self-assessment responses into a single numerical profile vector.
- A transparent, similarity-based recommendation layer that ranks careers by compatibility percentage and explains each suggestion.
- A roadmap towards machine-learning-based recommendation and privacy-aware facial expression analysis.

II. LITERATURE REVIEW

Research on technology-supported career guidance spans learning platforms, psychometric assessment, conversational agents, and AI-based recommendation. This section reviews representative work and identifies the gaps that motivate the proposed system.

The EduMate platform [3] is built on PHP and MySQL and integrates educational materials into a single dashboard using common technologies, which makes administration, grading, and delivery straightforward. Even with its smooth operation, however, it does not adapt to individual students: it lacks tailored feedback loops and intelligent adaptability, so it is ineffective when specific support pathways are required.

The authors of [4] merge DMIT and traditional psychometric assessments into a single guiding model, and a machine learning system uses the collected data to categorise individuals into various job classifications. Integrating both mental and physical characteristics into online platforms appears novel; however, specialist fingerprint scanners are difficult to make equally accessible, growth may stagnate, and costs may increase.

To increase engagement in career counselling, the work in [5] proposes an NLP-driven conversational bot. Instead of static, questionnaire-based interfaces, it analyses dialogue input to identify relevant talents and career domains. Despite a robust interface layer, the system provides little quantitative validation and does not offer labour market statistics.

The effect of psychometric tests on career awareness among students aged 12 to 16 is examined in a descriptive study [2]. Based on 120 surveys, its results show that career counselling and psychometric testing influence students' understanding of their own preferences and career choices, although the regional scope and small sample size prevent broad generalisation.

A cloud-assisted model [6] uses artificial intelligence to guide decisions and relies on interface and function testing to assess performance. Its design is founded on Holland's theory of careers and has solid roots in well-established frameworks, but the absence of real-world feedback over time prevents any conclusive evaluation of its long-term effectiveness. The authors of [7] address the limited awareness that high-school students have of careers in construction by building a static information website with details of job opportunities and prerequisites; their survey indicates that parental guidance influences career choices, but the lack of behavioural outcome evaluation and usability testing limits any assessment of the portal's practical effectiveness.

The availability and cost of conventional career counselling services are examined in [8], which uses PHP and MySQL to create a cloud-hosted, rule-based expert system with modules for course exploration and aptitude testing. A limited examination of user feedback shows it is well received; nonetheless, the absence of real-time interaction and dynamic labour market integration limits its ability to adapt to evolving career circumstances.

Several other studies support and contextualise this research. Deep-learning-based facial emotion recognition [9] provides reference material for future affect-aware modules and for making AI-powered cognitive assistance accessible to students. Big-data and AI approaches to career guidance are covered in [10] and systematically reviewed in [11]. Empirical evidence that digital solutions can improve career adaptability is provided by a pre-post evaluation of an online career planning module for university students [12], while a career counselling and guidance application [13] takes scalability and mobile support into account. Further AI-based systems include a conceptual hybrid neural expert system [14], counselling assistance platforms for college students [15], academic guidance systems based on student profiles and interests [16], and AI-powered career path recommenders [17]–[19]. Broader work on AI in counselling and mental health services [20], [21] examines AI alongside human counsellors, which supports

positioning the proposed system as a guide rather than a replacement for counsellors.

Table 1 summarises the main categories of existing career guidance approaches and their limitations.

TABLE 1

Summary of Existing Career Guidance Approaches and Their Limitations

Approach	Current Practice	Limitations
Traditional career counselling	Students receive guidance directly from a counsellor.	A counsellor has limited time to help many students.
Online career portals	Provide information on "what to become" and some course options.	Information is not personalised to a student's strengths and interests.
Psychometric-based systems	Use psychometric tests to suggest possible career paths.	Results may not adapt when the student's preferences change.
AI-based recommendation systems	Use machine learning to match a student's profile with suitable careers.	Limited data for new users; recommendations lack clarity.
EdTech career platforms	Digital dashboards and online career tools.	Most tools operate in isolation rather than as an integrated, intelligent decision-support system.

In summary, existing approaches are time-limited, generic, static, or opaque. This motivates a personalised, transparent, and scalable platform that grounds its recommendations in measurable compatibility.

III. PROPOSED SYSTEM ARCHITECTURE AND METHODOLOGY

A. AI-Powered Platform for Career Counselling

For students, choosing a career can be a daunting task. Many struggle not because they are unable, but because they lack structured guidance that takes their interests and personalities into account. The proposed AI-based career guidance platform aims to close this gap by delivering intelligent, personalised guidance through a layered technical architecture. Instead of making general recommendations, it combines psychological evaluation models with computational matching methods, so that recommendations are grounded in measurable compatibility rather than speculation. The architecture has four interrelated tiers, namely presentation, application, recommendation, and data (Table 2 and Fig. 1), each with a specific function that adds to the overall efficacy of the process.

TABLE 2
Layers of the Proposed Architecture and Their Responsibilities

Layer	Main Components	Responsibility
Presentation	HTML, CSS, JavaScript	Sign-up, login, test interface, and report display.
Application	Input validation; Big Five and RIASEC scoring	Convert responses into a numerical profile vector.
Recommendation	Career profile vectors; similarity measure	Rank careers by compatibility with the student's profile.
Data	Database	Store responses, scores, profiles, rankings, and reports.

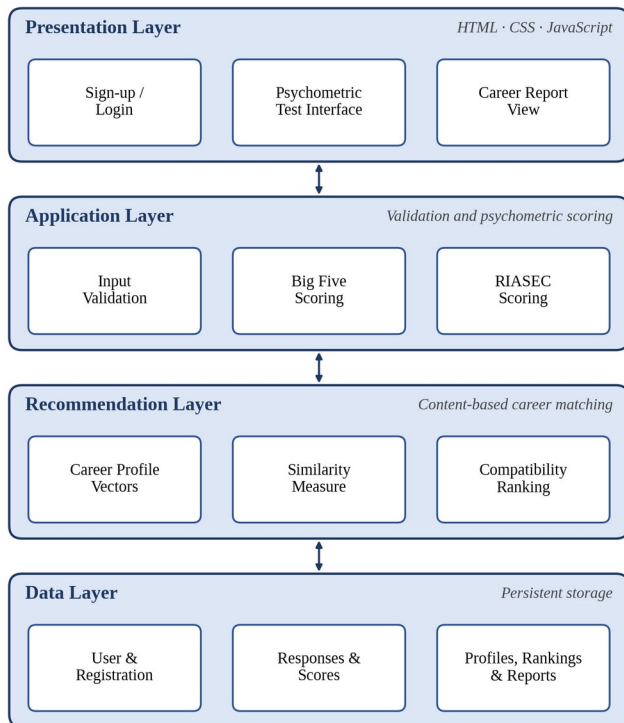


Fig. 1. Layered architecture of the proposed career guidance platform, showing the presentation, application, recommendation, and data layers and their main components.

B. Frontend Presentation Layer

Interaction begins at the screen level, where JavaScript controls actions and verifies live inputs, HTML provides the structure that dictates how elements are positioned, and CSS determines styling such as colour and spacing. Navigation is central to the interface (Fig. 2). A student must first sign up and then log in. After validation, the student takes a structured psychometric test, supplemented by a brain-mapping technique test, which identifies work interests and personality type. The test interface is designed to be simple, user-friendly, and distraction-free, and answers are validated for completeness and correctness before final submission. The resulting career analysis report is easy to read and provides compatibility scores together with explanations. The strategy is to keep the interface simple so that technology does not come between students and the guidance they receive.

Career Guidance Web Application Architecture

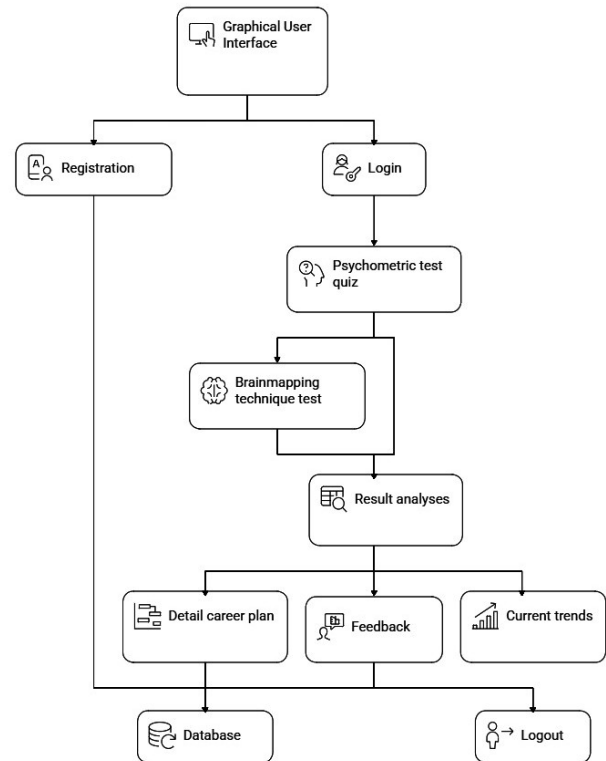


Fig. 2. User interaction flow of the career guidance web application, from registration and login through the psychometric test and result analysis to career plans, feedback, and current trends.

C. Core Processing: The Application Layer

The Application Layer is the key analytical component of the platform. It generates structured psychological insights from unstructured user responses. The first stage gathers and verifies user input, which guarantees that inconsistent or missing responses do not affect the outcome. Two well-known psychometric models are then used for scoring: the Big Five personality model and the RIASEC interest model.

D. The Big Five Personality Model

The system assesses five important aspects of personality:

- **Openness:** being open to new ideas and experiences.
- **Conscientiousness:** paying close attention to detail.
- **Extraversion:** an inclination towards sociability and outgoing behaviour.
- **Agreeableness:** willingness to make concessions and cooperate.
- **Emotional stability:** coherence in emotions.

Each response contributes to a score that reflects the user's preferences in behaviour, and the cumulative scores derived from all responses reflect the user's behavioural inclinations.

E. The RIASEC Interest Model

The system evaluates interest alignment simultaneously across six domains: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. These ratings indicate which kinds of environments and activities the user finds most appealing. After each dimension has been scored, the system combines the Big Five scores $b_1, \dots, b_5$ and the RIASEC scores $r_1, \dots, r_6$ into a single numerical representation, the profile vector given in (1). This vector summarises the user's interests and personality in a form suitable for computational comparison, and at this stage subjective responses are converted into organised, quantifiable data.

(1)

F. The Recommendation Layer

The Recommendation Layer is responsible for intelligently pairing students with careers (Fig. 3). Every career in the system is modelled using predefined personality and interest patterns, represented as career vectors c_k , which capture the characteristics commonly linked with success and satisfaction in that field. The system measures the similarity between the user's profile vector and each career vector, for example using cosine similarity as in (2), and careers that closely match the user's profile receive higher compatibility ratings.

(2)

This is a content-based filtering approach: filtering focuses on the content of the profiles rather than on other users' data, so suggestions are based on an individual's distinctive traits rather than on what is currently fashionable or attractive. Because the career list is arranged by compatibility percentage together with a description, the student can more easily understand why a career is a good fit, which keeps the suggestions logical and easy to comprehend.

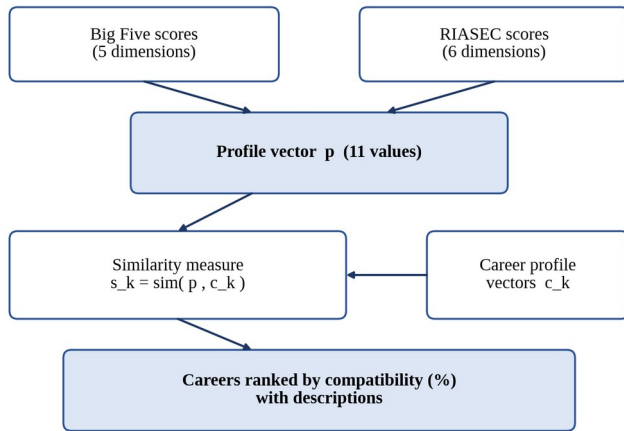


Fig. 3. Profile matching in the recommendation layer: Big Five and RIASEC scores form a profile vector, which is compared with career vectors to produce a ranked list of careers.

G. Data Layer

The database layer handles and stores data and supports the entire system. It maintains:

- responses to tests;
- user registration details;
- interest and personality ratings;

- vectors used to create profiles;
- rankings of suggested careers; and
- the most recent reports.

Because data is stored securely, users can review previous outcomes whenever they choose rather than starting from scratch. The division of functions into layers also makes it easier to integrate more sophisticated algorithms or real-time tracking later on.

H. System Workflow

The system follows a systematic process (Fig. 4): user interaction, user verification, scoring of the psychometric test, profile creation, job matching, ranking of compatibility, report generation, and safe storage. To ensure accuracy and consistency in the end result, each step builds upon the one that came before it.

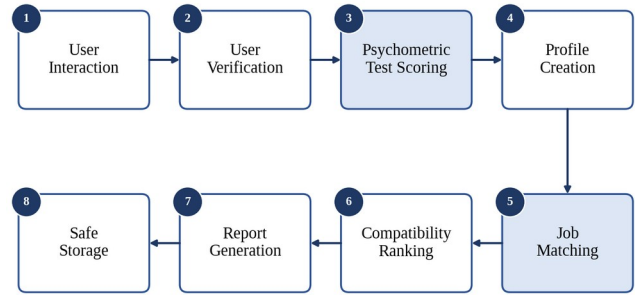


Fig. 4. End-to-end workflow of the proposed system, from user interaction to safe storage of results.

I. Architectural Significance

The effectiveness of this approach depends on how well psychology and technology are integrated. For career guidance it is more dependable than arbitrary recommendations or a simple form submission, because it considers the complexity of human nature and employs computational methods to deliver useful results. By combining vector-based similarity with validated psychological models [6], [22], the platform provides a systematic yet approachable technique for choosing a profession. Its layered structure offers:

- clearly defined roles and responsibilities;
- ease of improvement and maintenance;
- scalability for larger datasets; and
- openness in how recommendations are justified.

As opposed to popular or easily accessible jobs, the ultimate goal of the system is to assist students in choosing careers that better fit their personalities.

IV. RESULTS AND DISCUSSION

The current version of the proposed career counselling platform uses structured questionnaires and pre-established scoring criteria to provide recommendations. Fig. 5 shows the student dashboard, which offers navigation to appointments, test options, field guidance, counselling, and counsellors, together with a progress indicator and profile-completion status, and prompts the student to complete the profile to start the test. Testing indicated that the platform continued to function and to produce accurate output as demand increased.

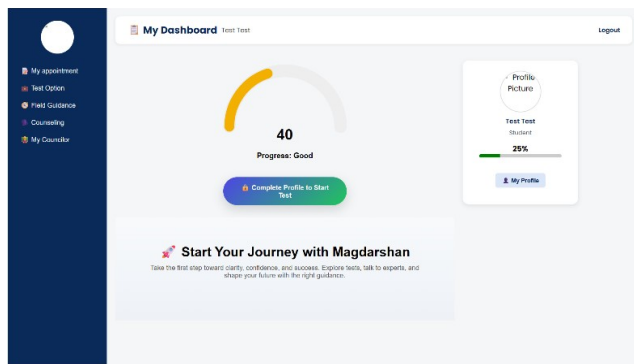


Fig. 5. Student dashboard of the Margdarshan career guidance platform, showing navigation, progress indicator, profile completion, and the prompt to start the assessment.

After the assessment, the platform generates a career guidance report (Fig. 6). The report presents the student's details and recorded responses, a RIASEC snapshot, personality-type scores, recommended career paths (for example, Research Scientist, Creative Designer/Architect, and Educator/Counselor), skills to improve (critical thinking, public management, and networking), and a concluding summary.

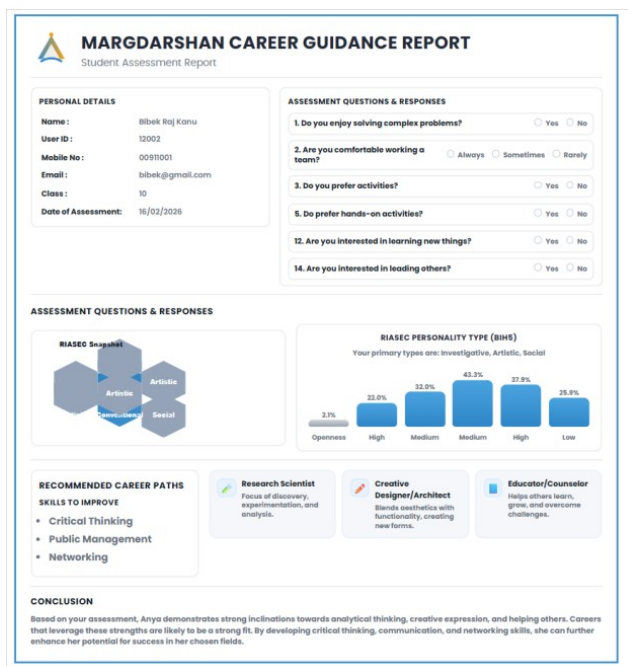


Fig. 6. Sample career guidance report generated by the platform.

A. Discussion and Limitations

Although the rule-based scoring procedure provides a systematic and transparent evaluation, it cannot accurately reflect how students behave during assessments. Overthinking, hesitancy, or temporary stress can influence responses and slightly change the outcome. Future development therefore aims to improve the flexibility and responsiveness of the platform rather than relying only on fixed rules.

V. FUTURE SCOPE

The proposed system currently uses a rule-based scoring mechanism together with supervised questionnaires. Although this is simple and

provides a rigorous testing methodology, it is not always indicative of how students act during tests: students who second-guess themselves, overanalyse, or are stressed may respond differently and obtain marginally different scores. Rather than fitting students to a fixed set of rules, future implementations will make the system more reactive.

We plan to implement a machine-learning-based recommendation engine. Traditional algorithms such as Random Forest, Gradient Boosting, or Neural Networks can learn from structured student data, including grades, interest scores, aptitude test results, and skills, instead of linking scores through predefined relationships. By identifying patterns in this data and making predictions from it, the engine can provide more personalised career suggestions.

We can also add a facial expression analysis module based on a CNN architecture such as MobileNet or ResNet, building on facial emotion recognition research [9]. This component would monitor engagement-related patterns throughout the assessment. Facial expression analysis would supplement the questionnaire results rather than replace them, and a fusion algorithm would combine both sources of data to create contextually aware suggestions. To limit unnecessary data collection and maintain privacy, analysis should be performed on-device whenever possible, and additional measures such as limited data retention and encrypted transmission will be enforced to secure user data.

Most career counselling websites in use today are built on rule-based systems and fixed questionnaires; they remain static throughout the test and can only generate fixed output from the reported information. In contrast, the proposed platform incorporates a validation layer to improve recommendation reliability, integrates multimodal inputs rather than depending on a single evaluation source, and introduces an adaptive learning model that changes with data. Unlike conventional methods, the system seeks to offer more contextually aware, data-driven, and flexible career counselling.

VI. CONCLUSION

This paper presented an AI-assisted career counselling platform that helps students reflect on their personality and interests through structured self-assessment. Using the Big Five and RIASEC models, the platform converts a student's responses into a profile vector, matches it against career profiles, and presents ranked, explainable recommendations. Its layered full-stack architecture is designed to remain secure, reliable, and usable when many students access it simultaneously. Although the current rule-based scoring is transparent, it cannot fully capture how students behave during assessments; the planned machine-learning recommendation engine and privacy-aware facial expression analysis aim to make the system more adaptive. Overall, the work shows that a simple and functional tool can help students make more informed and confident career decisions by acting as a guide rather than a decision-maker.

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