iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 13 **Issue:** V **Month of publication:** May 2025

DOI: https://doi.org/10.22214/ijraset.2025.70977

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 13 Issue V May 2025- Available at www.ijraset.com

Prepmania: an AI-Powered Mock Interview Platform for Skill Evaluation and Performance Feedback

Siddhi Awasare [1], Shreya Vedpathak [2], Shravani Pawar [3], Sanika Hatrote[4], Sakshi Patil[5], Mrs. K.A. Bhosale[6]
[1,2,3,4,5]*Students,* [6]*Assistant Professor ,Computer Science & Engineering, D Y Patil College of Engineering & Technology, Kolhapur, Maharashtra, India*

Abstract: ***Prepmania is an AI-powered mock interview platform designed to help job seekers prepare effectively for real interviews. The name combines "Preparation" and "Mania," reflecting a passionate, focused approach to interview readiness. The system generates role-specific questions based on user inputs like job title, skills, and experience. A key innovation is its multimodal analysis—using facial expression recognition and voice analysis to assess confidence, communication, and behavior. Prepmania enhances preparation through AI-powered feedback, response comparison, and visual performance analytics. It simulates real interviews with timed questions and tracks progress across sessions. Built with Next.js, it uses Clerk for authentication, Drizzle ORM for database handling, Tailwind CSS for UI, and Neon as its cloud database.***
Keywords: AI mock interview, Gemini API, Video analysis, job specific questions, evaluation.

I. INTRODUCTION

Proposed an AI-based mock interview behavioral recognition system that simulates real-time interview scenarios using a virtual recruiter. The system captures and analyzes multimodal inputs such as facial expressions, speech patterns, and emotional responses to assess a candidate's performance. It integrates machine learning models for emotion detection, personality recognition, and sentiment analysis, providing users with detailed feedback and progress tracking across sessions. Their work highlights the potential of AI in improving interview preparedness by offering objective, data-driven insights into behavioral traits. This research lays the groundwork for implementing intelligent virtual coaching systems in career readiness tools. [1]. Prepmania advances this further through the integration of computer vision and speech processing algorithms to evaluate user performance accurately. Other research has examined the effectiveness of dynamic, chatbot-driven mock interviews that adapt depending on the user's response and track their performance over time—a function that informed Prepmania's personalized question generation and real-time performance-monitoring functionality [2]. The platform leverages natural language processing (NLP) and machine learning algorithms to analyze both verbal and non-verbal responses in real time. Key features include context-specific question generation, speech recognition, sentiment analysis, and performance scoring. The system provides immediate feedback on various aspects such as communication skills, confidence, body language, and technical knowledge. By offering personalized and scalable support, this AI-powered solution serves as an innovative tool in career development and recruitment preparation. [3].

Interview preparation is an essential part of job acquisition, especially in today's competitive job market. Traditional preparation techniques, such as mock interviews with peers or mentors, are subjective in feedback, intermittent, and not comprehensive in assessment. These practices are most likely to yield little behavioral information, and it is difficult for candidates to track their real progress.

To address these shortcomings, we present Prepmania—a computer-based mock interview platform, built using Next.js and a modern web stack. The platform delivers role-specific, user-profile-based interview questions and evaluates verbal and non-verbal cues through multimodal analysis, including body language, tone, and speech intelligibility. These behavioral signals help deliver objective, real-time feedback to candidates, enabling them to identify improvement areas and enhance their interview readiness.

Prepmania does this by using a very detailed feedback dashboard that compares user responses with the best responses generated by AI and displays progress in graphs and reports. This paper captures the system design, development process, and initial user response for Prepmania. The findings set the potential of AI and web technologies to transform the interview preparation process to make it more streamlined, personalized, and evidence-based.

©IJRASET: All Rights are Reserved

II. RELATED WORK

Previous studies in the area of intelligent hiring technologies have shown promising outcomes in the use of video and behavioral analytics to extend the assessment of candidates.

Contemporary software like HireVue and MyInterview employs AI-driven video tests to examine the facial expressions, tone of voice, and speech of candidates. Such systems, however, are mainly developed for assessment from the recruiter's perspective and do not focus much on learning and monitoring development of candidates.

Conversely, Prepmania is user-oriented as it aims to improve interview preparation by means of an interactive online experience. Through our site, we incorporate body posture analysis, voice measurement, and computer-mediated response analysis for the purposes of mimicking actual interview settings and providing constructive criticism to the user in real time.

The research "Efficacy and Benefits of Virtual Mock Interviews: Analyzing Student Perceptions of Digital Employment Preparations" by Indiana University of Pennsylvania's LeAnn Wilkie and Joseph Rosendale [19] identifies the requirement of replicating real interview procedures while providing complete, personalized critiques on nonverbal communication, response timing, and content value. This outlook is consistent with Prepmania's aim to exactly replicate real interview situations and provide constructive feedback.

Similarly, the research paper "AI-Based Mock-Interview Behavioral Recognition Analyst" by Kolpe, Patil, Deshmukh, Jeughale, and Misal emphasizes the need for artificial intelligence systems that can accurately decipher nonverbal behavior, support varied interview styles, and offer end-to-end performance analysis [1]. Prepmania follows these recommendations by using AI models to examine physical behavior and communication effectiveness in real time.

The paper titled "Conversate: Supporting Reflective Learning in Interview Practice Through Interactive Simulation and Dialogic Feedback" by Taufiq Daryanto et al. (2024) [18] presents a next-generation AI-driven interview simulation tool aimed at fostering reflective learning among users preparing for job interviews. Conversate utilizes state-of-the-art Large Language Models (LLMs) such as GPT-3.5 and GPT-4 to not only simulate realistic interview conversations but also support learners in reviewing, analyzing, and improving their answers iteratively.

This research by P. K. Mishra, A. K. Arulappan, I. -H. Ra, T. M. L, G. R. G and Y. -S. Lee, "AI-Driven Virtual Mock Interview Development," 2024 Joint 13th International Conference on Soft Computing and Intelligent Systems and 25th International Symposium on Advanced Intelligent Systems (SCIS&ISIS), Himeji, Japan, 2024, pp. 1-4, doi: 10.1109/SCISISIS61014.2024.10760210 [16] contributes to the field by demonstrating the potential of AI in creating adaptive learning environments, particularly in the context of professional skill development. The virtual mock interview system serves as a tool for users to engage in self-paced, reflective practice, ultimately aiming to boost confidence and competence in real-world interview settings.

Shi, W., Wang, D. Empirical research on the application of AI mock interviews in enhancing graduate perceived employability: a case study in Hangzhou, China. Educ Inf Technol (2025) [17]. This study investigates the effectiveness of AI-powered mock interviews in enhancing the perceived employability of university graduates in Hangzhou, China. Amidst a competitive job market and increasing graduate numbers, the research aims to determine whether AI-driven interview simulations can bolster graduates' confidence and readiness for employment. Participants reported a significant increase in their self-assessed employability after undergoing AI mock interviews. The AI simulations contributed to better performance in actual interview scenarios, suggesting practical benefits beyond self-perception.

Also, sites like Interviewsby.ai show the growing demand for artificial intelligence-based mock interviewing sessions. The site provides topic-specific questions and provides user performance feedback based on AI. Efficient as they may be, most such comparable sites are proprietary or do not support full multimodal testing. Prepmania addresses this requirement by combining real-time question generation, body language monitoring, vocal analysis, and answer comparison in an open, web-based environment exclusively for students and job seekers.

Together, these studies identify the increasing ability of artificial intelligence to enhance interview readiness and provide key lessons on which Prepmania is founded.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

III. SYSTEM ARCHITECTURE

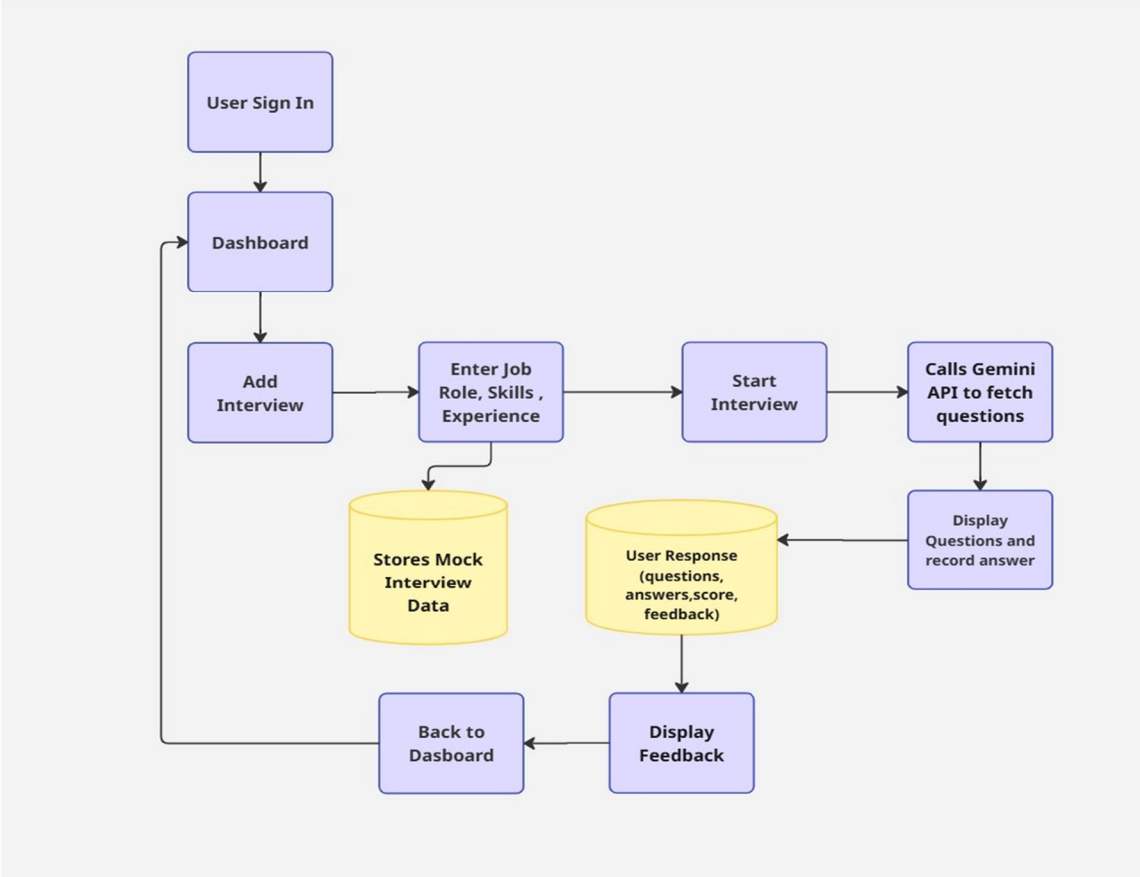


Fig. 1 System Architecture of Prepmania

The PrepMania design is carefully crafted to provide an AI-driven smooth mock interview experience to practice, receive immediate feedback, and track improvement over time. The key components and stages of the system are outlined below:

1. User Authentication
   - Sign In: Users securely log in to access their personalized dashboard.
2. Dashboard Access: After login, users are directed to a centralized dashboard where they can:
   - Initiate a new interview.
3. Interview Setup: Users start by providing essential details:
   - Job Role
   - Key Skills
   - Years of Experience

4.Start Interview:
   - After filling in the details, users proceed to initiate the mock interview.

5. Question Fetching
   - Dynamic Question Generation: Interview questions are automatically fetched from the Gemini API, and tailored to the job role, skills, and experience entered by the user.

6. Answer Recording and Monitoring
   - Display Questions: Questions are presented one by one for the user to answer.
   - Answer Recording: Users record their spoken answers, while the system simultaneously:
     - Converts speech-to-text using Speech-to-Text technology.
     - Monitors body posture and hand gestures using MediaPipe models.
     - Provides real-time prompts if improper posture or hand obstruction is detected.

7. Feedback Generation
   - AI-Based Analysis: Each recorded answer is sent to the Gemini API, where AI evaluates the content and generates structured feedback on:
     - Relevance
     - Clarity
     - Confidence
8. Data Storage
   - Database Integration: All user data is securely stored in a Neon PostgreSQL database through Drizzle ORM, including:
     - Interview metadata
     - Transcribed answers
     - AI-generated feedback
9. Feedback Display
   - Comprehensive Feedback Review: Upon completion of the interview, users receive detailed insights regarding:
     - Answer quality
     - Body language observations
     - Performance trends compared to previous sessions
10. Session Completion
    - Return to Dashboard: After reviewing feedback, users can return to the Dashboard to start new interviews or monitor progress over time.

Flowchart

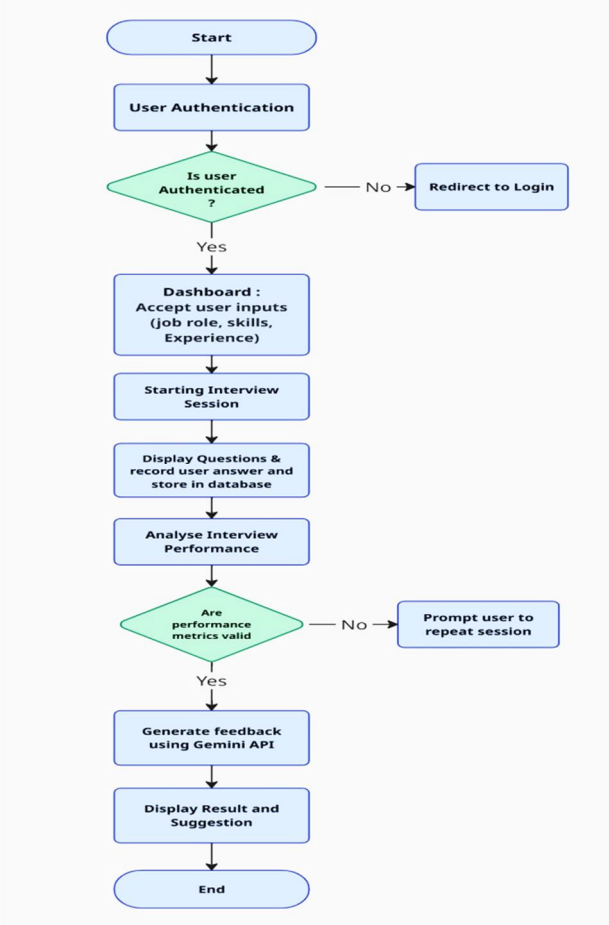


Fig 2: Flowchart of Prepmania

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 13 Issue V May 2025- Available at www.ijraset.com

IV. METHODOLOGY

1) System Design: Prepmania uses a full-stack architecture:
- Frontend: Built with Next.js and styled using Tailwind CSS for a responsive UI.
- Backend: Handles API integrations, data processing, and scoring logic.
- Database: Drizzle ORM with Neon stores user data and performance records.

2) Authentication : User login and session management are powered by Clerk (Clerk Authentication is a modern, developer-friendly authentication and user management service designed for web and mobile apps. It provides a complete set of features out of the box including) enabling secure access and personalized interview tracking.

3) Dynamic Question Generation : Questions are generated using the Gemini API, based on user input (job role, skills, experience). Responses are saved for future comparisons.

4) Audio-Visual Analysis
- Voice: Analyzes volume and clarity using Web Audio API.
- Posture: Tracks body posture using browser-based tools (e.g., face-api.js, MediaPipe). Suggestions are provided based on heuristics.

5) Answer Evaluation : User responses are transcribed and compared to Gemini-generated answers using keyword matching and structure checks. A score is assigned based on similarity.

6) Performance Feedback : Users receive feedback via:
- Visuals: Charts showing a comparison of past and current interview performance.
- Keyword Suggestions: Tips for improving delivery and presence.

7) Timed Question Flow : Each question has a timer. If unanswered, the system automatically moves to the next question. Timing data is logged for analysis.

8) Data Management : All user data, responses, and performance metrics are securely stored in Neon and managed via Drizzle ORM for efficient access and progress tracking.

V. RESULTS AND EVALUATION

This table provides a performance analysis of an AI mock interview system across four batches (A, B, C, D), with each batch consisting of 25 students. The system's effectiveness is evaluated on several key metrics:

1) System Performance: This includes the average question generation time and page load time for each batch. The system consistently performs with an average question generation time of around 1.8 seconds and page load times under 2 seconds.

2) Question Quality: The relevance and balance of questions are assessed, with batches showing high relevance ratings (ranging from 90% to 94%) and a well-balanced mix of technical and behavioral questions across all groups.

3) Audio-Visual Analysis: The system tracks voice clarity, volume accuracy, and facial expression/posture to evaluate non-verbal communication. The accuracy of voice volume and facial expression analysis ranges from 81% to 85%, showing effectiveness in monitoring user confidence and communication.

4) Answer Scoring: The system’s ability to evaluate answers is compared with human evaluation, achieving high correlation scores (around 90% to 92%), indicating accurate assessments of the students’ responses.

5) User Progress:

Progress is measured in three areas:
- Voice Consistency: Improvements in maintaining voice clarity.
- Answer Accuracy: Enhancement in the accuracy of responses.
- Confidence/Posture: Improvements in overall interview confidence and body language. Users show average improvements of 14% to 22% across these areas.

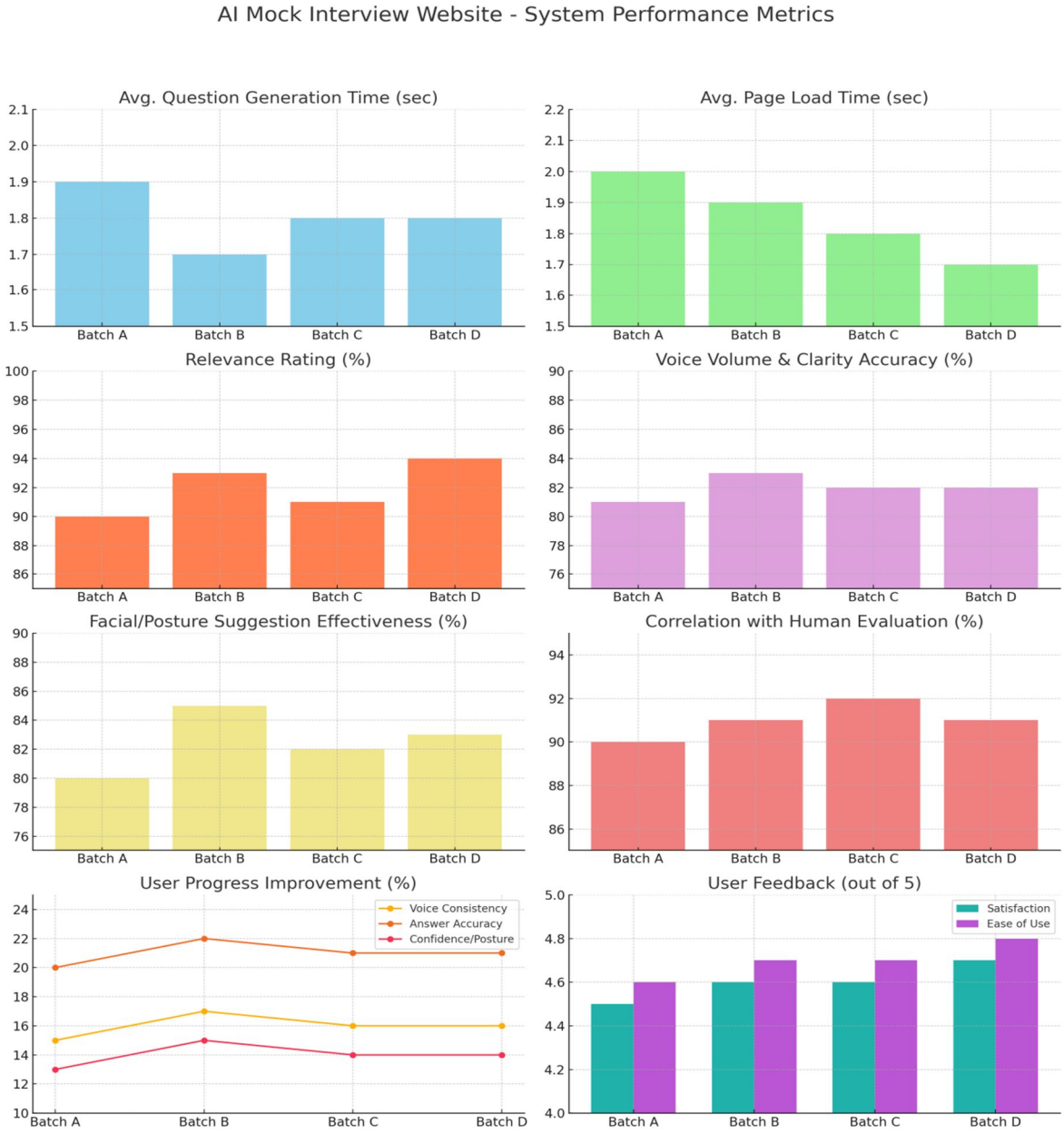
6) User Feedback: After completing the mock interview, students provide feedback on the system's usability. Satisfaction ratings range from 4.5 to 4.7 out of 5, with students appreciating the system's ease of use and features like timed flow and visual feedback.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

Category	Metric	Batch A (n=25)	Batch B (n=25)	Batch C (n=25)	Batch D (n=25)	Overall / System Avg
System Performance	Avg. Question Generation Time (sec)	1.9	1.7	1.8	1.8	1.8 sec
	Avg. Page Load Time (sec)	2.0	1.9	1.8	1.7	< 2 sec
Question Quality	Relevance Rating (Avg %)	90%	93%	91%	94%	92%
	A mix of Technical & Behavioral	High	High	High	High	✔ Balanced
Audio-Visual Analysis	Voice Volume & Clarity Accuracy	81%	83%	82%	82%	82%
	Facial/Posture Suggestion Effectiveness	80%	85%	82%	83%	80–85%
Answer Scoring	Correlation with Human Evaluation	90%	91%	92%	91%	91%
User Progress	Voice Consistency Improvement	+15%	+17%	+16%	+16%	+16%
	Answer Accuracy Improvement	+20%	+22%	+21%	+21%	+21%
	Confidence/ Posture Improvement	+13%	+15%	+14%	+14%	+14%
User Feedback	Satisfaction Rating (out of 5)	4.5	4.6	4.6	4.7	4.6 / 5
	Ease of Use (out of 5)	4.6	4.7	4.7	4.8	4.7 / 5
	Timed Flow & Visual Feedback	Appreciated by all	Appreciated by all	Appreciated by all	Appreciated by all	✔ Highly Appreciated

Table 1 : Analysis of assessment conducted

In summary, the analysis shows that the AI mock interview system is effective in improving interview performance, with consistent system performance, high-quality questions, accurate assessments, and significant improvements in student skills, all backed by positive user feedback.



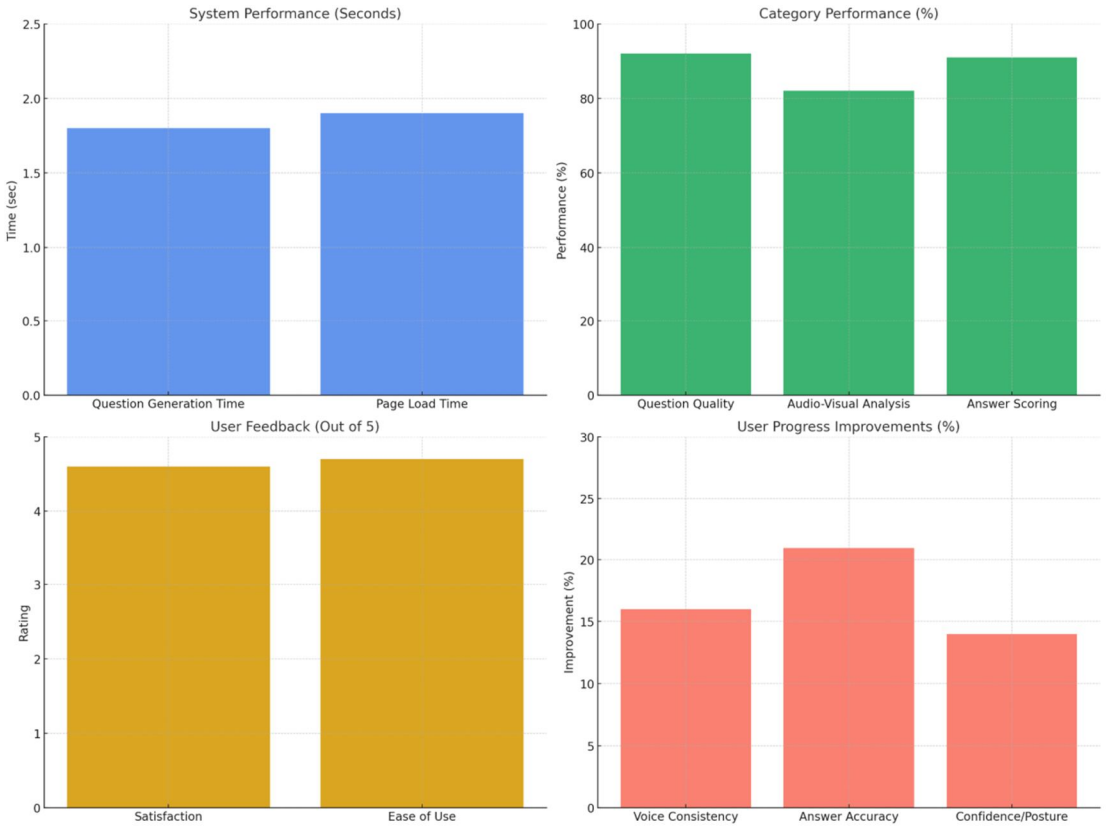
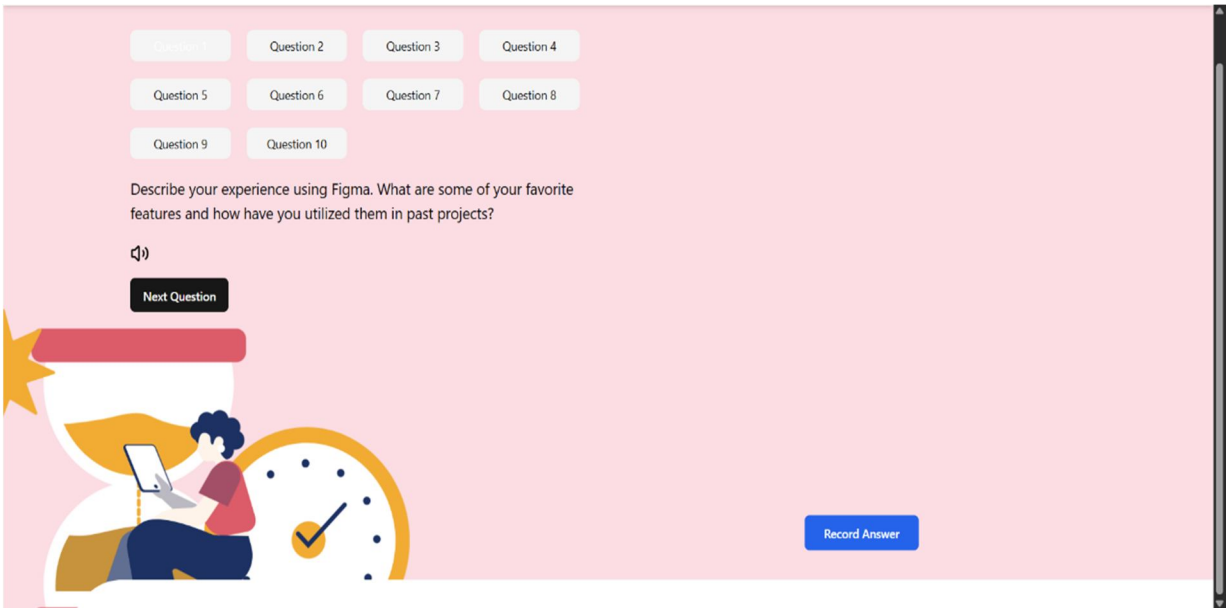
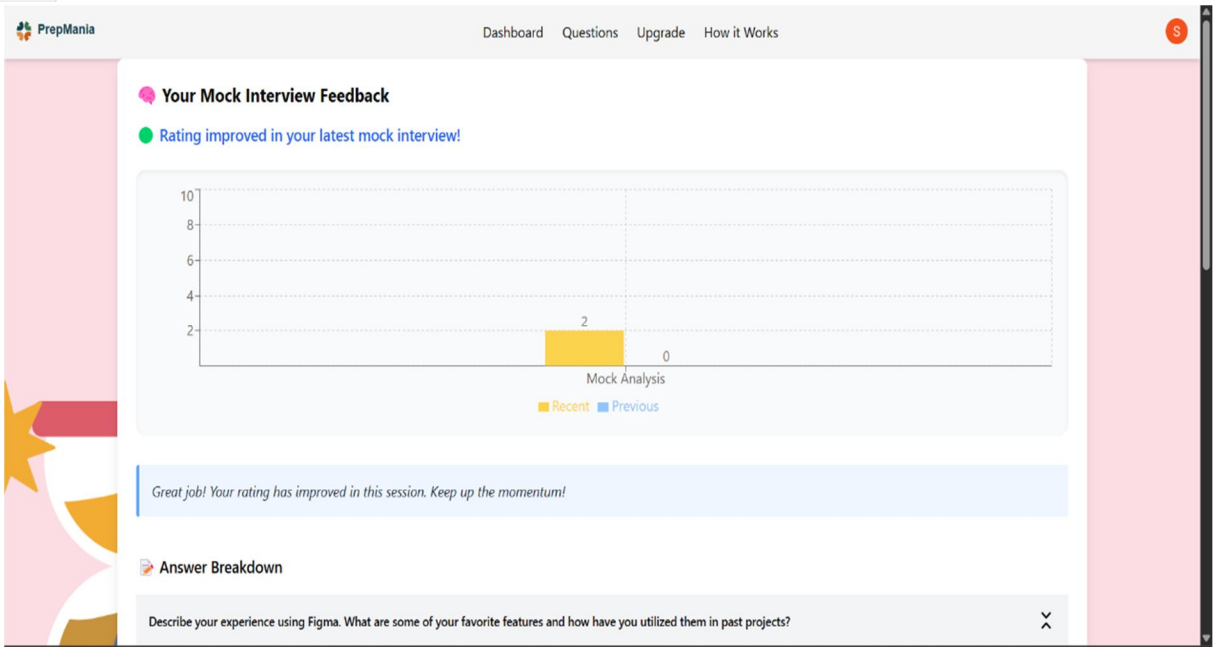


Fig 3 : Graphical Representation

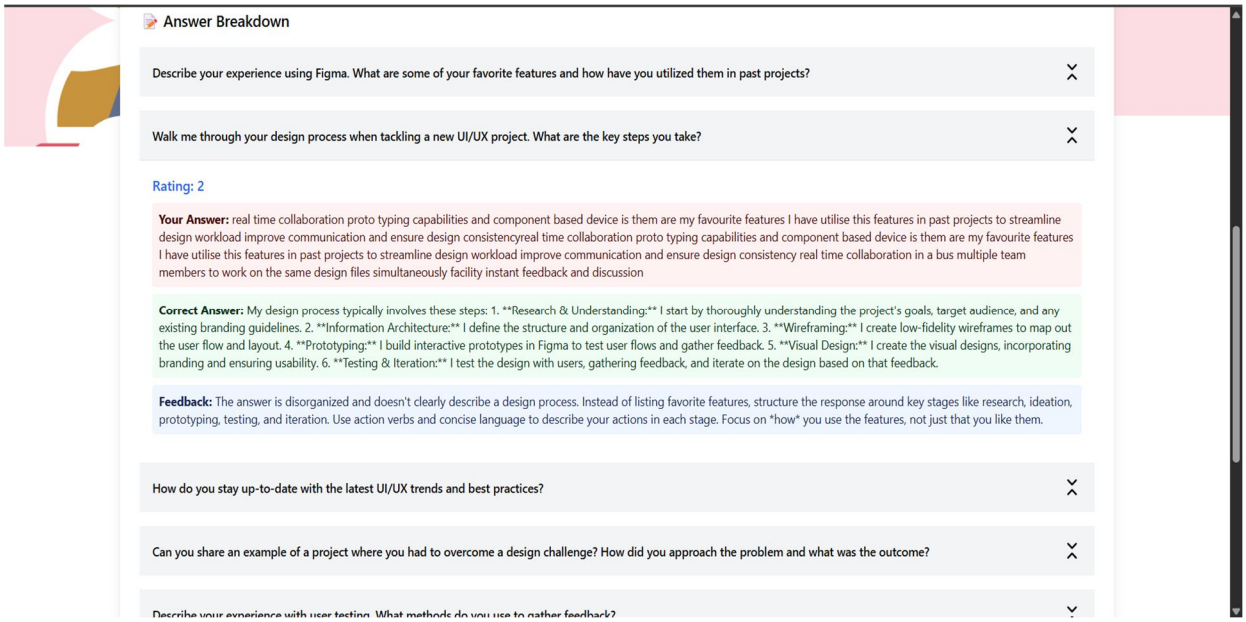
VI. SNAPSHOTS



Snapshot 1 : Question Section



Snapshot 2 : Analysis of previous & current mock interview



Snapshot 3 : Feedback from Gemini AI & user answer

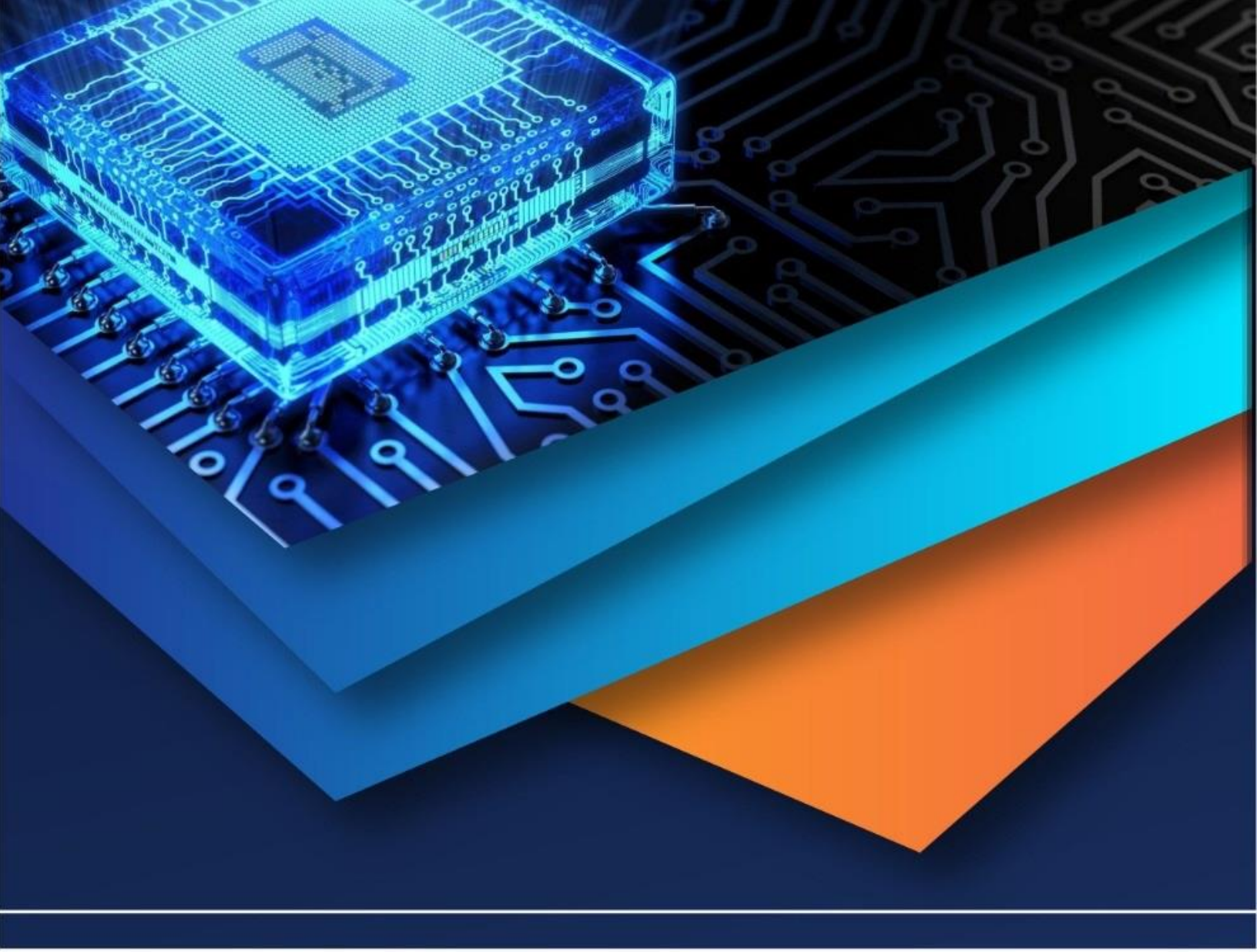
VI. CONCLUSION

The article covered Prepmania, a web-based mock interview platform developed with Next.js in conjunction with a contemporary frontend/backend tech stack. The platform combines functionalities such as question creation, multimodal analysis, visualization of performance, and timed evaluations to provide immersive and educational interview practice. Prospective future enhancements could involve a boost in real-time processing, broader API coverage, and support for adaptive difficulty in questions.

REFERENCES

[1] S. Kolpe, S. Patil, J. Deshmukh, S. Jeughale, and Y. Misal, "AI-Based Mock - Interview Behavioural Recognition Analyst," International Journal for Research in Applied Science and Engineering Technology (IJRASET), May 2024. [Online]. Available: https://doi.org/10.22214/ijraset.2024.61427

[2] S. Rai, A. Miranda, S. Jagirdar, and N. Chitalia, "Skillup Bot: An AI Driven Mock Interview Platform," IRJET, Apr.2024. [Online]. Available:https://www.irjet.net/archives/V11/i4/IRJET-V11I4385.pdf
[3] A. Katakar, N. Kadam, S. Jagtap, and P. Hole, "Mock Interview System Using AI," IRJMETS,Oct.2024.[Online].Available: https://www.doi.org/10.56726/IRJMETS6240
[4] H. R. Agashe, D. Anwat, P. Derle, P. Nagare, and S. Dhavale, "AI-Based Mock Interview Evaluator and Analysis," IJARSCT, Nov. 2023. [Online]. Available: https://ijarsct.co.in/Paper13645.pdf
[5] Balasaheb Jadhav; Avadhut Sawant; Arnav Shah; Pranamya Vemula; Abhijeet Waikar; Srushti Yadav " A Comprehensive Study and Implementation of the Mock Interview Simulator with AI and Pose-Based Interaction" [online] Available: https://ieeexplore.ieee.org/document/10530717
[6] Bharati Thawali , Pranjal Kalal, Samarth Dugam, Harshada Lokhande. "EmoConfident Interviewer :An AI Mock Interview Evaluato" [online] Available: https://www.ijraset.com/research-paper/emo-confident-interviewer-an-ai-mock-interview-evaluator
[7] Mr. Shivam Mangesh Patil, Mr. Kapil Vikas Shinde, Mr. Bhavesh Ganesh Vakare, Mr. Sandesh Sanjay Dunbale "AI Powered Mock Interview Platform" [online] . Available: https://www.ijirmps.org/research-paper.php?id=231993
[8] Latham, G. P., and Saari, L. M. (1984). "Applicant reactions to employment interviews: A review of the literature and research agenda. Journal of Applied Psychology" 69(3), 400-410.[online] Available: https://issuu.com/irjet/docs/irjet-v11i1230
[9] McCarthy, J. D., Goffin, R. D., and Kelloway, E. K. (2020). The role of technology in interview preparation. Human Resource Management Review, 30(4), 100-112. [online] Available: https://www.irjet.net/archives/V11/i12/IRJET-V11I1230.pdf
[10] Binns, R. S., Johnson, D., and Zhou, X. (2021). "Artificial Intelligence in career development and job matching. AI and Society, 36(2), 371-385. , S. A., and Imber, A. (2007). The effects of simulated interview practice on performance. International Journal of Selection and Assessment, 15(1), 32-42. [online] Available: https://www.irjet.net/archives/V11/i12/IRJET-V11I1230.pdf
[11] Allen, D. G., and Ryan, A. M. (2003). Feedback and performance improvement: A review of the literature.Organizational Behavior and Human Decision Processes, 91(2),186207.[online]Available: https://www.researchgate.net/publication/2855681_Organizational_Behavior_and_Human_Decision_Processes
[12] https://ieeexplore.ieee.org/document/10760210
[13] https://www.researchgate.net/publication/390438737_Empirical_research_on_the_application_of_AI_mock_interviews_in_enhancing_graduate_perceived_employability_a_case_study_in_Hangzhou_China
[14] https://dl.acm.org/doi/10.1145/3701188
[15] https://open-publishing.org/journals/index.php/jutlp/article/view/738



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)