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ALGO MENTOR AI– A BIPARTITE MATCHING SYSTEM USING SUPERVISED LEARNING

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ABSTRACT:

ALGO MENTOR AI is an innovative digital platform designed to simplify and enhance mentorship by intelligently connecting mentors and mentees based on shared interests, skills, and goals. In a world where finding the right guidance can be limited by access or opportunity, Mentor Connect offers a structured and inclusive solution for students, professionals, and experts alike. The platform uses smart matchmaking algorithms, real-time communication tools, and personalized user profiling to suggest meaningful connections. It supports both individual and group mentoring, while features like progress tracking, feedback, and scheduling ensure consistent and goal-oriented interactions. To maintain trust and safety, users can verify their profiles, leave reviews, and build reputations within the community. Mentor Connect not only removes traditional barriers to mentorship but also encourages a culture of collaboration and continuous growth. Whether seeking guidance or offering expertise, the platform empowers users to connect, learn, and thrive in a supportive environment.

Keywords: Algo Mentor AI, Home Page , Login Panel, Profile Page, Mentor-Mentee Dashboard, Sessions and Meeting Page, Search and Match Page, Resource Page , Personalized Learning , Mentor Connect , Matchmaking algorithms.

Introduction:

Mentorship plays a vital role in guiding individuals through academic, professional, and personal development. In a world where students and early-career professionals often struggle to find the right guidance, a structured and accessible mentorship system becomes essential. Mentor Connect is a web-based platform created to address this need by connecting mentors with mentees in an organized, user-friendly, and secure environment. The application is designed to support meaningful interactions, encourage knowledge sharing, and help mentees grow with the support of experienced mentors. Mentor Connect simplifies the process of establishing mentor-mentee relationships by offering a centralized system where users can register, log in, and engage based on their roles. The platform features two distinct dashboards—one for mentors and one for mentees—ensuring a tailored experience for each user type. Mentors can view mentee profiles, manage appointments, and provide feedback, while mentees can set goals, request sessions, and track their progress. This structure fosters a clear and productive communication channel, enhancing the overall mentoring experience.

The platform is particularly suited for use in academic institutions, internship programs, corporate training initiatives, and other environments where mentorship is critical. Students can benefit from expert advice and career guidance, while professionals can receive support in acquiring new skills or navigating workplace challenges. Mentor Connect aims to make these opportunities more accessible by eliminating geographical barriers and bringing everything into a digital space. Mentor Connect is built using modern web development technologies to ensure a smooth and responsive user experience. The project uses the MERN stack—MongoDB, Express.js, React.js, and Node.js—which allows for full-stack JavaScript development and seamless integration between the front-end and back-end.

ALGO MENTOR AI– A BIPARTITE MATCHING SYSTEM

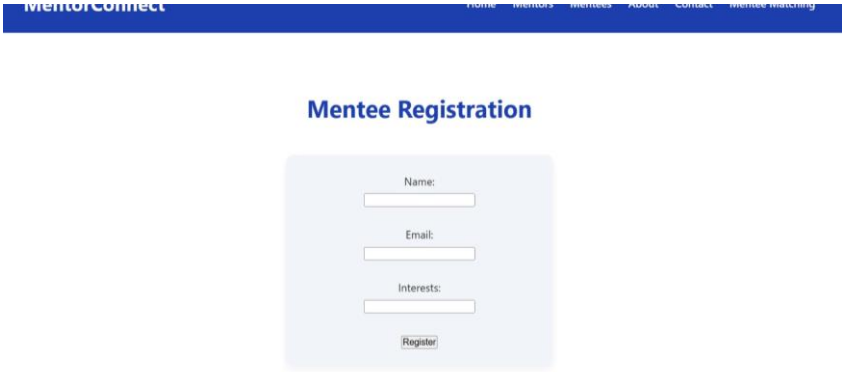
USING SUPERVISED LEARNING

HOME PAGE FOR ALGO MENTOR AI

The Home Page of ALGO MENTOR AI serves as the welcoming gateway to the platform, offering a clear and engaging introduction to its purpose and features. Designed with a clean and responsive layout, the page immediately captures user attention with a brief overview of the platform's goal—to connect mentors and mentees in a meaningful, organized, and efficient way. Visitors to the Home Page are greeted with a prominent banner or hero section that highlights the importance of mentorship and how the platform supports personal and professional growth. This section may include a brief tagline, a call-to-action button (such as "Get Started" or "Join Now"), and relevant visuals that reflect collaboration and learning.

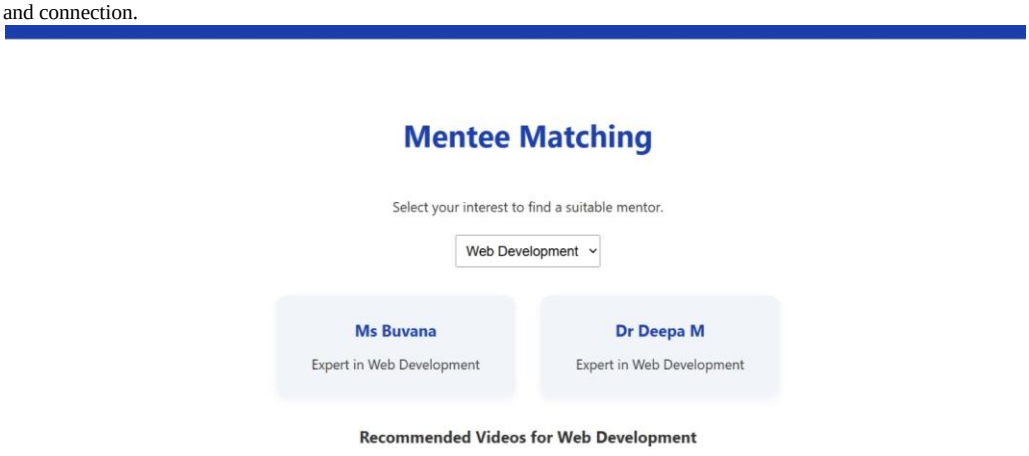
LOGIN PANEL

The Login Panel of Algo Mentor AI acts as the secure access point to the platform, enabling users to enter a personalized learning environment focused on algorithmic problem-solving and mentorship. It is designed to be intuitive, fast, and secure, ensuring that mentors and learners can easily log in and begin their journey with minimal effort. This panel features input fields for the user's registered email or username and password. It is designed with clear labels, smooth transitions, and responsive styling to provide a seamless experience across all devices. To maintain data integrity and user privacy, the system uses secure authentication practices and provides immediate feedback for invalid login attempts without exposing sensitive details. A key function of the login panel is role-based redirection.



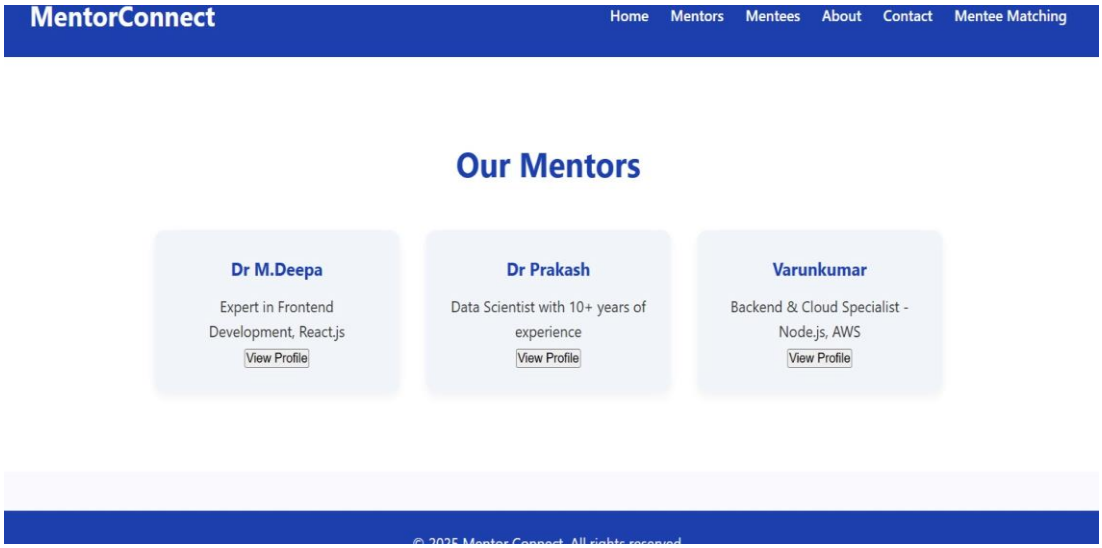
PROFILE PAGE

The Profile Page in Algo Mentor AI serves as a personalized space where users can view and manage their individual information, preferences, and activity within the platform. Designed with a clean and user-friendly layout, the page provides a clear overview of each user's identity, role (mentor or learner), and key details related to their engagement with the platform. For mentors, the profile page displays their name, area of expertise (e.g., algorithms, data structures, competitive programming), experience level, availability, and a list of mentees they are currently guiding. For learners, it shows their name, current learning track, completed problems, progress metrics, and assigned mentor details if applicable. Users can edit their profile details through an "Edit" or "Update" button, allowing them to change their profile picture, update personal info, or modify preferences such as time zone, learning goals, or communication preferences. The page may also include a brief bio section to help mentors and learners introduce themselves to each other, enhancing collaboration and connection.



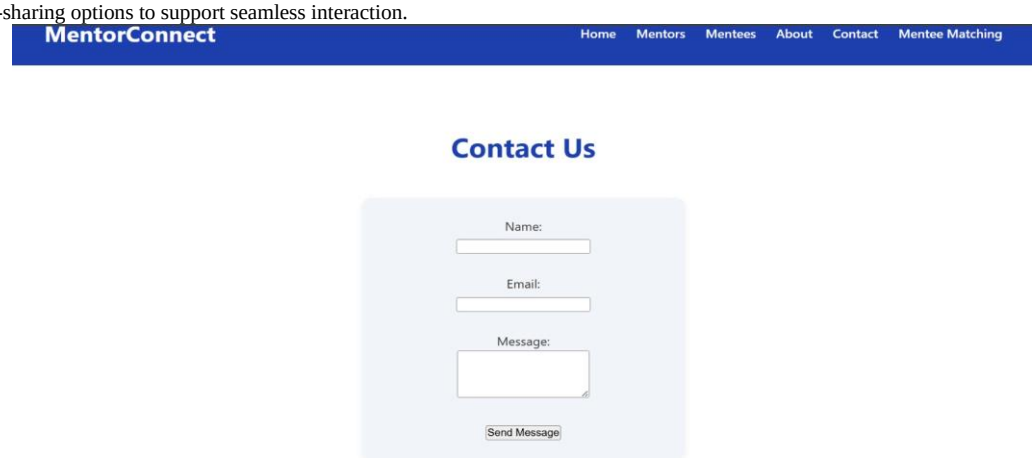
MENTOR-MENTEE DASHBOARD

The Dashboard in Algo Mentor AI acts as the core workspace for both mentors and mentees, offering a tailored experience based on the user's role. It is intelligently designed to streamline the mentorship process, foster productive communication, and support progress tracking in algorithmic learning. For mentors, the dashboard provides a structured environment to manage all mentee-related activities. Upon login, mentors are welcomed with an overview of their mentees, showcasing profiles, current progress, and pending tasks. They can assign algorithm challenges, monitor submission status, and offer timely feedback. For mentees, the dashboard serves as a personal learning hub. It displays current assignments, recently solved problems, and upcoming sessions with their mentor. Visual progress bars, milestone indicators, and topic-specific scores help mentees understand where they stand and what to focus on next. A dedicated section allows mentees to submit solutions, request help, and receive mentor feedback in real time. The dashboard also includes access to curated learning paths in various algorithmic topics, such as recursion, dynamic programming.



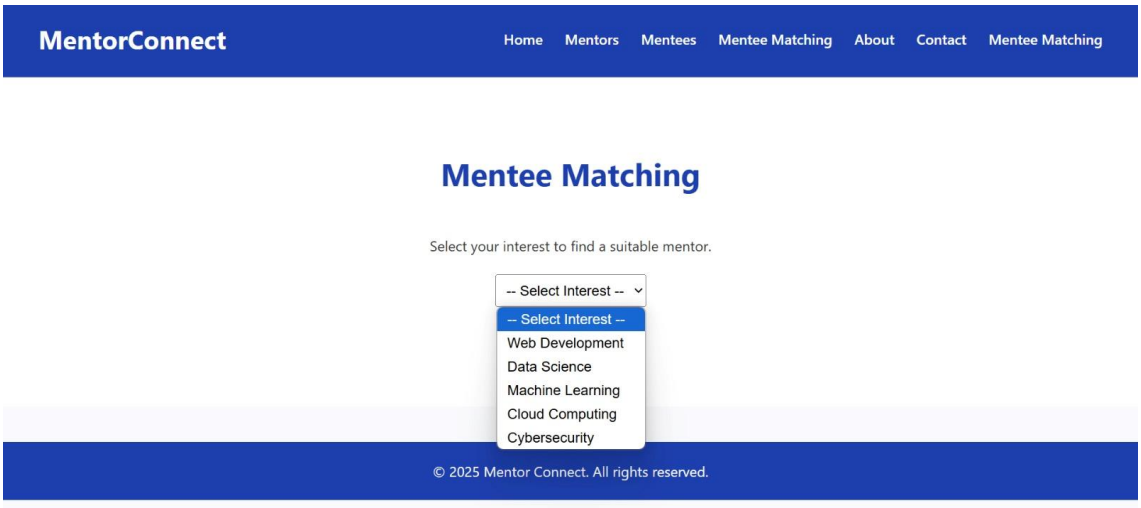
SESSIONS AND MEETING PAGE

The Sessions and Meeting Page in Algo Mentor AI is a dedicated space designed to schedule, manage, and conduct interactive sessions between mentors and mentees. This page plays a crucial role in fostering real-time communication, enabling personalized guidance, and enhancing the overall mentoring experience through structured, one-on-one or group interactions. For mentees, the page offers an intuitive interface where they can view available time slots, request meetings with their assigned mentor, and check upcoming or past session details. A built-in calendar view helps learners stay organized by displaying all scheduled meetings, deadlines, and reminders in one place. Once a request is sent, mentees receive confirmation notifications when the mentor approves the session. For mentors, the page provides tools to manage meeting requests, set their availability, and review session history. Mentors can accept or reschedule meetings, add session notes, and mark attendance. They can also use this page to prepare discussion points, share relevant resources, or track topics covered in previous sessions. The page integrates communication tools such as video conferencing links, chat windows, and file-sharing options to support seamless interaction.



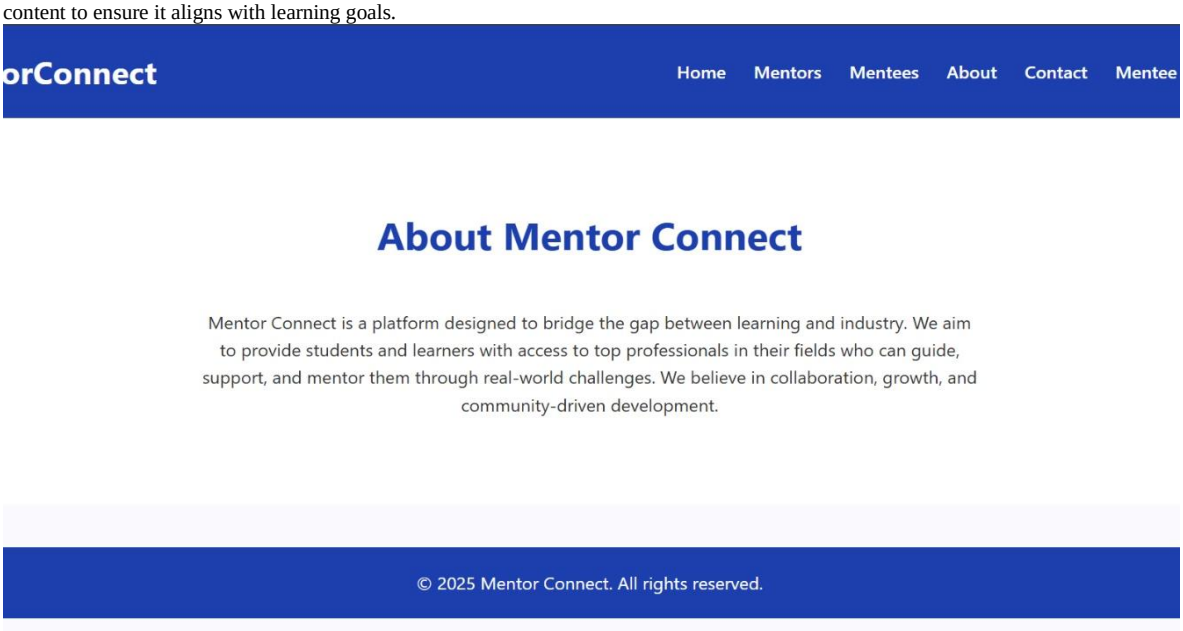
SEARCH AND MATCH PAGE

The Search, Match, and Sessions Page in Algo Mentor AI is designed to facilitate seamless connections between mentees and mentors, ensuring an efficient and personalized mentoring experience. Mentees can easily search for mentors based on specific criteria such as expertise, experience level, and availability, with an advanced matching algorithm providing tailored recommendations for the best mentor-mentee fit. Once a mentor is selected, mentees can request meetings or book available time slots directly through the platform. The Sessions Page allows both mentors and mentees to schedule, track, and manage their sessions, keeping all communication and progress centralized. This page includes features like session reminders, notes, and performance tracking, enhancing the overall learning journey.



RESOURCE PAGE

The Resources Page in Algo Mentor AI is a central hub designed to provide mentors and mentees with essential learning materials, tools, and references to support their algorithmic learning journey. This page offers easy access to curated content such as tutorials, problem sets, code samples, study guides, and practice challenges that cover a wide range of algorithm topics. For mentees, the page helps in reinforcing learning by offering structured resources categorized by skill level or topic (e.g., sorting algorithms, dynamic programming, graph theory). They can download materials, view instructional videos, or use links to external educational platforms for further learning. For mentors, the Resources Page allows for uploading custom resources, including slides, books, and advanced challenges to guide their mentees. It also offers tools for tracking the resources shared with each mentee and managing content to ensure it aligns with learning goals.



FUNDAMENTAL TECHNIQUE:

At the heart of the platform lies the emphasis on algorithmic problem-solving. Algo Mentor AI guides users through various problem-solving techniques, helping them develop a structured approach to tackling algorithmic challenges. These include methods like divide and conquer, dynamic programming, greedy algorithms, and backtracking, which are essential for learners seeking to master algorithms. A core feature of Algo Mentor AI is its advanced matching algorithm. Using a combination of factors such as expertise, availability, and learning goals, the platform automatically matches mentees with the most suitable mentors. This personalized matching technique ensures that each mentorship experience is tailored to the individual's learning needs and preferences, optimizing the learning process.

PROPOSED METHODS :

The Algo Mentor AI platform incorporates a set of innovative methods to enhance both the learning and mentoring experience, optimizing algorithmic education through personalized, data-driven, and interactive approaches. These methods aim to deliver a dynamic and scalable solution for students and mentors alike.

AI-Powered Mentor Matching Algorithm

One of the key methods proposed is the use of an AI-powered matching algorithm that analyzes mentees' learning styles, skill levels, and preferences to recommend the most suitable mentors. This approach goes beyond basic filtering by using machine learning techniques to improve the matching process continuously, ensuring that each mentee is paired with a mentor who is best equipped to guide them through their learning journey.

2. Adaptive Learning Pathways

Adaptive learning pathways are designed to dynamically adjust based on the mentee's progress. This method tracks each learner's performance on algorithmic problems and offers personalized pathways, recommending specific topics, exercises, and resources that target weak areas. By adjusting the curriculum as the learner advances, the platform ensures that the learning experience remains relevant and challenging, fostering continuous improvement.

3. Real-Time Performance Analytics

Another method is the integration of real-time performance analytics that tracks mentees' engagement with the material, coding problem-solving abilities, and session participation. Using this data, the platform provides mentors with insights into a mentee's learning progress, helping them to tailor their guidance and provide targeted feedback. This ensures more effective and focused mentoring.

4. Collaborative Learning and Peer Reviews

Collaborative learning is encouraged through the integration of a peer review system, where mentees can work on coding problems together, review each other's solutions, and learn through collaboration. This not only promotes teamwork but also allows mentees to gain different perspectives on problem-solving. Peer feedback is incorporated into the learning process, further enhancing the educational experience.

5. Interactive Coding Challenges and Problem Solving

The platform proposes the use of interactive coding challenges that simulate real-world algorithmic problem-solving. Mentees can work on problems that adjust in complexity as they improve, ensuring that they are always engaged with tasks that push their abilities. These challenges include hints, solution explanations, and guided feedback to ensure mentees learn the correct approaches and techniques.

6. Mentor Dashboard with Progress Tracking

The mentor dashboard is an essential component of the proposed methods, providing mentors with a comprehensive view of each mentee's progress. This includes detailed tracking of the mentee's completed tasks, strengths, weaknesses, and overall performance. By using this method, mentors can plan their sessions effectively, offer targeted guidance, and monitor the growth of each mentee over time.

7. Automated Session Scheduling and Feedback System

Automated scheduling and Feedback collection systems streamline the logistical aspects of the mentoring process. Mentees can book sessions based on the mentor's availability, and the system automatically syncs calendars. After each session, an automated feedback system collects insights from both mentors and mentees, ensuring that the mentorship experience is continually refined for better results.

8. Scalable Cloud Infrastructure for Data Storage and Processing

To support a growing number of users and large datasets, the platform utilizes a scalable cloud infrastructure. This ensures that as the number of users increases, the platform remains performant and capable of handling large amounts of data from coding challenges, session interactions, and mentor-mentee communications. Cloud storage allows for easy access and sharing of learning materials, making it an essential method for scalability.

Results and Discussions:

The Algo Mentor AI project has shown promising results in enhancing the learning and mentorship experience for algorithmic problem-solving. Through personalized mentor-mentee matching, adaptive learning pathways, and real-time performance analytics, the platform effectively tailors the educational experience to individual needs. Initial feedback from users has indicated increased engagement and improved understanding of complex algorithms, with mentors noting the value of data-driven insights to guide their sessions. The integration of interactive coding challenges and real-time communication tools has facilitated better collaboration and more efficient problem-solving. However, there is still room for improvement in expanding content coverage, enhancing AI-driven learning tools, and exploring gamification to further boost user motivation. The platform's scalability and potential for integration with educational institutions provide a solid foundation for future growth, ensuring its continued relevance and effectiveness in algorithmic education.

Conclusion and Future Enhancements:

The Algo Mentor AI platform provides a robust and personalized solution for algorithmic learning and mentorship. By leveraging advanced techniques such as AI-powered mentor matching, adaptive learning pathways, real-time performance analytics, and interactive problem-solving challenges, the platform ensures an engaging and effective educational experience. It bridges the gap between theoretical knowledge and practical application by offering a scalable, user-friendly environment where both mentors and mentees can thrive.

Future Scope

While the Algo Mentor AI platform has made significant strides in creating an effective learning and mentoring environment, there is substantial room for future enhancement. Some potential areas for development include:

Expansion of Learning Content

The platform can be expanded to cover additional areas of computer science, such as data structures, machine learning, and artificial intelligence. This would broaden the scope of mentorship and attract a wider audience interested in other domains of programming.

2. Integration of AI-Driven Content Generation

Future iterations of the platform could integrate AI-driven tools that generate personalized learning content, such as custom challenges, quizzes, and problem sets based on individual progress. This would make the learning experience even more tailored to each user's specific needs.

3. Advanced Mentor Analytics

The platform could incorporate more sophisticated analytics for mentors, such as behavioral analysis tools to assess their teaching effectiveness. By providing insights into a mentor's communication style, session effectiveness, and mentee progress, the platform could help mentors improve their teaching strategies over time.

4. Gamification of Learning

Introducing gamification elements, such as badges, leaderboards, and achievement systems, could further increase user engagement and motivation. Mentees could track their progress through levels, unlocking new challenges as they improve, which would make the learning process more enjoyable and competitive.

5. Global Reach with Multilingual Support

To cater to a wider global audience, the platform could introduce multilingual support, making it accessible to learners and mentors worldwide. This would help foster a more diverse and inclusive learning community, connecting individuals from different backgrounds and cultures.

6. Mobile Application

Developing a mobile version of Algo Mentor AI would allow users to access the platform on the go. This would increase flexibility and accessibility for mentees and mentors, particularly in regions where mobile usage is higher than desktop.

7. Collaboration with Educational Institutions

Partnering with universities, coding boot camps, and other educational institutions could lead to the integration of Algo Mentor AI into formal curricula. This would allow institutions to leverage the platform for their students' algorithmic education and mentoring. By addressing these areas for improvement, Algo Mentor AI can continue to evolve into a comprehensive and highly effective platform, expanding its impact and providing valuable learning experiences to a global audience.

REFERENCES:

1. Cormen, T.H., Leiserson, C.E., Rivest, R.L., & Stein, C. (2009). Introduction to Algorithms (3rd ed.). MIT Press. - A foundational text for understanding algorithms, providing a detailed exploration of both basic and advanced topics.

2. GeeksforGeeks. (n.d.). Algorithms Section. Available at: https://www.geeksforgeeks.org/fundamentals-of-algorithms/ - A widely-used online resource offering tutorials and coding challenges to learn and practice algorithms.

3. LeetCode. (n.d.). LeetCode Algorithm Practice. Available at: https://leetcode.com/ - A popular platform offering a variety of algorithmic problems to improve coding and problem-solving skills.

4. Skiena, S.S. (2008). The Algorithm Design Manual. Springer. - This book provides in-depth strategies for designing algorithms and solving problems efficiently, ideal for both learners and experienced developers.

5. Zachary, L.J. (2000). The Mentor’s Guide: Facilitating Effective Learning Relationships. Jossey-Bass. - A comprehensive guide on the principles of mentorship and how to build effective mentor-mentee relationships.

6. Mentorloop. (n.d.). Mentoring Software. Available at: https://mentorloop.com/ - An online platform designed to connect mentors and mentees, providing tools for matching and managing mentorship.