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Intelligent Mock Interview System: Skill-Based Assessment and Adaptive Interviewing in MockMate

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ABSTRACT –

In the current competitive job market, interviewees need organized and effective preparation to succeed in interviews. Conventional methods are not always personalized, timely, and interactive, resulting in skill gaps. MockMate is an artificial intelligence interview preparation platform that aims to solve these problems by providing customized skill evaluations, AI-based mock interviews, adaptive learning blueprints, and tracking. The site is developed with React.js as the frontend, Node.js as the backend, and MongoDB as the database to provide a responsive and scalable experience to users.

Unlike traditional learning sites, MockMate combines AI-generated question creation and peer-to-peer mock interview simulations to offer an authentic interview experience. The Skill Matcher module dynamically assigns users interview partners according to their knowledge, while the Mock Interview module enables AI-based and human-conducted mock interviews. The system is designed with RESTful APIs to facilitate easy communication among modules, and all the tests are dynamically created according to user-chosen skills.

The system has been rigorously tested via unit testing, integration testing, and actual user feedback, which has proven the system to be effective in boosting interview preparedness and organized learning. Enhancements for the future include AI-based sentiment analysis, voice and facial recognition, and deep learning-based feedback mechanisms for further tailoring of user experiences.

MockMate is a cutting-edge solution towards tech-enabled interview prep, which closes the gap between theory and actual practice.

Keywords – AI-driven Mock Interviews, Adaptive Learning, Skill Matcher, Interview Preparation, Real-time Feedback.

Introduction

The employment market has grown more competitive, and candidates are expected to showcase excellent technical, analytical, and communication skills in interviews. Conventional interview preparation techniques are not personalized, do not provide real-time feedback, and lack structured learning, which makes it challenging for candidates to evaluate and enhance their skills. MockMate is an artificial intelligence-based interview preparation platform that aims to increase user readiness by providing personalized skill evaluation, AI-based mock interviews, adaptive learning roadmaps, and progress monitoring. Research on adaptive learning systems [1] indicates that personalized learning through AI enhances candidate confidence and performance.

MockMate utilizes React.js on the frontend, Node.js for the backend, and MongoDB to manage data in a scalable, interactive manner for users. RESTful APIs are used to construct the system for ease of inter-module communication. The Skill Matcher Module, which is one of the fundamental building blocks, pairs users with mock interview partners dynamically according to selected skills and level of experience in order to engage in peer-to-peer learning as well as effective interview practice. Studies in peer-learning settings [2] emphasize the efficacy of peer-to-peer practice in the enhancement of interview success rates.

This article discusses the technical deployment of MockMate, its system design, functional units, data processing, and practical usage. The platform is designed with modularity to ensure it can be scaled and incorporate sophisticated AI-powered features like speech analysis, sentiment analysis, and deep learning-based feedback systems. AI-powered interview evaluation [3] research highlights the application of NLP and machine learning in evaluating

communication and technical skills. The paper also tests the platform extensively using unit testing, integration testing, and real-world user validation to determine its efficacy in improving interview readiness.

The following sections of this paper contain a detailed explanation on the literature survey, system architecture, implementation process, testing methodologies, and results obtained through the deployment of MockMate.

Related work

Various research studies and websites have tried to enhance interview preparation with AI-based solutions, peer-to-peer mock interviews, and adaptive learning frameworks. Current solutions concentrate on coding problems, AI-based question generation, and formal learning tracks, but they do not have an integrated system that brings together personalized roadmaps, AI-based mock interviews, and skill-based peer matching. This section mentions some of the significant works in interview preparation, mock interview systems, and skill-based evaluation.

Over the last few years, websites like LeetCode, Codeforces, and HackerRank have become popular for providing competitive programming problems and auto-coded assessments. These websites enable candidates to improve their coding skills but do not provide AI-based mock interviews or instant feedback on communication skills. A study by Zhang et al. [2] suggested an AI-based assessment tool for technical interviews, which is designed to assess code efficiency but does not involve behavioral interview preparation or peer-to-peer interaction.

Peer-to-peer interview simulation is another technique used in the area of mock interviews. Green et al. [12] emphasize the value of peer learning and live interview simulation, wherein candidates alternate as interviewers and interviewees. These systems usually do not include adaptive learning systems, and peer feedback quality varies greatly based on the interviewer's experience.

Recent breakthroughs in Natural Language Processing (NLP) and AI-powered tests have given rise to AI-interview coaches. Tools such as HireVue and Interviewing.io use NLP to process candidate answers and give automated feedback. Yet, these tools concentrate more on speech and facial expressions than on technical skill testing or interactive learning maps. Studies by Patel et al. [8] show that integrating AI with structured interview practice greatly increases user confidence and performance but current implementations still fall short of having customizable skill-based learning paths.

MockMate is designed to fill these gaps by bringing together skill-based tests, adaptive learning pathways, AI-powered and peer-assisted mock interviews, and real-time progress monitoring on a single platform. Unlike other coding platforms, MockMate offers technical as well as behavioral interview preparation, making it a complete solution for job aspirants seeking to polish their interview skills in a step-by-step and customized way.

To gain a deeper insight into MockMate's innovation, the comparison table below displays major differences between current interview preparation systems and the suggested platform with regard to functionality, personalization, and flexibility.

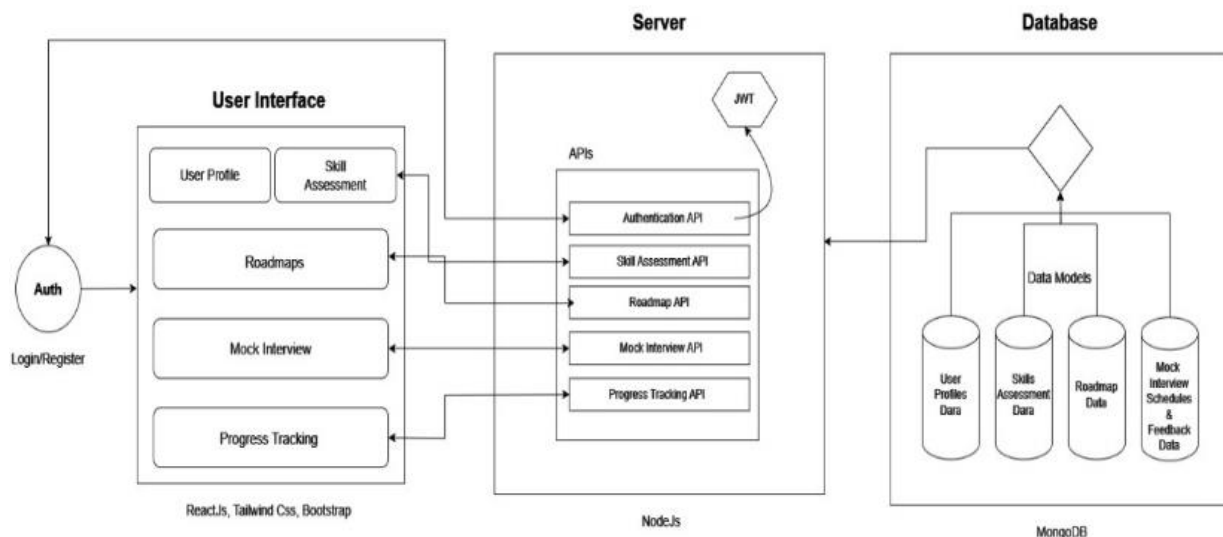
Table 1. Comparison between Existing Solutions and MockMate

Feature / Criteria	Existing Systems (e.g., LeetCode, HireVue, Interviewing.io)	MockMate (Proposed System)
AI-Based Mock Interviews	Limited or Generic	Skill-based, with feedback
Behavioral Interview Preparation	Not emphasized	Integrated with AI and peer support
Peer-to-Peer Interviewing	Present in some (Interviewing.io), not adaptive	Dynamic pairing based on skills
Adaptive Learning Roadmaps	Not Available	Personalized, based on user performance
Scalability and Modularity	Varies	Microservice architecture, easily extendable

proposed Rpb architecture

The architecture planned for MockMate is intended to offer a scalable, adaptive, and interactive system for interview readiness. The architecture comprises several interactive modules that authenticate users, gauge skills, simulate interviews, and monitor progress. The architecture has a modular as well as a service-oriented model, which renders the system capable of future extensibility and integration. Artificial intelligence-based learning platform research [4] shows that modular systems improve scalability as well as the adaptability of the system and are ideal for dynamic learning purposes.

Fig. 1. System Architecture



The intended architecture of MockMate is intended to offer a scalable, adaptive, and interactive interview preparation platform. The system has several modules that are integrated with each other to manage user authentication, skill evaluation, mock interviews, and progress monitoring. The architecture adopts a modular and service-oriented style, which guarantees flexibility for future extensions and integrations. Literature on AI-based learning platforms [4] indicates that modular architectures improve scalability and system adaptability, which makes them ideal for dynamic learning systems.

The site is developed with a three-tier architecture that includes the presentation tier, business tier, and data storage tier. The client-side is developed with React.js to offer an interactive interface, whereas the server-side is developed with Node.js and Express.js to process API calls, business logic, and system operations. MongoDB is employed as the main database for storing user profiles, skill tests, interview information, and progress reports. The system incorporates external APIs to conduct real-time coding tests and performance monitoring [5].

A. System Components

1. User Authentication Module Handles user registration, login, and JWT-based secure access control [6].
2. Skill Assessment Module Creates tailored tests based on chosen skills, such as multiple-choice questions and coding challenges. Adaptive assessment strategies, as recommended in [4], enhance learning results by adapting difficulty levels from user performance.
3. Mock Interview Module Offers AI-powered and peer-to-peer mock interviews with NLP being used to scan responses and provide feedback. A study in NLP-based evaluation systems [8] identifies how AI can efficiently examine candidate responses and provide suggestions for improvement.
4. Roadmap Generation Module Generates individualized learning pathways that dynamically get updated according to the progress made by the user. A study in adaptive learning [9] points to how individualized roadmaps play a critical role in systematic skill-building.
5. Tracking Progress and Analytics Module Tracks users' performance, provides reports, and gives feedback on improvement areas. Performance analysis of educational technology [10] has been demonstrated to enable the user to learn their weak points and improve them with time.

B. System Workflow

1. Registration and setup of the profile are done by users where they choose experience and skill levels.
2. A skill analysis and an individualized roadmap [11] are provided by the system.
3. Mock interviews are completed by users using AI-powered or peer-to-peer feedback [12].
4. The system monitors progress and adjusts learning paths accordingly [13].

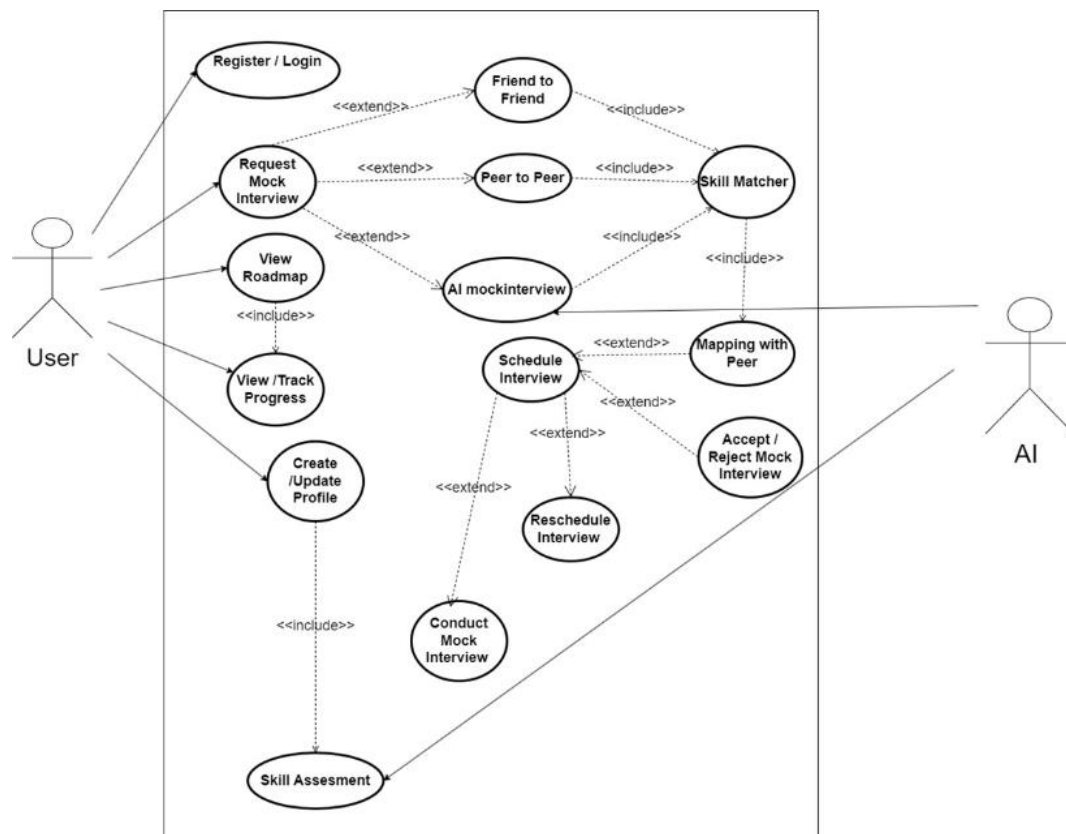


Fig. 2. Use-case Diagram

As shown in Fig.2 following are the relationships between different actors and system.

User ↔ Register/Login:

- The user interacts with the system to either register for a new account or log in to an existing one.

User ↔ AI mock Interview:

- The user interacts with the system to request a mock interview, which can be conducted by AI or peer users.
- The AI assists in scheduling, conducting, and providing feedback for the interview.

User ↔ Skill Assessment:

- The user can perform a skill assessment to evaluate and track their abilities. The system includes this feature as part of the user's learning progress.

User ↔ Roadmap & Progress Tracking:

- The user can view the roadmap to track their learning path and use the system to monitor their progress over time.

Request Mock Interview ↔ Peer Matching:

- The system includes functionality for matching peers based on skill levels and conducting peer-to-peer interviews. AI also helps in the mapping process for users.

Schedule/Reschedule Interview ↔ User:

- The user can schedule and reschedule interviews, if necessary, either with AI or peer participants.

Accept/Reject Mock Interview ↔ Peer/User:

- Users have the option to accept or reject mock interview requests sent by peers, allowing flexibility in interview planning.

Friend to Friend / Peer to Peer / Skill Matcher: The system includes friend-to-friend or peer-to-peer matching for interviews based on similar skill levels, with the skill matcher helping to align users with appropriate peers.

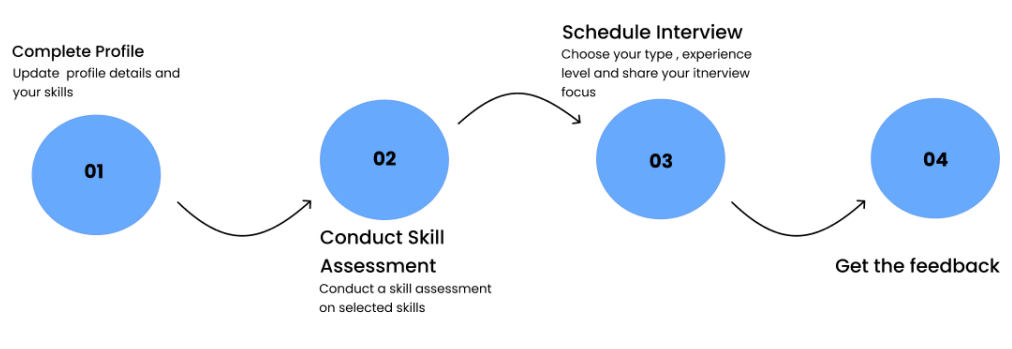


Fig. 3. Workflow of Interview Preparation in MockMate

The proposed architecture ensures seamless communication between components and provides an efficient interview preparation experience. The modular design allows for scalability and integration of advanced AI-driven feedback mechanisms.

C. System Integration

MockMate has a modular architecture in which the frontend, backend, and database are decoupled but tightly integrated with RESTful API communication. The frontend is developed using React.js, which is the presentation layer and is responsible for rendering the user interface, managing user input, and issuing asynchronous API calls.

Every action on the frontend makes an HTTP request (GET, POST, PUT, DELETE) to the Node.js and Express.js-developed backend server. The requests are received by individual API routes, which receive data, talk to the MongoDB database, and return the necessary responses.

For instance, when a user submits an assessment of skills, the frontend will send a POST request with the user's input to an API endpoint such as `/api/assessment/submit`. The backend does the following:

- Verifies the request and parses the input.
- Talks to the MongoDB database to store the results.
- Executes logic to update the adaptive roadmap for the user according to the new information.
- Returns a response back to the frontend with confirmation and progress update data.

For ensuring safe and authenticated interactions, JWT-based authentication is employed. When a user logs in, the backend provides a JWT token, which is kept on the frontend and appended to all subsequent API requests in the Authorization header. This guarantees safe data exchange and content delivery suitable for a particular user.

This design supports separation of concerns and allows the frontend and backend to be scaled separately but still support high performance and reliability. Integration testing is also carried out to validate that all modules are able to communicate appropriately between the system boundaries.

methodologies

MockMate development is carried out in a systematic manner to make it efficient, scalable, and adaptable for interview preparation. The process involves requirement analysis, system design, implementation, and testing to realize an AI-based, customized mock interview platform. Research on AI-based learning platforms [6] indicates that systematic methodologies increase adaptability and enhance learning outcomes.

A. Requirement Analysis

The initial phase was to collect requirements from prospective users, such as students, job applicants, and professionals. Interviews and surveys were done to determine major issues in current interview preparation websites. The results highlighted the importance of a learning roadmap, AI-based mock interviews, real-time feedback, and peer-to-peer practice sessions. Personalized learning platform research [7] stresses the significance of establishing clear user requirements to make it effective.

B. System Design

A service-oriented and modular architecture was used to improve scalability and flexibility. The system was implemented with a three-tier architecture:

1. Presentation Layer – Built using React.js to deliver an easy-to-use user interface.
2. Business Logic Layer – Built using Node.js and Express.js to manage authentication, skill evaluation, and interview simulations.
3. Data Storage Layer – Handled using MongoDB for effective storage and retrieval of user profiles, evaluations, and interview outcomes [8].

C. AI-Based Skill Evaluation and Simulated Interviews

Machine learning algorithms were combined to develop dynamic tests as a function of user-chosen abilities. The ability testing module accommodates user performance, setting difficulty levels appropriately [9]. Mock interviews by artificial intelligence harness the power of Natural Language Processing (NLP) to judge candidate answers and return instant technical and soft skill feedback. AI-based testing systems [10] reveal that tests by NLP raise candidate preparedness by testing for speech behavior, confidence measures, and fact correctness.

D. Implementation Strategy

MockMate was designed with the Agile method [11] in place to provide regular iterations and improvement on the basis of feedback. Implementation was spread over several sprints:

- 1.Sprint 1 – Module development of user authentication and setup of profile.
- 2.Sprint 2 – Integration module of skill evaluation and generation of roadmap.
- 3.Sprint 3 – Development of AI-based and peer-conducted mock interview modules.
- 4.Sprint 4 – Testing and optimization of tracking progress and analytics features.

E. Testing and Validation

Multiple testing methodologies were employed to ensure system reliability and performance:

- 1.Unit Testing – Individual components were tested to validate their functionality.
- 2.Integration Testing – Modules were tested together to ensure seamless data flow.
- 3.User Acceptance Testing – Real users participated in testing to provide feedback on usability and effectiveness [12].

The Agile-based development process enabled ongoing improvements based on test outcomes and user input to ensure that MockMate is up to the standards of a good and interactive interview preparation tool.

experimental results

In the Mock Interview Module of MockMate, various components have been designed and implemented. One of these is the Skill Assessment Module, which allows users to select relevant skills and give the AI assessment for personalized interview experiences.

Below is an implementation snapshot of the Skill Assessment Module, showcasing its UI and functionality

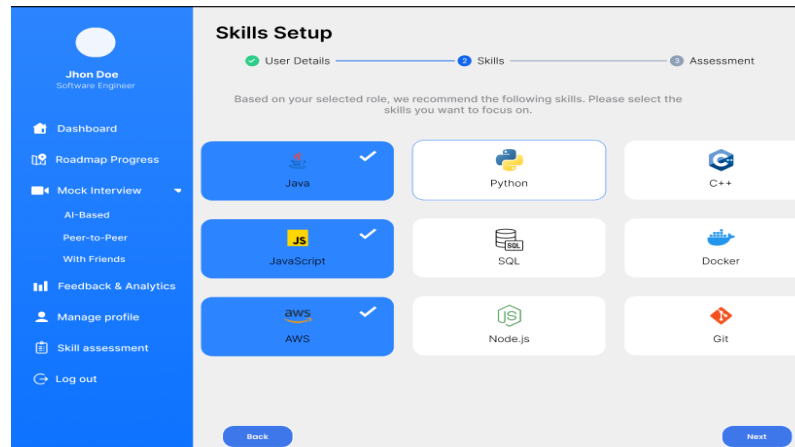


Fig. 4. User details for the skill assesment

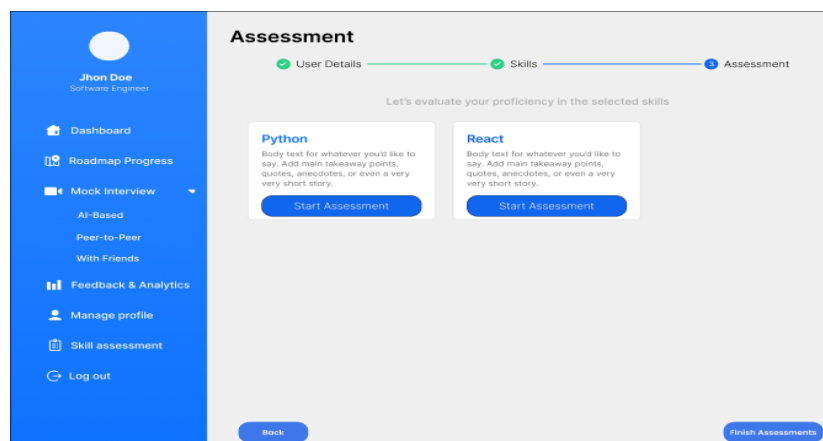


Fig. 5 Assesment for the selected skill

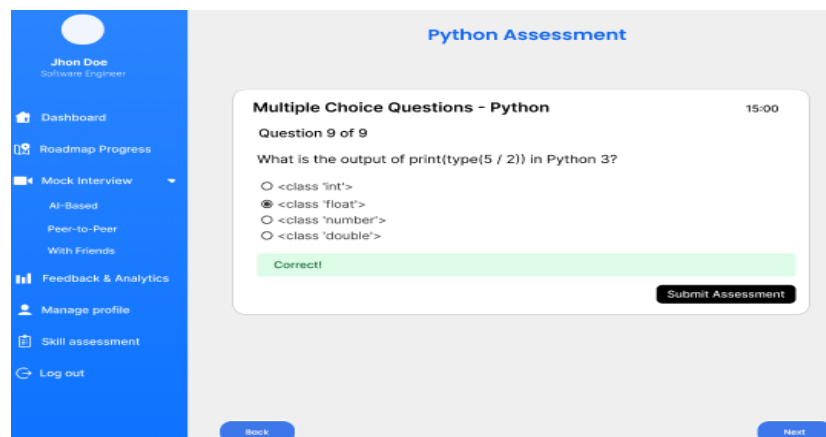


Fig. 6. Question generation

This module efficiently processes user-selected skills, generate question for assesment , integrates them into the interview system, give the result and ensures a seamless experience

conclusion

Current interview preparation platforms solely concentrate on the testing of technical skills with no holistic mock interview experience. MockMate remedies this shortcoming by combining AI-based skill testing, peer-to-peer and AI-conducted mock interviews, and customized learning roadmaps into one platform.

This study illustrates the evolution of MockMate as a structured and adaptive interview preparation platform. The website adapts learning routes dynamically and offers real-time feedback, making the preparation experience more interactive and efficient.

MockMate currently has support for skill-based tests, coding problems, and mock AI interviews. Future developments could extend to sentiment analysis, facial recognition, and industry-tailored interview modules. Adding support for non-technical areas will further increase its applicability.

MockMate seeks to make interview preparation easier through guided assistance and instant feedback. Future updates may look to virtual reality-based interview simulations to make practice more engaging and experiential.

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