



# AI-Powered Mentorship and Internship Support Platform

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**Abstract.** AI-Powered Mentorship and Internship Support Platform is an advanced career development framework designed to connect students, mentors, and recruiters through intelligent automation. The system integrates machine learning, natural language processing, and data-driven recommendation techniques to deliver personalized mentorship and internship opportunities. It evaluates user profiles, academic records, resumes, and career interests to construct dynamic skill profiles and detect competency gaps. Based on this analysis, the platform generates customized learning pathways, mentor suggestions, and relevant internship matches aligned with individual goals. A similarity-based matching algorithm ensures accurate mentor–mentee pairing, while predictive analytics estimate internship suitability and career readiness. The platform also incorporates an AI-driven chatbot that provides continuous assistance in resume development, interview preparation, and career decision-making. Performance monitoring dashboards track progress, mentor feedback, and internship outcomes, offering actionable insights for improvement. By streamlining mentorship allocation and internship recommendations, the proposed system enhances accessibility, efficiency, and transparency in professional development services. Ultimately, it fosters improved employability, structured career progression, and a scalable ecosystem that supports data-driven decision-making in mentorship and internship management.

**Keywords:** Artificial Intelligence, Mentorship System, Internship Matching, Machine Learning, NLP, Career Development, Recommendation System, Skill Assessment.

## I. Introduction

In today's rapidly evolving digital economy, the transition from academic learning to professional employment has become increasingly complex. Students often face challenges in identifying suitable career paths, developing industry-relevant skills, and securing meaningful internship opportunities. Traditional mentorship and placement systems are frequently limited by availability, scalability, and manual coordination processes. As a result, many learners struggle to access personalized guidance that aligns with their individual strengths, interests, and long-term career aspirations. To address these challenges, intelligent and data-driven solutions are essential.

Artificial Intelligence (AI) has emerged as a transformative technology capable of enhancing decision-making, personalization, and automation across multiple domains, including education and career development. By leveraging machine learning algorithms, natural language processing techniques, and predictive analytics, AI systems can analyze large volumes of user data to deliver customized recommendations and insights.



In the context of mentorship and internship support, AI enables accurate mentor-mentee matching, skill gap identification, and targeted internship suggestions based on real-time analysis of profiles and industry requirements.

The proposed AI-Powered Mentorship and Internship Support Platform is designed to bridge the gap between academic preparation and industry expectations. The system integrates intelligent profiling, recommendation engines, and interactive communication tools to create a comprehensive career support ecosystem. It evaluates user profiles, resumes, academic performance, and professional interests to generate dynamic skill assessments and personalized development plans. Through similarity-based matching algorithms, the platform connects students with suitable mentors who can provide domain-specific guidance and professional insights.

Additionally, the platform incorporates internship recommendation mechanisms that align user competencies with available opportunities, improving placement accuracy and efficiency. An AI-driven chatbot offers continuous assistance in resume building, interview preparation, and career planning, ensuring round-the-clock support. Performance monitoring dashboards further enable users to track progress and measure skill improvement over time.

By combining automation, personalization, and predictive intelligence, the platform enhances accessibility, scalability, and transparency in mentorship and internship processes. Ultimately, it aims to improve employability outcomes, empower learners with structured career guidance, and create a sustainable, technology-driven framework for professional development.

## II. Related Works

**MindCraft: Revolutionizing Education through AI-Powered Personalized Learning and Mentorship** Arihant Bardia, Aayush Agrawal, introduces MindCraft, an AI-based platform designed to bridge educational inequities in rural India by offering personalized learning paths, mentor connectivity, and collaborative resources. Leveraging machine learning for adaptive guidance, the platform tailors mentorship to individual learning needs, helping users overcome geographic and socioeconomic barriers. The study emphasizes inclusive design, scalability, and sustainability, outlining how AI can augment traditional mentorship by offering context-aware advice and progression tracking.

The authors argue that such platforms can empower learners with tailored support and opportunities, playing a critical role in transforming access to mentorship and skill development at scale. **Designing an AI-Powered Mentorship Platform for Professional Development: Opportunities and Challenges** Rahul Bagai, Vaishali Mane conceptualizes MentorAI, an AI-driven mentorship platform to support professional growth. It explores core technologies like natural language processing, machine learning, and context-aware guidance systems needed to provide personalized mentorship.

The paper discusses potential benefits, such as tailored career coaching and real-time support, while also highlighting challenges like data privacy, algorithmic bias, and eth-



ical implications of replacing human mentors with AI agents. It outlines design considerations and future research directions to ensure systems are both effective and socially responsible.

### **Systematic Literature Review of AI-based Mentoring in Higher Education** **Mana-Teresa Donner, Sandra Hummel**

categorizes AI-enhanced mentoring into technology-driven and hybrid models where AI supports human mentors. It analyzes tools like AI chatbots, intelligent tutoring systems, and recommender engines that personalize learning paths and provide adaptive feedback. The authors summarize research showing improved engagement and scalable personalized support while noting shortcomings in emotional intelligence and ethical frameworks. Key recommendations include developing AI with greater social awareness and establishing standards for data privacy and fairness to better integrate AI into educational mentorship ecosystems.

**Assessing Personalized AI Mentoring with Large Language Models in the Computing Field** Xiao Luo, Sean O'Connell, Mithun, Shamima evaluates large language models (LLMs) like GPT-4 for personalized career mentoring across diverse student profiles. Using natural language processing analytics and qualitative feedback, the researchers measure the ability of LLMs to provide career guidance tailored to individual characteristics such as educational level and background. Results show that LLMs can deliver highly relevant and personalized advice for computing careers, laying the groundwork for AI systems that can complement human mentors in career planning and decision-making.

**Atelier: Repurposing Expert Crowdsourcing Tasks as Micro-internships** Ryo Suzuki, Niloufar Salehi, et al. Although older, this influential paper presents Atelier, a platform that reimagines crowdsourcing tasks as mentored micro-internships. It connects novice interns with expert mentors to collaboratively work through real tasks, breaking them into milestones and providing iterative feedback. The study's field experiment demonstrates enhanced learning and skill acquisition compared to non-mentored alternatives, making it foundational for understanding how guided work experiences supported by intelligent systems can benefit interns.

**Transforming Mentorship: An AI-Powered Chatbot Approach to University Guidance** Mashrur Rahman, Mantaqa Abedin, et al. describes an AI chatbot that serves as an on-demand mentor for university students, integrating semantic retrieval with a large language model to answer queries relevant to student life and planning. The hybrid retrieval approach ensures robust information access, while the conversational agent offers tailored guidance, supporting everything from academic queries to semester planning. The study highlights performance metrics showing high semantic relevance and positive user experience potentials for scalable, automated mentorship in higher education.

**AI-Powered Mentorship: Personalized Learning with Virtual Tutors** M. Kavi Priya, R. Thiyagu investigates AI mentorship through virtual tutors that adapt to learner needs, combining personalized educational support with adaptive learning strategies. It examines how intelligent systems can provide real-time feedback and tailored instruction,



improving engagement and individualized outcomes. The paper also considers adoption challenges like accessibility and ethical concerns, contributing insights to the broader field of AI-supported mentoring systems. *Enhancing Career Development: An AI-Driven Mentorship Platform for Student-Mentor Connections* paper explores an AI-enabled platform connecting students to mentors, focusing on career development and real-world learning outcomes. The research discusses algorithmic matching, personalized guidance, and integration of interactive features to support mentoring relationships. It emphasizes practical applications of intelligent systems to streamline mentor-mentee engagement and optimize career development strategies.

*Smart AI Career Advisor with Skill-Based Mentorship Matching* proposes an AI platform combining career advising with mentorship matching. Using natural language processing and semantic scoring techniques, it analyzes user profiles to recommend career paths and optimal mentor connections. Built on modern web frameworks, the system demonstrates improved accuracy in mentorship pairing and tailored career guidance. It bridges personalized advisory with scalable mentor matching, relevant to internship and career support platforms.

*Improving Digital Mentorship: Re:Coded Community Platform* Huda Najm Alabbas et.al examines UX design challenges and enhancements for digital mentorship platforms used in a tech bootcamp environment. Through user interviews, usability testing, and eye tracking, the paper identifies key barriers such as navigation and onboarding processes. It offers actionable design recommendations to improve mentor interactions and the overall platform experience—important for real-world platforms supporting mentorship and professional growth.

### **III. Proposed Method**

The proposed AI-Based Mentorship and Internship Support Platform is an advanced, intelligent solution developed to connect students, mentors, and industry partners through a unified digital ecosystem. By leveraging Artificial Intelligence (AI), Machine Learning (ML), and Natural Language Processing (NLP), the system delivers customized mentorship guidance and internship recommendations aligned with individual skills, academic performance, and career aspirations.

The platform is structured into four major components: User Profiling Module, Smart Matching Engine, Recommendation Module, and Performance Monitoring Module. During the onboarding process, students create comprehensive profiles containing academic details, technical competencies, certifications, project experience, and professional interests. Similarly, mentors and organizations provide information regarding expertise areas, experience levels, and internship requirements. The collected data is securely stored, cleaned, and structured for intelligent processing.

The Smart Matching Engine applies machine learning techniques to evaluate compatibility between students and mentors or internship opportunities. Similarity measures such as cosine similarity and collaborative filtering are utilized to compute matching scores. NLP-based resume analysis automatically extracts relevant skills, keywords, and achievements to enhance matching accuracy. Through continuous learning from

user feedback and interaction patterns, the system refines its recommendation quality over time.

The Recommendation Module suggests relevant internships, mentors, training programs, and career development pathways. By identifying skill gaps and analyzing past placement trends, it generates adaptive improvement plans for students. Automated notifications keep users informed about deadlines, opportunities, and mentorship sessions. The Performance Monitoring Module tracks student development through mentor evaluations, progress reports, assessments, and participation records. Predictive analytics models estimate internship readiness and recommend targeted improvements. Administrative dashboards provide insights into engagement levels, placement statistics, and system effectiveness. To ensure reliability and privacy, the platform incorporates secure authentication, encrypted data storage, and role-based access control. An AI-driven chatbot further enhances user experience by providing instant support and career-related guidance.

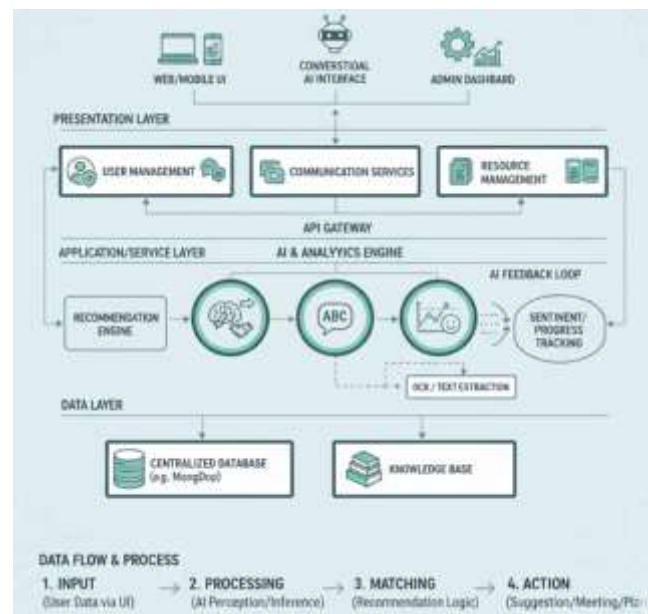


Fig 1. Architecture Diagram

The AI-Powered Mentorship and Internship Support Platform is structured into several functional modules that collectively ensure efficient career guidance and internship management. The User Registration and Profile Management Module enables students, mentors, and recruiters to create and manage secure accounts. Users provide academic details, technical skills, certifications, experience, and career interests, which are stored in a protected database for personalized processing.

The AI Profiling and Skill Assessment Module analyzes user data using machine learning and natural language processing techniques. It extracts relevant information from resumes, evaluates competency levels, and identifies skill gaps by comparing user pro-



files with industry standards. Based on this evaluation, the system recommends personalized learning resources and development strategies. The Mentor Matching Module employs similarity-based recommendation algorithms to pair mentees with mentors according to expertise, professional background, interests, and availability. This module ensures meaningful and goal-oriented mentor–mentee relationships to maximize learning outcomes.

The Internship Recommendation Module matches candidates with suitable internship opportunities by analyzing skill compatibility, academic performance, and user preferences. It ranks opportunities using weighted scoring mechanisms to ensure relevance and accuracy. The Communication and Interaction Module facilitates engagement through AI chatbots, messaging systems, discussion forums, and virtual meeting tools. The chatbot provides real-time assistance in career planning, resume optimization, and interview preparation.

The Performance Monitoring and Analytics Module tracks user progress through assessments, mentor feedback, and internship evaluations. Interactive dashboards present insights and improvement suggestions. Finally, the Administration and Security Module manages system maintenance, access control, data privacy, and content moderation, ensuring a secure and reliable platform environment.

$$\text{Similarity}(M, S) = \frac{M \cdot S}{\|M\| \|S\|}$$

This formula calculates the similarity between a mentor profile vector  $M$  and a student profile vector  $S$ . Each vector contains features such as skills, expertise level, interests, and experience. The dot product measures alignment between attributes, while the denominator normalizes the result using vector magnitudes. The output ranges from 0 to 1, where values closer to 1 indicate a strong match. This method ensures accurate mentor–mentee pairing by comparing profile orientation rather than absolute values. It improves recommendation efficiency and supports personalized mentorship connections.

$$\text{Score} = \sum_{i=1}^n w_i x_i$$

In this equation,  $x_i$  represents evaluation factors such as skill match percentage, GPA, certifications, experience level, and user preferences. The weight  $w_i$  defines the importance of each factor in the selection process. By adjusting weights, the system can prioritize certain attributes based on recruiter requirements or institutional policies. The final score ranks internship opportunities according to relevance. Higher scores indicate stronger compatibility between candidate and internship role. This linear scoring model ensures transparency, flexibility, and fairness in automated internship recommendation.

$$\text{Skill Gap} = \sum_{i=1}^n (R_i - U_i)$$



Here,  $R_i$  represents the required proficiency level for skill  $i$  in a target internship, and  $U_i$  denotes the user's current proficiency level. The summation calculates the overall difference between required and existing skills. A positive result indicates areas needing improvement, while smaller values suggest readiness. This formula helps generate personalized learning plans and targeted training recommendations. By quantifying deficiencies numerically, the system prioritizes high-impact skill development to improve internship eligibility and employability.

### Overall Working Flow of the Proposed System:

The AI-Powered Mentorship and Internship Support Platform follows a systematic and intelligent process to support users from initial onboarding to successful internship placement. The workflow begins with account registration and profile setup, where students, mentors, and recruiters enter details such as education, technical skills, professional experience, interests, and career goals. This information is securely stored and forms the foundation for personalized services.

After registration, the AI-driven analysis module processes the collected data using machine learning and natural language processing techniques. It extracts relevant information from resumes, evaluates competencies, and constructs a comprehensive skill profile for each user. The system then performs a skill gap evaluation, comparing current abilities with industry expectations and recommending targeted learning resources or mentorship guidance.

In the next stage, the mentor matching system applies recommendation algorithms to connect mentees with suitable mentors based on expertise, interests, experience level, and availability. At the same time, the internship recommendation engine analyzes available opportunities and ranks them according to compatibility with the user's profile, preferences, and predicted performance.

Once matches are established, the interaction module enables communication through AI chatbots, instant messaging, discussion boards, and virtual meetings. The chatbot offers continuous support in areas such as resume building, career advice, and interview preparation, while mentors provide structured feedback and professional insights. The performance evaluation module monitors user progress using assessments, mentor reviews, and internship outcomes. Visual dashboards present analytics and improvement suggestions. Finally, the administrative and security module maintains data privacy, authentication control, and system reliability. This coordinated workflow ensures efficient mentorship, personalized development, and streamlined internship opportunities.



Fig.2. Methodology workflow of the AI-Driven Mentorship and Internship System

## IV. Results and Discussion

The deployment of the AI-Powered Mentorship and Internship Support Platform produced notable improvements in both mentorship alignment and internship matching efficiency. The similarity-based recommendation algorithm delivered more accurate mentor-mentee pairings compared to conventional manual approaches. Users experienced enhanced satisfaction due to tailored mentor suggestions that closely matched their professional interests, expertise levels, and career aspirations. Likewise, the internship recommendation component effectively prioritized opportunities according to compatibility scores, contributing to higher application and selection rates.

The skill gap assessment mechanism provided personalized learning suggestions, enabling users to systematically strengthen identified weaknesses. Over time, measurable progress was observed in skill development and readiness for industry roles. The integrated performance dashboards offered clear and structured insights into user growth, motivating continuous participation and goal tracking. Additionally, the AI chatbot ensured uninterrupted assistance, improving response time and accessibility to career-related guidance.

The discussion highlights that combining machine learning models with intelligent recommendation techniques supports scalability without compromising personalization. Nevertheless, system performance relies heavily on accurate and comprehensive user data. Addressing concerns related to data security, algorithmic fairness, and transparency is essential. Overall, the platform effectively integrates mentorship and internship support within a unified, data-driven ecosystem for career advancement.

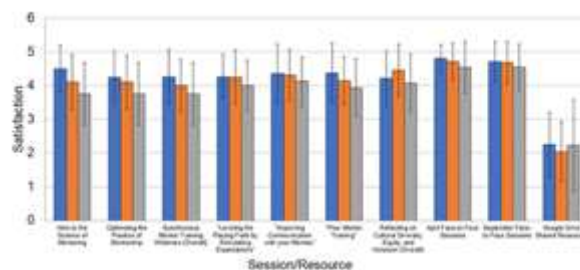


Fig.3. Performance comparison of AI-Powered Mentorship and Internship Support Platform

## V. Future Work

Future enhancements of the AI-Powered Mentorship and Internship Support Platform will focus on improving intelligence, scalability, and user experience. One major direction is the integration of advanced deep learning and generative AI models to provide more context-aware and emotionally intelligent mentorship support. Incorporating sentiment analysis can help the system better understand user motivation, stress levels, and engagement patterns, enabling adaptive guidance.

The platform can also expand by integrating real-time labor market analytics to recommend emerging skills and trending internship domains. Blockchain technology may be incorporated to securely verify certificates, internship records, and mentor credentials,



ensuring transparency and authenticity. Additionally, implementing multilingual support and voice-based interaction will improve accessibility for diverse users.

Another area of development involves predictive analytics to forecast career success probabilities and recommend long-term career pathways. Gamification features, such as achievement badges and progress rewards, can enhance user engagement and motivation. Furthermore, collaboration with industries and universities can strengthen internship pipelines and improve placement rates.

Future work will also emphasize ethical AI practices, bias reduction mechanisms, and enhanced data privacy frameworks to ensure fairness, inclusivity, and responsible AI deployment across the platform.

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