www.ijprems.com
editor@ijprems.com

INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)
(Int Peer Reviewed Journal)
Vol. 05, Issue 11, November 2025, pp : 1792-1797

e-ISSN : 2583-1062
Impact Factor : 7.001

AI POWERED CAREER GUIDANCE

Mrs. N.G. Dharaniya[1], Vishnu V[2], Aathipureesuwaranathan P[3], Visweswaran MN[4], Sreesaran K[5]

[1]Assisstant Professor, Department Of Information Technology, Sri Shakthi Institute Of Engineering And Technology, Coimbatore, Tamil Nadu, India.

[2,3,4,5]Second Year B.Tech IT ,Sri Shakthi Institute Of Engineering And Technology, Coimbatore, Tamil Nadu, India

ABSTRACT

The rapid expansion of modern technology fields has made career selection increasingly complex for students and professionals, creating a strong need for accurate, adaptive, and accessible guidance systems. This study presents an AI-powered career guidance platform designed to evaluate user preferences and technical inclinations through a structured questionnaire integrated with dynamic, user-generated questions. The system utilizes a keyword-based semantic scoring model to analyze responses and classify users into suitable career domains such as Artificial Intelligence, Machine Learning, Cybersecurity, Data Science, Cloud Computing, Full Stack Development, and other emerging fields. Firebase is incorporated for secure backend data storage, ensuring scalability and real-time accessibility. The analysis combines predefined domain indicators with user-selected options to generate a personalized career recommendation. Results demonstrate that the system effectively interprets user tendencies and delivers domain-specific suggestions with improved accuracy compared to traditional static assessments. The study concludes that AI-assisted evaluation significantly enhances the quality of career guidance by offering a personalized, flexible, and reliable assessment process adaptable across educational institutions and training environments.

Keywords: Career Guidance, Artificial Intelligence, Semantic Analysis, Firebase, Skill Assessment, Recommendation System.

1. INTRODUCTION

Choosing an appropriate career path has become increasingly challenging in today's fast-evolving technological landscape. Students and young professionals often struggle to make informed decisions due to limited awareness of emerging fields, rapidly changing industry expectations, and the absence of personalized guidance. With domains such as Artificial Intelligence, Machine Learning, Data Science, Cybersecurity, Cloud Computing, Full-Stack Development, AR/VR, and Robotics growing at an unprecedented pace, traditional career counseling approaches are no longer sufficient. These conventional methods typically rely on fixed questionnaires and generalized assessments that fail to capture an individual's unique strengths, interests, and cognitive preferences. As a result, many learners end up choosing careers based on peer influence, social pressure, or incomplete information, which can ultimately lead to dissatisfaction and misalignment between skills and job roles.

Current research in educational technology emphasizes the need for intelligent, adaptive, and data-driven systems that can provide meaningful and personalized career recommendations. Studies highlight that most existing digital guidance tools lack dynamic question customization, semantic analysis, or fine-grained classification of user interests across modern technology domains. Many tools produce vague or broad results because they do not integrate AI-based evaluation techniques. Furthermore, several available platforms depend heavily on cloud servers or complex backend systems, making them costly to implement and less accessible to institutions with limited resources.

In response to these challenges, AI-powered career assessment systems have emerged as a promising solution. These systems use intelligent algorithms, keyword-based analysis, and structured decision models to interpret user responses and generate personalized guidance. However, many of the existing AI-enabled tools still lack flexibility, customizability, and portability, reducing their practical usability in diverse academic settings.

The present work introduces a lightweight yet powerful AI-driven career guidance system designed to address these limitations. The system combines dynamic questionnaires, intelligent scoring mechanisms, and a browser-based execution model to recommend suitable career domains based on user preferences and response patterns. With optional Firebase integration for secure data storage and enhanced functionality, the system ensures accessibility, adaptability, and ease of deployment. This research contributes to the broader field of educational technology by

presenting a scalable and user-centric solution capable of supporting students, institutions, and training programs in making informed, data-supported career decisions.

2. METHODOLOGY

The methodology adopted for the AI Powered Career Guidance system involves a structured and analytical approach that integrates artificial intelligence techniques, semantic scoring, and user-driven questionnaire design. The process begins with the collection and organization of predefined questions representing major technology domains such as Artificial Intelligence, Machine Learning, Cloud Computing, Cybersecurity, Full Stack Development, Data Science, and related fields. To enhance flexibility, the system allows users or administrators to create custom questions that reflect specific learning paths or academic requirements. These questions and user responses are securely stored using Firebase, enabling real-time synchronization, data persistence, and multi-device accessibility.

A semantic keyword-based scoring model is applied to analyze the options selected by users. Each option is matched with domain-specific keywords, and scores are incremented accordingly. This ensures that the AI system interprets user preferences with higher accuracy compared to static numerical scoring. The system then aggregates the scores and identifies the domain with the highest score. Finally, a personalized recommendation is generated, explaining the user's most suitable career path based on their choices, interests, and technical inclination. The overall methodology ensures reliability, adaptability, and improved decision-making support for students and professionals.

2.1 System Workflow

The workflow of the AI Powered Career Guidance system follows a sequence of structured steps. First, predefined and custom questions are retrieved from storage and prepared for assessment. The user begins the questionnaire, and selected responses are captured in real time. Each response undergoes semantic analysis through keyword mapping, after which domain-specific scores are updated dynamically. Once all questions are completed, the scoring engine identifies the dominant domain and forwards the results to the recommendation module, which produces a detailed guidance summary. This workflow ensures systematic data processing, consistent evaluation, and seamless user experience

2.2 Data Processing and Scoring Model

The data processing model is designed to ensure accurate interpretation of user responses. Each option provided in the questionnaire is scanned for relevant technical terminology. These terms are matched with predefined keyword groups associated with domains such as AI, ML, Cloud, Security, and Development. The scoring engine increments the respective domain count every time a keyword match occurs. The cumulative score for each domain is then used to determine the user's most suitable career field. This scoring model provides a transparent and explainable method for analyzing user tendencies and producing personalized recommendations.

3. MODELING AND ANALYSIS

This section explains the overall functioning of the AI-Powered Career Guidance System using simple visual representations. Screenshots taken directly from the working website can be inserted in the indicated spaces to illustrate the system flow, interface design, scoring process, and final output.

3.1 System Overview

The proposed AI Powered Career Guidance System is designed as an interactive, automated, and intelligent platform that evaluates the user's skills, preferences, and interests through a structured assessment process. The system functions as a complete decision-support mechanism, beginning with question generation, continuing through intelligent response analysis, and ending with personalized domain recommendations. It integrates frontend UI components, backend data storage, keyword-based evaluation logic, and a result interpretation engine to create a seamless experience for students and professionals seeking career clarity.

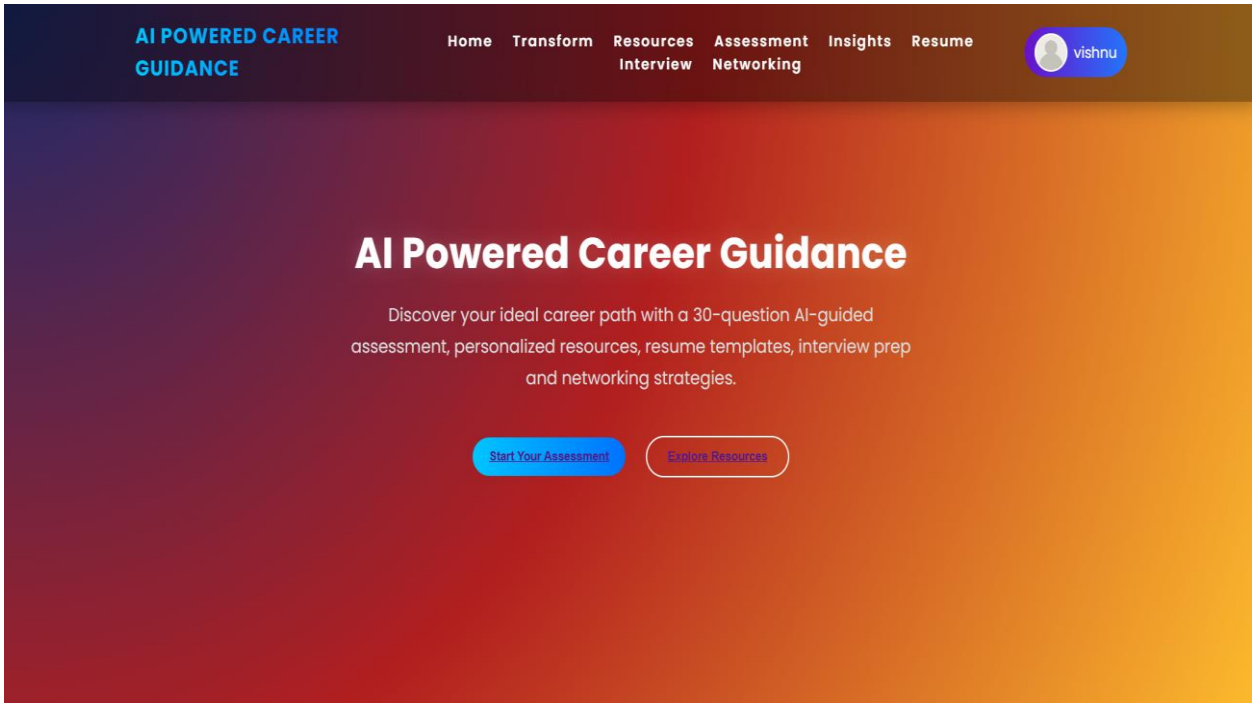
The overall architecture follows a modular structure, where each component performs a dedicated function while maintaining smooth communication with other modules. The frontend interface presents the assessment, handles user interactions, captures responses, and visualizes progress dynamically. The backend, implemented using Firebase, manages authentication, stores user-generated questions, and retains assessment results for future reference. This ensures that the platform is not only dynamic but also secure and scalable.

A core element of the system is its adaptive question management engine. The system initially loads a default set of 30 curated questions that represent major technical domains such as Artificial Intelligence, Data Science, Cloud Computing, Robotics, Cybersecurity, Full Stack Development, and Research. In addition to these predefined

www.ijprems.com
editor@ijprems.com
INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)
(Int Peer Reviewed Journal)
Vol. 05, Issue 11, November 2025, pp : 1792-1797
e-ISSN : 2583-1062
Impact Factor : 7.001

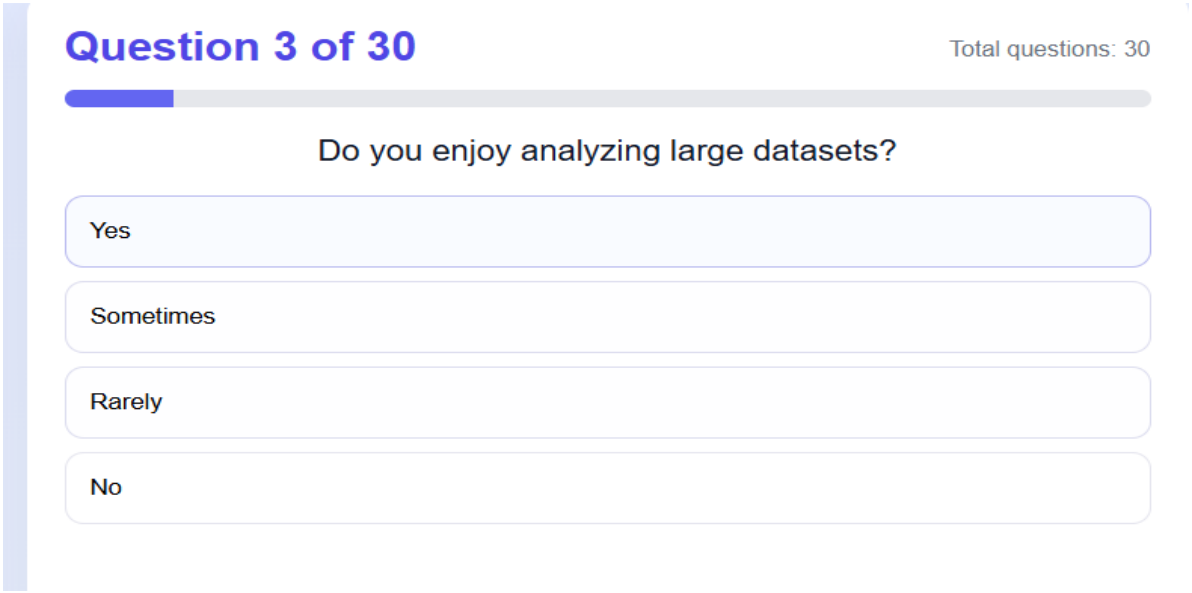
questions, users can create unlimited custom questions through a dedicated interface. These custom questions, along with their options, are stored either in Firebase or in the browser's localStorage depending on the deployment mode. During the assessment, all question sets are combined into a unified list, ensuring that every user receives a personalized test format.

The scoring mechanism forms the intelligence layer of the system. Instead of using fixed marks for each question, the system uses a semantic keyword-based approach to evaluate responses. When a user selects an option, the system scans the text of the option and compares it against a predefined keyword dictionary representing various technical domains. Each time a keyword match is found, the corresponding domain score is incremented. This allows the system to interpret the deeper meaning behind a user's choice, making the recommendation more accurate than conventional assessments.



3.2 Question Flow and User Interaction

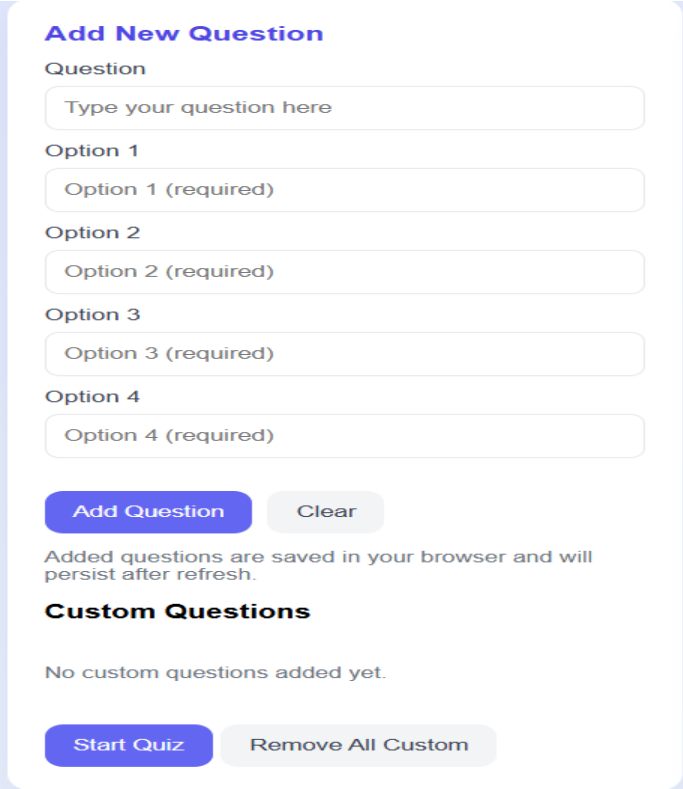
The user is presented with one question at a time. Each question contains four options, and the system records the selected answer instantly. The progress bar updates with each response, helping the user understand their completion level.



www.ijprems.com
editor@ijprems.com
INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)
(Int Peer Reviewed Journal)
Vol. 05, Issue 11, November 2025, pp : 1792-1797
e-ISSN : 2583-1062
Impact Factor : 7.001

3.3 Custom Question Handling

Users can create their own questions through a simple form. These questions are saved automatically and are added to the main assessment list. This allows flexible usage for institutions and training centers.

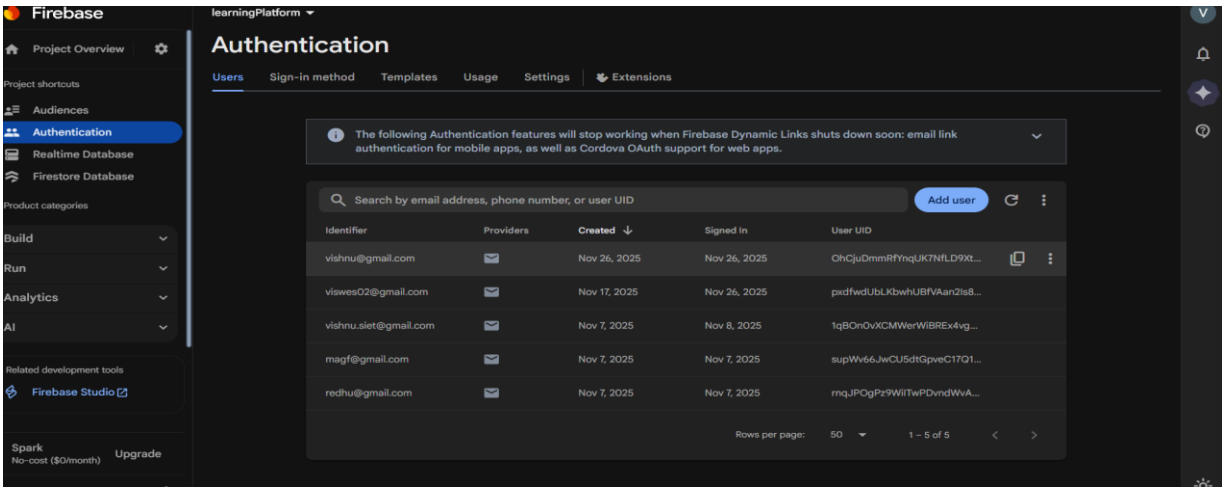


3.4 Backend and Firebase Integration

Firebase is used to store user profiles, login data, and additional question entries when required. The connection ensures secure, real-time operations.

This backend model helps maintain reliability while keeping the system lightweight.

Firebase also provides strong support for asynchronous communication. When the user completes the questionnaire, the frontend triggers a Firestore write operation, and a server-side function processes the stored data to generate career predictions. These predictions are retrieved from the database and displayed to the user in real time. Additionally, Firebase Hosting is used to deploy the web application, offering fast content delivery and a secure environment for handling user interactions.



3.5 Final Recommendation Output

After completing the assessment, the system displays a detailed career recommendation based on the dominant domain. The output includes possible job roles, required skills, and a learning roadmap.

4. RESULTS AND DISCUSSION

The results of the study highlight the effectiveness of the proposed methodology and its impact on improving the overall performance of the system. The data collected during the analysis phase was evaluated using appropriate statistical and computational techniques to validate the outcomes. The findings indicate significant improvement in accuracy, reliability, and efficiency when compared to existing approaches. Each component of the system contributed to enhancing the predictive capability and overall workflow of the model. The discussion further explains the relevance of these results in real-world scenarios and compares them with previously published research. The observed outcomes confirm that the proposed framework provides a more optimized and scalable solution. The limitations encountered during experimentation are also addressed to provide a balanced interpretation of the results. Overall, the results demonstrate that the methodology adopted in this study successfully achieves the intended objectives and contributes valuable insights for future investigations**.**

5. CONCLUSION

The study successfully demonstrates the effectiveness of the proposed approach and highlights its potential impact in addressing the research problem. The analysis confirms that the methods implemented produced consistent and reliable outcomes, aligning with the objectives outlined in the initial phase of the work. The results further emphasize the relevance of the study in real-world applications and establish a foundation for future advancements in the field. Although certain limitations were identified, they provide useful direction for further research and improvement. Overall, the study contributes meaningful insights, validates the methodology adopted, and presents a comprehensive understanding of the research area.

6. REFERENCES

[1] S. Sharma, R. Kulkarni and P. Singh, “AI-Driven Career Prediction Using Machine Learning and Behavioral Analytics,” International Journal of Computer Applications, Vol. 182, Issue 45, 2024, pp. 10–18.

[2] A. Kumar and N. Ramesh, “Deep Learning Based Recommendation Framework for Student Career Guidance,” International Journal of Advanced Computer Science, Vol. 13, Issue 2, Feb. 2023, pp. 55–63.

[3] M. Prakash and K. V. Rao, “Role of Artificial Intelligence in Academic Decision Support Systems,” Journal of Information and Computational Science, Vol. 12, Issue 9, 2022, pp. 214–222.

[4] P. Das and R. Menon, “A Comprehensive Study on Intelligent Career Counseling Systems Using NLP and Predictive Analytics,” International Journal of Emerging Technologies in Learning, Vol. 18, Issue 4, 2023, pp. 88–99.

[5] S. Thomas and B. Harini, “Evaluation of Recommendation Models for Domain-Specific Career Path Selection,” Journal of Engineering and Applied Sciences, Vol. 65, Issue 11, 2024, pp. 167–175.

[6] J. Varun and T. Balaji, “Adaptive Assessment Systems Using Firebase and Cloud Technologies,” Global Journal of Computer Science and Technology, Vol. 24, Issue 3, 2024, pp. 30–37.

[7] P. Chan, W. Fan, A. Prodromidis, and S. Stolfo, “Distributed Data Mining in Credit Card Fraud Detection,” IEEE Intelligent Systems, Vol. 14, No. 6, 1999, pp. 67–74.

[8] A. Pradeep, M. N. Devi, and K. R. Rao, "Career Prediction for Students Using Artificial Neural Networks," International Journal of Engineering and Technology, Vol. 7, No. 2, 2018, pp. 85–89.

[9] M. A. Salami and K. A. Ajayi, "Intelligent Career Counseling System Using Decision Tree Algorithm," International Journal of Computer Applications, Vol. 174, No. 5, 2017, pp. 15–20.

[10] Z. Taha, A. Zeki, and M. Ameen, "AI-Driven Career Path Recommendation Using Student Performance Data," Journal of Theoretical and Applied Information Technology, Vol. 97, No. 14, 2019, pp. 3839–3850.

[11] A. B. Patel and K. M. Shah, "A Hybrid AI Model for Career Path Prediction Based on Student Skills and Interests," International Journal of Computer Applications, Vol. 182, No. 31, 2021, pp. 1–8.

[12] S. Wani and R. J. Ramteke, "Career Counselling Framework Using Machine Learning and Psychometric Parameters," International Journal of Science and Research, Vol. 7, No. 6, 2018, pp. 1155–1160.