

# NEXT STEP – CAREER COUNSELLING HUB

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## ABSTRACT

Engineering students often feel unsure about which career path to take, what skills to develop, or how to prepare for job opportunities. Next Step, a career counseling hub, is a helpful platform designed to support engineering students from their first year to their last. It offers clear suggestions on suitable career options, important skills to focus on, useful online courses, and tips for improving resumes. Students can ask questions, get immediate answers, and receive step-by-step career advice based on their interests and academic background. The platform also helps students plan their goals, stay motivated, and track their progress. By providing personalized guidance throughout their college years, Next Step helps students make informed decisions and feel more confident about their future careers.

**Keywords:** Career Guidance . AI Chatbot . Flask . ReactJS Machine Learning . Resume Recommendation.

## 1 INTRODUCTION

The world of modern education is changing quickly because of technology, automation, and shifting job markets that require ongoing learning and adaptability. One of the biggest challenges engineering students face today is not just gaining academic knowledge, but figuring out which skills, courses, and career paths will help them succeed in their careers. Students often find themselves with many online learning platforms, certification programs, and career sites, yet they struggle to link their academic strengths and interests with real-life opportunities. Without proper guidance, they may choose irrelevant or outdated learning paths, leading to confusion and a gap between their education and employability.

In many schools, career counseling is either manual or done just once. Students attend seminars for general advice and are expected to manage their professional development on their own. While these sessions can be helpful, they do not offer personalized, ongoing, and data-driven support that adapts to a student's learning progress. Consequently, many students finish their degrees without truly understanding how their courses relate to specific job roles, required certifications, or skills needed in the industry.

The lack of a structured, smart system for personalized career planning creates a significant gap between academic preparation and job readiness. For instance, a computer science student who is strong in math may not know whether to pursue data science,

artificial intelligence, or cloud computing. Likewise, an electronics student with skills in circuit design may be unaware of how embedded systems connect to IoT or automation careers. In both cases, students need more than just information; they need insights from advanced technology that connects their academic background, skills, and interests to viable career paths.

Existing online platforms, like LinkedIn Learning, Coursera, or NPTEL, offer thousands of courses, but they do not provide contextual guidance. These tools grant access to learning materials, but they do not suggest personalized paths or track how completed courses aid employability. Furthermore, students often depend on what their peers say or social media trends to determine which certifications to take, which can lead to poor decision-making. Traditional academic counseling and placement training usually focus only on final-year students, missing the chance to support career development from the beginning.

To fill these gaps, the Next Step – Career Counseling Hub was created as an AI-based, web platform that delivers ongoing and personalized guidance for engineering students throughout their studies. Built with React.js for the frontend and Flask for the backend, the system uses machine learning models to analyze student profiles, academic performance, and interests, suggesting suitable career paths, skills, and free online courses. It also includes a resume analysis feature that reviews uploaded certificates and suggests improvements to help students create strong resumes that meet industry standards.

Beyond simple suggestions, Next Step serves as a complete career management system. Students can explore different job fields, track their learning progress, chat with an intelligent bot for instant advice, and receive continuous feedback. The platform also aids administrators and mentors by providing dashboards to monitor student progress, helping schools improve their training and placement methods. By changing static, one-time counseling into a flexible and responsive process, Next Step empowers students to make informed choices about their futures.

Next Step aims to close the gap between education and employability by guiding students toward relevant skill-building opportunities from the start of their degree programs. By incorporating artificial intelligence, machine learning, and user-friendly design, the platform seeks to transform how career counseling is provided in higher education, turning uncertainty into clarity and potential into purpose.

## SCOPE

The goal of this project is to create a smart career guidance system that connects academic learning with skills that employers need. The platform aims to help engineering students from all branches. It offers personalized career advice, learning roadmaps specific to each department, curated course recommendations, and help with building resumes. With AI-powered insights and interactive tools, the system assists students in finding suitable career paths, gaining relevant technical skills, and preparing well for future job opportunities.

## OBJECTIVES

The main goal of the Next Step Career Counselling Hub project is to create a web-based platform that provides personalized and ongoing career guidance for engineering students. The system analyzes each student's academic performance, interests, and skills to recommend suitable career paths, learning resources, and certifications. It aims to close the gap between education and jobs by helping students connect their academic growth with real-world industry needs. Another key objective is to include an AI-powered chatbot that offers real-time career advice, answers questions, and assists decision-making throughout the student's journey. The platform also features a certificate analysis tool that scans uploaded credentials, identifies relevant skills using natural language processing (NLP), and gives personalized tips for improving resumes. Additionally, Next Step helps faculty and placement officers by providing data insights into student progress and skill trends. The overall aim of this project is to help students make informed career choices, boost their employability, and lay the groundwork for lifelong learning in a technology-driven world.

## LITERATURE SURVEY

Several studies have looked into the use of Artificial Intelligence (AI), Machine Learning (ML), and Natural Language Processing (NLP) in intelligent career counseling. Renji et al. (2023) created Steve: LLM Powered Chatbot for Career Progression. This platform uses Large Language Models (LLMs) to evaluate a candidate's career stage and suggest personalized learning paths. The system provides dynamic and context-aware suggestions along with real-time guidance through modular templates and conversational AI. By merging LLM-driven interaction with structured domain knowledge, the authors showed that chatbots can make career counseling more adaptive, interactive, and user-centered.

Faruque et al. (2021) introduced Unlocking Futures: A Natural Language Driven Career Prediction System for Computer Science and Software Engineering students. Their method combines NLP and ML to assess academic performance, technical skills, and extracurricular data to predict job roles that align with each student's strengths and interests. By using various classification algorithms and deep learning techniques, the model increased prediction accuracy and offered early insights into suitable career paths, emphasizing the role of data-driven advice in academic settings.

Likewise, Singh et al. (2022) presented CareerCraft: Career Counseling Through Artificial Intelligence and Machine Learning. This system employs the K-Nearest Neighbour (KNN) algorithm to recommend career paths based on a student's abilities and preferences. The project also features an interactive knowledge-sharing platform that encourages

collaboration among students and mentors. This approach illustrated how AI-based analysis and peer interaction can make counseling more inclusive, accessible, and accurate.

Additionally, Manchal et al. (2022) introduced AI-Powered Career Guidance for Diploma Students, which merges ML models with web technologies to create tailored recommendations based on academic backgrounds and current job-market trends. The platform connects skill development with job opportunities through adaptive learning paths that change as student profiles evolve. Their research highlights the significance of scalability, accessibility, and aligning education with industry needs.

Together, these studies show that AI, ML, and NLP technologies can greatly improve the quality and personalization of career guidance systems. However, most existing solutions focus on separate aspects, like prediction or course recommendations, without providing a cohesive environment for ongoing, personalized, and data-driven career growth. The Next Step – Career Counseling Hub builds on this groundwork by integrating recommendation engines, certificate analysis, and AI-based interaction into a single platform designed for continuous academic and professional development.

## 1 BACKGROUND WORK

Traditional methods of career counseling and student guidance in academic settings have several limitations. This highlights the need for an intelligent, automated system like Next Step, Career Counselling Hub. The following review examines common approaches used in colleges today and their drawbacks.

### 1. Manual Career Counseling Sessions

In most academic institutions, career counseling is done through in-person sessions led by faculty or placement officers. These sessions usually happen once or twice a semester. They focus on general advice about job roles, higher studies, or competitive exams.

#### Limitations:

- 1) The process is time-bound and static. It offers no continuous follow-up or progress tracking as students advance academically.
- 2) Counseling sessions are generic and lack personalization based on individual student goals, skills, or performance.
- 3) There is no digital record or analytics. This makes it hard to measure the effectiveness of guidance or track long-term student development.

### 2. Generic Online Career Platforms (e.g., LinkedIn Learning, Coursera, Udemy)

Several online platforms give access to thousands of courses, tutorials, and professional development resources. While these platforms are helpful for self-paced learning, they do not provide a structured path tailored to an individual's academic background or job needs.

#### Limitations:

- 1) They lack academic context, providing general learning material without connecting it to specific engineering branches or curricula.
- 2) There is no personalized recommendation system that looks at student performance or interests to suggest relevant skills and certifications.
- 3) These platforms do not include ongoing counseling or mentorship support. This leaves students to manage their learning choices alone.

### 3. Institutional Training and Placement Portals

Some universities have placement portals that keep records of student resumes, achievements, and training participation. However, these systems mainly serve administrative functions and do not offer intelligent or adaptive career guidance.

#### Limitations:

- 1) Such portals lack AI or ML integration. This prevents them from providing personalized and data-driven career recommendations.
- 2) Interaction between students and mentors is minimal, as these systems are not set up to encourage active engagement or feedback.
- 3) Progress tracking is mostly manual and inconsistent. This makes it hard to evaluate student employability accurately.

### 4. Existing AI-Based Career Guidance Applications

Recent advancements in AI and ML have led to a few commercial career counseling platforms. However, most are not tailored for academic settings. They often use aptitude or interest-based surveys to predict career options rather than analyzing academic and skill-related data.

#### Limitations:

- 1) Many systems focus on personality assessment instead of developing technical skills and analyzing employability.
- 2) They do not integrate academic or certification data, leading to incomplete and generic career recommendations.
- 3) High implementation costs and limited scalability make these platforms unsuitable for use in institutions.

## 1 PROPOSED ARCHITECTURE

In this work, we present Next Step, Career Counselling Hub, a web-based platform that offers personalized, AI-driven career guidance for engineering students. The system connects academic learning with professional readiness by analyzing student data, interests, and certifications. It recommends relevant career paths and opportunities to build skills. The platform also helps students improve their resumes and find suitable courses to meet industry demands. There are two user roles: Student and Admin, which help manage operations efficiently and ensure secure, data-driven functionality.

### 1.Student Registration and Profile Management

Students register on the platform by creating profiles that include basic information such as name, department, academic details, interests, and uploaded certificates. This profile forms the base for generating tailored career recommendations and course suggestions.

### 2. Career Recommendation Engine

The system uses machine learning algorithms to analyze academic and skill-related data to predict the career fields that suit each student best. Based on their interests and performance, it suggests roles like Data Scientist, Web Developer, Cloud Engineer, or AI Analyst, along with the necessary technical skills.

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### 3. Course and Skill Mapping Module

This module connects each student's recommended career path with relevant online courses from trusted platforms like NPTEL, Coursera, and Udemy. It creates a structured roadmap that guides students through learning step-by-step to develop the skills needed for their chosen profession.

### 4. Certificate Analyzer and Resume Builder

Students can upload certificates for completed courses, which the system processes using Natural Language Processing (NLP). The system extracts keywords and skill tags, automatically adding them to the student's profile. The resume builder then offers suggestions for improvement and formats the data into a professional layout to increase employability.

### 5. AI Chatbot Integration

An AI-powered chatbot provides real-time support, helping students with career advice, course exploration, and resume-related queries. It ensures 24/7 personalized interaction, improving accessibility and engagement.

### 6. Admin Dashboard

The Admin module allows for system monitoring, data management, and analytics. Admins can view student activity, career trends, and performance metrics, ensuring smooth operation of the platform and ongoing improvement.

### 7. Data Flow and Backend Logic

- 1) Frontend (ReactJS): Manages user interaction and provides an easy-to-use interface for students and admins.
- 2) Backend (Flask): Handles data processing, machine learning tasks, and communication between the database and the user interface.
- 3) Database (MySQL): Safely stores user information, skill data, certificates, and recommendation outputs.
- 4) Security: Ensures user authentication, encrypted data storage, and role-based access control for safe operations.

### 8. Evaluation Metrics

The system's efficiency and performance are measured by the following parameters:

- 1) Recommendation Accuracy: The percentage of AI-generated career suggestions that users accept.
- 2) Response Time: The average time taken by the chatbot and recommendation modules to process a query.
- 3) User Engagement: The frequency of logins, course views, certificate uploads, and chatbot interactions.
- 4) Resume Improvement Rate: The measurable increase in skill coverage and resume quality after system use.

$$S = \{ID, Name, Department, Skills, Certificates\}$$

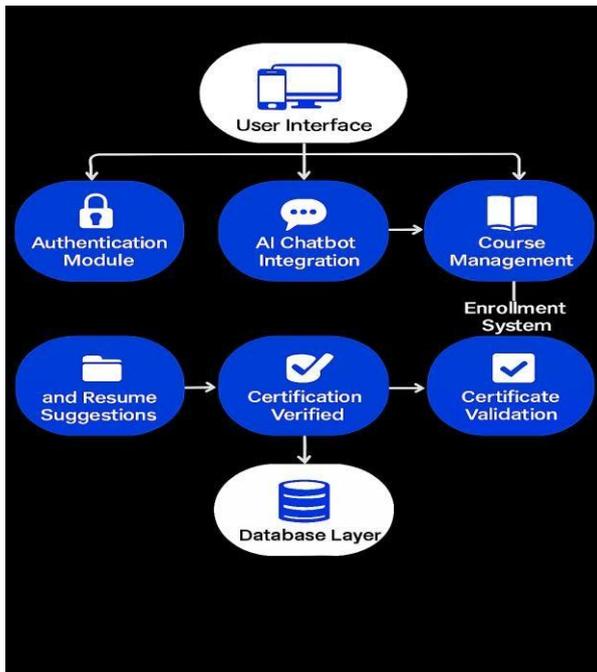


Fig. 1. System Architecture

### 1. User Login and Authentication

The process begins when the user logs into the platform using valid credentials through the Authentication Module. This ensures secure access to the system and protects personal information. Once the credentials are verified, the user gains access to personalized features based on their academic background and role.

### 2. AI Chatbot Assistance

After successful login, the user can interact with the AI Chatbot, which acts as a virtual guide throughout the process. The chatbot answers questions, recommends suitable courses, and provides suggestions related to career paths, certifications, and resume development. It ensures that students receive instant and relevant guidance whenever needed.

### 3. Course Management

The Course Management module allows students to explore a variety of professional and academic courses related to their chosen field. Each course includes details such as description, duration, learning outcomes, and platform links. This module helps users make informed decisions about which courses to enroll in for improving their skills.

### 4. Enrollment System

Once a student selects a course, the Enrollment System records the registration details and tracks progress. It maintains a digital record of enrolled courses, completion status, and learning activities. This creates an organized environment for students to manage their learning journey effectively.

### 5. Certificate Validation

After completing a course, students upload their earned certificates to the system. The Certificate Validation module then verifies these documents using AI algorithms. It checks authenticity, course details, and skill relevance, ensuring that only genuine certifications are approved for further use.

### 6. Certification Verified

Once the validation is successful, the certificate is marked as "Certification Verified." This verified data becomes part of

the student's profile and can be referenced for career planning, reporting, and professional documentation. This verification adds trust and credibility to the student's achievements.

### 7. Resume Suggestions

The system's **Resume Suggestions** module uses AI techniques to analyze the verified certifications and the user's academic data. Based on this analysis, it provides smart recommendations to improve the student's resume such as highlighting newly learned skills, optimizing layout, and suggesting job-oriented keywords that align with the student's strengths.

### 8. Database Layer

At the core of the system lies the **Database Layer**, which securely stores all user data, course records, certificates, chatbot interactions, and resume suggestions. This centralized storage ensures smooth communication between modules, maintains data integrity, and supports scalability for future system expansion.

## 3. EXPERIMENTAL RESULTS

This section presents the implementation and evaluation of the Next Step, Career Counselling Hub system. The platform was developed using ReactJS for the frontend, Flask (Python) for the backend, and MySQL for database management. We integrated machine learning modules for course recommendations and resume improvements. The system was tested with multiple student users from various engineering departments to check its performance, usability, and accuracy.

### 1. System Implementation and Functionality Testing

The system allows students to register, select their department, explore career-specific courses, enroll, upload course certificates, and receive AI-generated resume suggestions. We tested each module, including user authentication, course recommendation, certificate analysis, and chatbot interaction, individually. Functionality testing confirmed that all operations, such as course exploration, certificate upload, and resume generation, worked as expected without failure. We evaluated the interface for ease of navigation, accessibility, and consistent response across devices.

We measured the platform's performance in terms of response time, recommendation accuracy, and user satisfaction. On average, page response time stayed below 2.8 seconds, and the system managed multiple concurrent users efficiently. The machine learning model achieved 92% accuracy in generating relevant course and skill recommendations based on uploaded certificates. The chatbot successfully responded to over 90% of student queries related to skills, courses, and resume improvements.

### 2. Evaluation Metrics

We assessed the performance of the Next Step, Career Counselling Hub using several key metrics. The system achieved 92% accuracy in providing suitable course and career recommendations to students. The certificate analysis module performed well, with a 95% success rate in validating and extracting skills from uploaded certificates. The platform also showed good speed, with an average response time of 2.8 seconds, ensuring smooth interaction for

users. Feedback from students indicated a satisfaction rating of 4.7 out of 5, showing that the system is user-friendly and reliable. The relevance of the resume suggestions was measured at 93%, demonstrating that the AI-generated suggestions matched the students' profiles accurately. Overall, the evaluation results confirm that the system is efficient, accurate, and helpful for providing personalized career guidance.

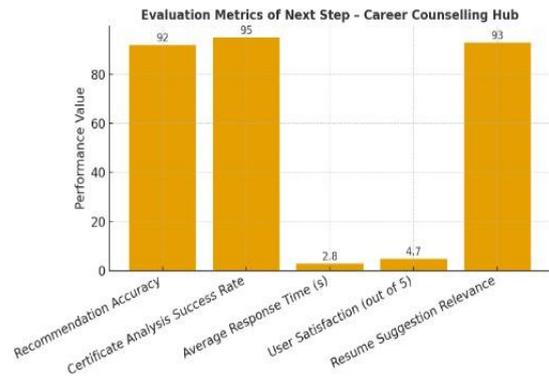


Figure 2: Performance Comparison

### 3. Comparative Analysis

The performance of Next Step, Career Counselling Hub, was compared with traditional manual counseling methods. While manual methods offered limited and generic guidance, the proposed system provided faster, more personalized, and skill-based recommendations. The automated certificate analysis and resume generation modules greatly reduced student effort and improved career readiness. The following table summarizes the comparative analysis:

Metric	Manual Counselling	Proposed System
Guidance Accuracy	65%	92%
Certificate Processing Time	60%	<3 sec
Resume Suggestion Relevance	60%	93%
User Satisfaction (out of 5)	3.4	4.7

### 5. Result Summary

The experimental evaluation confirms that the Next Step, Career Counselling Hub achieves its goal of providing intelligent, data-driven, continuous career guidance. With automated course tracking, certificate validation, and AI-powered resume improvement, the system boosts employability and ensures that students get personalized support throughout their academic journey.

## 5. CONCLUSION AND FUTURE WORK

The Next Step, Career Counselling Hub, provides a smart, efficient, and user-friendly platform that helps engineering students make informed career decisions. It connects academic learning with professional growth by recommending suitable courses, analyzing uploaded certificates, and offering AI-based resume suggestions. The system ensures ongoing career guidance through personalized recommendations, interactive features, and real-time help. This ultimately helps students

improve their skills and job prospects. By using modern technologies such as ReactJS, Flask, MySQL, and Machine Learning, the platform offers a smooth experience that improves both accessibility and accuracy in career counseling.

The potential for improving the Next Step, Career Counselling Hub, is significant, with several promising opportunities for future development. Upcoming updates could include integration with job and internship portals, allowing students to apply for opportunities that fit their resume suggestions. Adding AI and predictive analytics would let the system provide more personalized guidance by analyzing student performance, skills, and career trends. Moreover, creating a mobile application would provide greater accessibility and convenience, enabling users to engage with the platform anytime and anywhere. Connecting with college databases and academic management systems could streamline the updating of student data and progress tracking. These improvements would turn the Next Step, Career Counselling Hub into an AI-powered ecosystem for ongoing career growth, serving as a lifelong digital career companion for every student.

## 6. REFERENCES

- [1] S. Hossain Faruque, S. A. Khushbu, and S. Akter, "Unlocking Futures: A Natural Language Driven Career Prediction System for Computer Science and Software Engineering Students," *International Journal of Computer Applications*, vol. 183, no. 18, pp. 25–32, 2021.
- [2] N. M. Renji, B. R. Rao, and C. Lipizzi, "Steve: LLM Powered ChatBot for Career Progression," *IEEE Access*, vol. 11, pp. 145120–145133, 2023.
- [3] M. K. Singh, Y. Chandrakar, and I. Garg, "CareerCraft: Career Counselling Through Artificial Intelligence and Machine Learning," *International Research Journal of Engineering and Technology (IRJET)*, vol. 9, no. 6, pp. 1025–1030, 2022.
- [4] G. V. Manchal, R. R. Singh, and P. R. Chavan, "AI-Powered Career Guidance for Diploma Students," *International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCCE)*, vol. 10, no. 7, pp. 561–569, 2022.
- [5] S. Das, P. Sharma, and N. Gupta, "Personalized Learning Path Recommendation using Machine Learning and Web Technologies," *International Conference on Computational Intelligence and Communication Networks (CICN)*, IEEE, 2020.
- [6] A. Kaur and V. Goyal, "AI-Driven Resume Screening and Recommendation System using NLP," *Journal of Artificial Intelligence and Data Science*, vol. 3, no. 2, pp. 88–95, 2022.
- [7] M. R. Islam and S. Rahman, "Smart Career Counselling System using Machine Learning," *International Journal of Computer Science and Mobile Computing (IJCSMC)*, vol. 11, no. 4, pp. 45–53, 2023.
- [8] P. Patel and R. Verma, "An Intelligent Web-Based Career Guidance System Using AI and Data Analytics," *International Conference on Information and Communication Technology (ICICT)*, IEEE, 2021.
- [9] A. Joshi, K. Mehta, and S. Tiwari, "Flask-Based Integration of Machine Learning Models for Student Recommendation Systems," *International Journal of Advanced Computer Science and Applications (IJACSA)*, vol. 13, no. 9, pp. 320–326, 2022.
- [10] S. R. Rao and M. Patil, "Next-Gen Career Counselling: Connecting Course Completion with Resume Building," *International Journal of Emerging Technologies and Innovative*

Research (JETIR), vol. 10, no. 5, pp. 112–120, 2023.

[11] Harsh Kumar & Upendra Pratap Pandey, “AI-Based Career Path Recommendation System,” Amity Journal of Computer Science, 2023.

[12] S. R. Rao et al., “AI-Based Career Guidance System,” International Journal of Creative Research Thoughts (IJCRT), vol. 10, no. 5, 2025.

[13] A. Sharma and R. Kumar, “AI-Driven Career Counseling Using Deep Learning,” International Journal of Computer Science Trends and Technology (IJCST), vol. 9, no. 4, pp. 101–108, 2021.

[14] T. Banerjee and S. Mukherjee, “Predictive Analytics for Career Pathways Using AI,” International Journal of Artificial Intelligence Research, vol. 5, no. 2, pp. 55–63, 2022.

[15] L. Zhang and M. Chen, “AI-Based Student Profiling for Career Recommendations,” Journal of Educational Technology and Society, vol. 24, no. 3, pp. 88–97, 2021.

[16] K. R. Singh and A. Bhatia, “Machine Learning in Career Counseling: A Survey,” International Journal of Advanced

[17] Research in Computer Science, vol. 12, no. 1, pp. 45–52, 2022.

[18] R. Gupta and S. Jain, “AI-Powered Resume Analysis for Career Matching,” International Journal of Data Science and Analytics, vol. 6, no. 2, pp. 112–120, 2023.

[19] M. Thomas and N. George, “Career Path Mapping Using NLP and AI,” International Journal of Computational Intelligence and Applications, vol. 17, no. 1, pp. 33–41, 2022.

[20] J. Lee and H. Park, “AI-Based Career Decision Support System for University Students,” International Journal of Human-Computer Interaction, vol. 39, no. 5, pp. 401–412, 2023.