

Ai-Driven Mentor–Mentee Matching and Guidance Platform for Career Development

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Abstract—Mentorship plays a crucial role in guiding students and professionals toward successful career development. However, traditional mentoring systems often face challenges such as limited accessibility, lack of personalized guidance, and difficulty in connecting mentors with suitable mentees. With the rapid advancement of digital technologies and artificial intelligence, there is a growing need for intelligent platforms that can simplify mentorship and provide real-time guidance. This research proposes an AI-driven mentor-mentee platform that integrates intelligent matching, real-time communication, and chatbot-based assistance to enhance the mentoring experience. The proposed system is developed using modern web technologies including React for the frontend, Node.js and Express.js for backend services, and MongoDB for efficient data management. The platform allows users to create profiles, discover mentors based on skills and interests, schedule mentoring sessions, and interact through real-time chat and video communication. Additionally, the system integrates an AI-powered chatbot using advanced language models to provide career guidance, answer queries, and support users in their learning journey. The proposed solution aims to improve mentorship accessibility, provide personalized recommendations, and enhance interaction between mentors and mentees. By combining artificial intelligence with scalable web technologies, the platform creates a smart and interactive environment that supports career guidance, knowledge sharing, and professional development for learners in a digital ecosystem.

Index Terms—Artificial Intelligence, Mentor–Mentee Matching, Career Guidance System, AI Chatbot, Recommendation System, Web-Based Mentorship Platform, Real-Time Communication.

I. INTRODUCTION

Mentorship plays an essential role in the academic and professional development of students and young professionals. Effective mentorship provides guidance, knowledge sharing, skill development, and career advice that helps individuals make informed decisions about their future. Traditionally, mentorship has relied on direct personal connections, institutional programs, or informal networks. However, these conventional mentoring approaches often face several challenges such as limited accessibility, difficulty in finding suitable mentors, lack of structured communication platforms, and time constraints for both mentors and mentees. With the increasing adoption of digital technologies and online learning platforms, there is a growing need for intelligent systems that can facilitate mentorship in a more efficient, scalable, and accessible manner. Recent advancements in artificial intelligence (AI), recommender systems, and conversational technologies have opened new opportunities to transform the way mentorship services are delivered. AI-powered platforms can analyze user profiles, skills, interests, and goals to recommend suitable mentors and learning opportunities. Additionally, chatbot technologies have emerged as effective tools for providing automated support, answering questions, and assisting users in educational environments. Studies have shown that conversational agents can enhance learning experiences by providing instant feedback and continuous support to users [1], [2]. Educational chatbots are increasingly being used to support students, provide guidance, and improve interaction within digital learning environments [4], [5]. Another important aspect of digital mentoring platforms is the use of recommendation systems to

intelligently match mentors with mentees. Recommender systems have been widely applied in various domains, including e-commerce, online communities, and learning management systems, to provide personalized suggestions based on user preferences and behavior [13]. Research has demonstrated that machine learning-based mentor-mentee matching systems can significantly improve mentorship outcomes by connecting users with mentors who have relevant expertise and experience [3], [14]. Such intelligent matching mechanisms help overcome the limitations of traditional mentoring programs where mentees may struggle to identify appropriate mentors. Furthermore, the integration of AI-based career guidance systems has gained attention as a way to assist individuals in exploring suitable career paths and learning opportunities. AI-driven career recommendation systems analyze user interests, academic backgrounds, and skill sets to provide personalized career advice and professional development suggestions [8], [9]. Conversational AI technologies also enable natural interactions between users and digital assistants, making mentorship platforms more interactive and user-friendly [6], [10]. These systems contribute to creating a more engaging environment where users can receive guidance and support at any time. In addition to AI technologies, modern web frameworks and service-oriented architectures have made it possible to build scalable online platforms that support real-time communication and collaboration. Service-oriented computing enables the development of flexible systems where multiple services such as user authentication, messaging, video communication, and data storage work together seamlessly [7]. These technologies support the development of integrated mentorship platforms that combine AI capabilities with real-time interaction features. Despite the progress in digital learning technologies, many existing mentorship platforms still lack intelligent mentor matching, AI-driven guidance, and interactive communication tools. Therefore, this research proposes the development of an AI-driven mentorship platform that integrates mentor-mentee matching, real-time communication, and an AI-powered chatbot to enhance mentorship accessibility and effectiveness. The proposed system aims to provide a smart digital environment where mentors and mentees can connect, communicate, and collaborate efficiently while benefiting from

personalized career guidance and learning support. By combining artificial intelligence with modern web technologies, the platform seeks to improve the overall mentoring experience and support the professional growth of users in an increasingly digital world [11], [12], [15].

II. LITERATURE REVIEW

Mentorship has long been recognized as an essential component of professional development, academic success, and knowledge transfer. Traditional mentorship systems typically rely on institutional programs or informal networking to connect mentors and mentees. However, these approaches often suffer from limited scalability, inefficient matching processes, and accessibility issues. With the advancement of digital technologies, researchers have increasingly explored the use of artificial intelligence, recommender systems, and conversational technologies to improve mentorship systems and educational support platforms. Early research on mentorship emphasizes the importance of compatibility between mentors and mentees for achieving successful outcomes. Studies have shown that effective mentoring relationships depend on factors such as shared interests, professional goals, and communication compatibility [24]. Matching mechanisms that consider these factors significantly improve learning outcomes and career development. In recent years, researchers have proposed automated mentor-mentee matching algorithms to address the limitations of manual matching processes. For example, algorithmic matching approaches have been developed to pair individuals based on preferences, skills, and professional interests, improving the efficiency of mentorship programs [16]. These systems utilize data-driven techniques to analyze user profiles and identify suitable mentoring relationships. The development of recommender systems has further enhanced the ability to provide personalized recommendations within educational and professional platforms. Recommender systems have been widely used in domains such as e-commerce, online learning, and academic advising to suggest relevant content or connections to users. Research has shown that recommender algorithms can support decision-making processes by analyzing large datasets and user preferences [6]. In educational environments, these

systems help students select courses, mentors, and career paths that align with their interests and goals. Studies on recommender systems in higher education highlight their ability to guide students toward more informed academic and professional decisions [15]. Similarly, machine learning-based mentor recommendation systems have been proposed to automate the process of pairing mentors with mentees, thereby increasing mentorship efficiency and effectiveness [14]. Another important technological advancement influencing mentorship systems is artificial intelligence. AI technologies enable systems to analyze large amounts of data, identify patterns, and provide intelligent recommendations. Recent research highlights the growing role of AI in education, particularly in enabling personalized learning experiences. AI-based educational systems can adapt to individual learning needs, provide personalized recommendations, and improve student engagement [2]. These technologies allow mentorship platforms to provide customized guidance based on the user's background, interests, and career objectives. AI-driven mentorship systems can therefore create a more adaptive and personalized mentoring environment. Conversational AI technologies, particularly chatbots, have also gained significant attention in the education sector. Chatbots are computer programs designed to simulate human conversation and provide automated responses to user queries. Studies have demonstrated that chatbots can support learning by providing instant responses, assisting with academic queries, and guiding users through digital platforms [3]. Educational chatbots have become increasingly popular due to their ability to provide continuous support to students without requiring human intervention. Research indicates that chatbot-based systems can improve accessibility to educational resources and enhance the overall learning experience by offering real-time assistance [11]. The use of chatbots in education has expanded rapidly over the past decade. Modern AI chatbots leverage natural language processing and machine learning techniques to understand user queries and generate meaningful responses. These systems are capable of providing personalized learning support, answering frequently asked questions, and assisting users in navigating complex information systems. Studies show that AI chatbots can function as virtual tutoring assistants, enabling students to receive guidance and feedback at

any time [20]. Additionally, chatbot technologies contribute to reducing the workload of educators by automating routine tasks such as answering common questions or providing study guidance [13]. Research has also explored the integration of AI chatbots within mentoring systems to enhance communication and accessibility. AI-based mentoring platforms combine conversational interfaces with recommendation systems to provide intelligent guidance to users. These platforms allow mentees to interact with AI assistants that can suggest mentors, provide career advice, and support decision-making processes. Studies on AI-based mentoring systems highlight their potential to create hybrid mentorship models in which human mentors collaborate with AI tools to deliver comprehensive support [0]. Such hybrid approaches leverage the strengths of both human mentorship and artificial intelligence to improve mentoring outcomes. Another important aspect of modern mentorship platforms is the development of virtual mentorship networks. Virtual mentorship programs utilize online platforms to connect mentors and mentees across geographical boundaries. Research indicates that virtual mentoring systems supported by AI technologies can significantly improve access to mentorship opportunities, especially for students in remote or underserved areas [12]. By providing digital communication tools, AI analytics, and recommendation mechanisms, these systems create scalable mentoring environments that support professional development and knowledge exchange. Recent research has also focused on AI-powered mentorship platforms designed specifically for career development and professional guidance. These platforms integrate multiple technologies, including recommender systems, AI chatbots, and real-time communication tools, to create comprehensive mentoring ecosystems. Studies show that such platforms can improve mentorship accessibility, enhance user engagement, and provide personalized guidance to users seeking career advice [9]. Furthermore, AI-driven recommendation systems can analyze user data to suggest mentors, training programs, or career opportunities that align with individual goals.

Despite these advancements, several challenges remain in the implementation of AI-based mentorship systems. Researchers highlight concerns related to

data privacy, algorithmic bias, and the limitations of AI in understanding complex human emotions and mentorship dynamics [13]. Additionally, some studies argue that while AI systems can provide valuable guidance and support, they cannot fully replace the human aspects of mentorship such as empathy, motivation, and personal connection. Therefore, many scholars advocate for hybrid mentorship models that combine AI technologies with human mentoring relationships to achieve optimal outcomes. In summary, the literature indicates that artificial intelligence, recommender systems, and conversational technologies have significantly transformed mentorship and educational support systems. AI-powered mentorship platforms have the potential to improve mentor-mentee matching, provide personalized guidance, and enable real-time interaction between users. However, effective mentorship systems should balance technological innovation with human involvement to ensure meaningful and supportive mentoring experiences. The proposed AI-driven mentorship platform builds upon these existing research contributions by integrating intelligent matching algorithms, AI chatbot guidance, and real-time communication tools to create an efficient and scalable digital mentoring environment [1]-[15].

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III. METHODOLOGY

The proposed system introduces an AI-driven mentorship platform designed to connect mentors and mentees efficiently while providing intelligent guidance and real-time communication features. The methodology focuses on developing a scalable web-based platform that integrates modern web technologies, artificial intelligence, and recommendation mechanisms to improve mentorship accessibility and effectiveness. The overall system workflow is organized into several stages, including user registration, profile management, mentor-mentee matching, AI chatbot assistance, session scheduling, and real-time interaction. The first stage of the methodology involves user registration and authentication. Users can sign up on the platform either as mentors or mentees by providing basic information such as name, email address, professional background, skills, and areas of interest. Secure

authentication mechanisms ensure that user credentials are protected and only authorized users can access the platform. After successful registration, each user creates a detailed profile that highlights their skills, expertise, experience, and mentorship preferences. This profile information plays a crucial role in enabling the system to perform intelligent mentor-mentee matching.

The second stage focuses on mentor-mentee matching using a recommendation-based approach. The system analyzes user profiles, including their skills, interests, and professional goals, to identify suitable mentoring relationships. A matching algorithm processes this information and recommends mentors to mentees who are seeking guidance in specific domains. This automated matching mechanism improves the efficiency of mentorship programs by eliminating the need for manual selection and enabling users to quickly find mentors with relevant expertise.

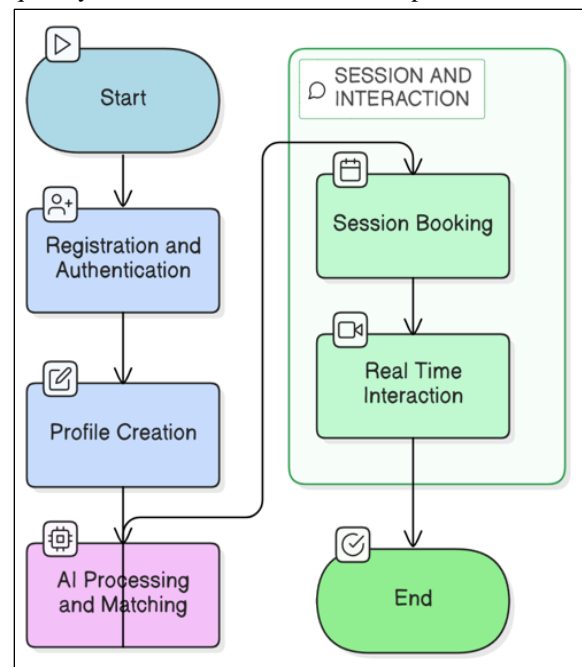


Figure 1: Proposed System Methodology of the AI-Driven Mentorship Platform

The third stage integrates an artificial intelligence chatbot that assists users in navigating the platform and provides career-related guidance. The AI chatbot uses natural language processing techniques to understand user queries and provide relevant responses. It can answer common questions, suggest mentors based on the user's interests, provide career advice, and guide users through the mentorship

process. The chatbot serves as a virtual assistant that enhances user engagement and ensures that support is available at any time. The fourth stage of the methodology involves the session scheduling and booking system. Once a mentee identifies a suitable mentor, the platform allows them to request and schedule mentoring sessions. The scheduling module manages session availability, booking requests, and confirmation notifications. This feature simplifies the process of organizing mentorship meetings and ensures smooth coordination between mentors and mentees. The fifth stage focuses on real-time communication features. The platform integrates messaging and video communication tools that allow mentors and mentees to interact effectively during mentorship sessions. Real-time chat functionality enables instant communication, while video conferencing capabilities allow users to conduct virtual mentoring sessions regardless of geographical location.

These communication tools enhance collaboration and create a more interactive mentorship environment. Finally, the system includes a feedback and review mechanism that allows mentees to evaluate their mentoring sessions. Users can provide ratings and feedback about mentors based on their experience. This information helps improve the quality of the platform by promoting transparency and allowing users to identify highly rated mentors. Additionally, collected feedback can be used to improve the recommendation algorithm and enhance future mentor-mentee matching. Overall, the proposed methodology integrates user management, intelligent matching algorithms, AI chatbot assistance, session scheduling, and real-time communication features into a unified platform. This structured approach ensures that the system effectively connects mentors and mentees while providing personalized guidance and interactive communication tools to support professional development and knowledge sharing.

IV. PROPOSED METHODOLOGY

The proposed system is an AI-driven mentorship platform designed to facilitate effective interaction between mentors and mentees through intelligent matching, real-time communication, and automated guidance. The system aims to address the limitations of traditional mentorship programs by providing a

structured digital environment where users can easily connect, share knowledge, and receive career guidance. By integrating artificial intelligence with modern web technologies, the platform enhances accessibility, personalization, and efficiency in the mentoring process. The platform is developed using a full-stack architecture consisting of a frontend interface, backend server, database management system, and AI integration modules. The frontend of the system is built using modern web technologies such as React and Tailwind CSS, providing a responsive and user-friendly interface. This interface allows users to register, create profiles, explore mentor listings, schedule sessions, and interact with other users seamlessly. The backend is developed using Node.js and Express.js, which handle server-side operations, data processing, and API management. MongoDB is used as the database system to store user profiles, mentorship sessions, chat messages, reviews, and other relevant information efficiently.

One of the core components of the proposed system is the intelligent mentor-mentee matching mechanism. The platform analyzes user profiles, including their skills, professional interests, and career goals, to recommend suitable mentors. This automated matching process ensures that mentees are connected with mentors who possess relevant experience and expertise, improving the effectiveness of mentoring relationships. The system also provides filtering and search options that allow users to manually explore mentor profiles if needed. Another important feature of the system is the integration of an AI-powered chatbot. The chatbot acts as a virtual assistant that provides instant support to users by answering queries, suggesting mentors, and offering career guidance. By using natural language processing techniques, the chatbot can understand user requests and generate relevant responses. This feature enhances user engagement and ensures that guidance is available at any time without requiring direct human intervention.

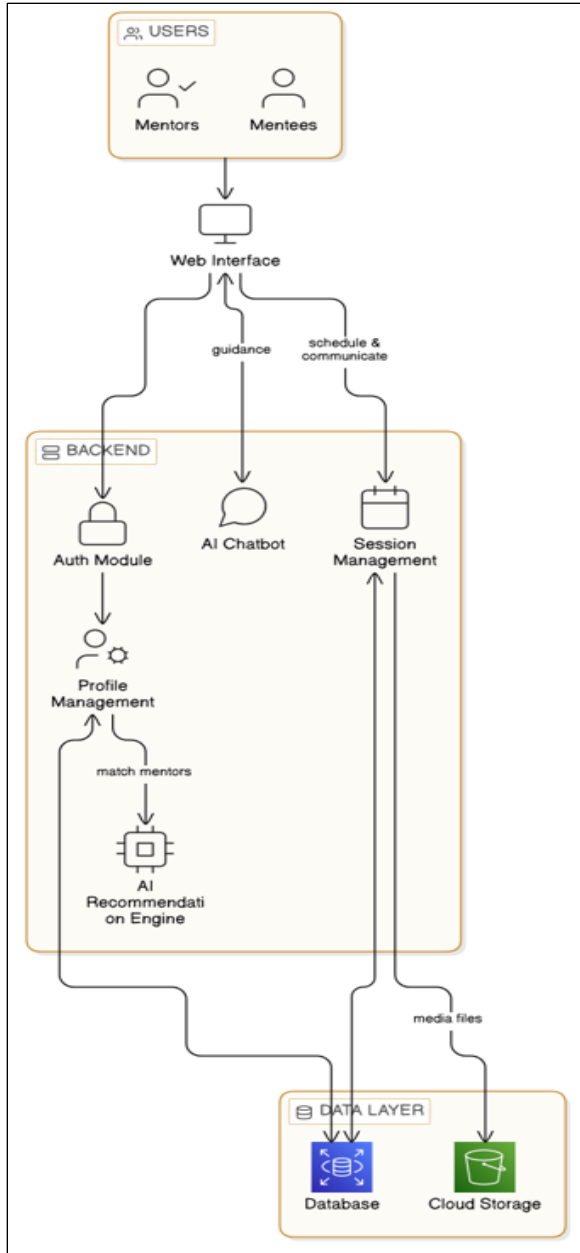


Figure 2: Proposed System Architecture of the AI-Driven Mentorship Platform

The proposed system also incorporates real-time communication tools to support effective mentor-mentee interaction. The platform includes messaging and video communication features that enable users to conduct mentoring sessions remotely. This eliminates geographical barriers and allows mentors and mentees from different locations to collaborate easily. Additionally, the system provides a session booking and scheduling mechanism that helps users organize mentoring meetings efficiently. To maintain quality

and transparency, the platform includes a feedback and rating system where mentees can evaluate mentors based on their mentoring sessions. This feature helps build trust within the platform and assists future users in selecting highly rated mentors.

V. IMPLEMENTATION

The implementation of the proposed AI-driven mentorship platform focuses on developing a scalable and efficient web-based system that enables seamless interaction between mentors and mentees. The system is implemented using modern full-stack web technologies combined with artificial intelligence integration to provide intelligent guidance and real-time communication capabilities. The development process involves frontend design, backend server development, database integration, AI chatbot implementation, and real-time communication features. The frontend of the system is developed using React along with TypeScript to create a dynamic and responsive user interface. Tailwind CSS is used for styling and designing interactive components that provide a visually appealing experience for users. The frontend includes several modules such as user registration, login authentication, mentor listing, session booking, chat interface, and user dashboards. These components are designed to ensure that users can easily navigate the platform and access mentorship services. React's component-based architecture allows the application to maintain modularity and reusability, which simplifies the development and maintenance process.

The backend of the platform is implemented using Node.js with the Express.js framework. This backend architecture handles server-side operations, including user authentication, profile management, session scheduling, messaging services, and interaction with the database. RESTful APIs are created to enable communication between the frontend and backend systems. These APIs process user requests, retrieve relevant information from the database, and return responses to the frontend interface. Secure authentication mechanisms are implemented to protect user data and ensure that only authorized users can access specific features of the platform. MongoDB is used as the database management system for storing user data, mentor profiles, session details, chat messages, feedback records, and other relevant

information. MongoDB's flexible document-based structure allows the platform to manage large volumes of user data efficiently. The database is connected to the backend server using Mongoose, which provides schema-based modeling and simplifies database operations such as data retrieval, insertion, and updates.

A key component of the system is the integration of an AI-powered chatbot. The chatbot is implemented using an external AI language model service that enables natural language interaction with users. The chatbot is capable of answering frequently asked questions, providing career guidance, and assisting users in navigating the platform. It acts as a virtual assistant that supports mentees in identifying suitable mentors and accessing learning resources. This AI component enhances the overall user experience by providing intelligent support and personalized recommendations.

Real-time communication features are implemented using WebSocket technology through libraries such as Socket.IO. This enables instant messaging between mentors and mentees within the platform. The real-time chat module allows users to exchange messages, share information, and communicate effectively during mentorship sessions. Additionally, the platform supports video communication features that allow users to conduct virtual mentoring sessions remotely. Cloud-based media storage services are integrated to manage profile images and other uploaded content. This ensures efficient storage and retrieval of multimedia data while maintaining system performance. Furthermore, a feedback and rating system is implemented to allow mentees to evaluate mentors after each session. The collected feedback helps maintain quality standards and improves the mentor recommendation process. Overall, the implementation combines modern web technologies, AI integration, and real-time communication tools to create a robust mentorship platform. This system architecture ensures scalability, flexibility, and an enhanced user experience, enabling effective mentorship and professional guidance within a digital environment.

VI. RESULT AND ANALYSIS

The developed AI-driven mentorship platform was evaluated based on its functionality, usability, and

system performance to determine its effectiveness in facilitating mentor-mentee interactions. The evaluation focused on key aspects such as user registration and authentication, mentor-mentee matching efficiency, chatbot response capability, real-time communication performance, and overall user experience. The results demonstrate that the proposed system successfully integrates artificial intelligence and modern web technologies to provide an efficient digital mentoring environment. During system testing, the user registration and authentication module functioned reliably, allowing users to create accounts and access the platform securely. The authentication process ensured that only authorized users could access specific dashboards and platform features. Profile creation and management were also tested, and users were able to update their skills, interests, and professional information easily. This profile information was effectively utilized by the system's mentor recommendation mechanism to suggest relevant mentors to mentees.

The mentor-mentee matching functionality showed promising results in recommending appropriate mentors based on user interests, skills, and professional goals. The system's recommendation mechanism helped mentees quickly identify mentors who possessed expertise in their desired domains. This feature significantly reduced the time required for mentees to search for suitable mentors manually. The availability of filtering and search options further improved the usability of the platform by allowing users to explore mentor profiles more efficiently. The AI-powered chatbot component demonstrated effective performance in responding to user queries and assisting users in navigating the platform. The chatbot was capable of answering frequently asked questions, providing career-related suggestions, and guiding users through various platform features. This functionality improved user engagement by offering instant assistance and reducing the need for manual support.

Real-time communication features were also evaluated during testing. The messaging system enabled mentors and mentees to communicate instantly, while video communication features allowed users to conduct virtual mentoring sessions without geographical limitations. These communication tools enhanced the interaction between mentors and mentees and created a

collaborative learning environment. The feedback and rating system allowed mentees to evaluate their mentoring sessions and share their experiences with the platform. The collected feedback helped identify highly rated mentors and provided valuable insights into the effectiveness of mentoring sessions. This transparency encourages mentors to maintain high-quality mentorship and improves trust within the platform. Overall, the results indicate that the proposed system effectively addresses the challenges of traditional mentorship programs by providing intelligent mentor matching, AI-assisted guidance, and real-time communication capabilities. The platform demonstrates strong potential for supporting career guidance, knowledge sharing, and professional development in a digital mentoring ecosystem.

VII. CONCLUSION

In conclusion, the proposed AI-driven mentorship platform provides an effective solution for improving the accessibility and efficiency of mentorship systems. Traditional mentoring approaches often face challenges such as limited availability of mentors, difficulty in finding suitable matches, and lack of structured communication tools. The developed system addresses these issues by integrating artificial intelligence, recommendation mechanisms, and modern web technologies into a unified digital platform that facilitates mentor-mentee interaction. The platform enables users to create detailed profiles, discover suitable mentors based on their interests and professional goals, and schedule mentoring sessions through an organized booking system. The integration of an AI-powered chatbot enhances user engagement by providing instant assistance, answering queries, and offering career guidance. In addition, real-time communication tools such as messaging and video interaction allow mentors and mentees to collaborate effectively regardless of geographical barriers. The results and analysis demonstrate that the system successfully supports mentorship activities by improving mentor-mentee matching, simplifying communication, and providing personalized guidance. The feedback and rating system further contributes to maintaining the quality and transparency of mentoring services within the platform. Overall, the proposed system demonstrates the potential of combining artificial intelligence with scalable web technologies

to create a smart digital mentorship environment. Such platforms can play a significant role in supporting career development, knowledge sharing, and professional growth in the evolving digital education ecosystem.

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