

# JOURNAL OF INFORMATION SYSTEMS APPLIED RESEARCH AND ANALYTICS

**Volume 19, No. 3**  
September 2026  
ISSN: 1946-1836

In this issue:

- 4. Household Digital Twin for Storm Preparedness and Response**  
Chaitali Bonke, University of Texas Rio Grande Valley  
Jun Sun, University of Texas Rio Grande Valley
- 17. AI & Machine Learning Deployment: Best Practices, Costs and Priorities**  
Nicholas Williams, University of North Carolina Wilmington  
Jeff Cummings, University of North Carolina Wilmington  
Yu Wang, University of North Carolina Wilmington  
Yasin Emre Gokce, University of North Carolina Wilmington
- 28. Computer-Supported Collaborative Learning: An Analysis of the Relationship Between Human Critical Thinking and the Use of Artificial Intelligence (AI)**  
Temitope Elijah, Georgia Southern University  
Hayden Wimmer Georgia Southern University  
Carl Rebman Jr, University of San Diego
- 41. Enhancing Programming Productivity for Individuals with ADHD Through Generative Artificial Intelligence: An Inductive Analysis**  
Lionel Mew, University of Richmond
- 50. AI-Enhanced Interview Preparation: A Comprehensive Review of Technical, Behavioral, and Immersive Training Systems**  
Silvia Sanjana, Kennesaw State University  
Yi Li, Kennesaw State University  
Selena He, Kennesaw State University
- 68. AI-Powered Study Assistant for Exams: QuizAI**  
Thi Hong Anh Nguyen, City University of Seattle  
Sam Chung, City University of Seattle
- 82. An Emotional Analysis for Psychology, Affective Science, and Mental Health Using Agentic Multi-Agent AI Systems**  
Cynthia Ani, University of North Texas  
Thuan Luong Nguyen, University of Texas at Austin

The **Journal of Information Systems Applied Research and Analytics** (JISARA) is a double-blind peer reviewed academic journal published by ISCAP, Information Systems and Computing Academic Professionals. Publishing frequency is four issues a year. The first date of publication was December 1, 2008. The original name of the journal was Journal of Information Systems Applied Research (JISAR).

JISARA is published online (<https://jisara.org>) in connection with the ISCAP (Information Systems and Computing Academic Professionals) Conference, where submissions are also double-blind peer reviewed. Our sister publication, the Proceedings of the ISCAP Conference, features all papers, teaching cases and abstracts from the conference. (<https://iscap.us/proceedings>)

The journal acceptance review process involves a minimum of three double-blind peer reviews, where both the reviewer is not aware of the identities of the authors and the authors are not aware of the identities of the reviewers. The initial reviews happen before the conference. At that point papers are divided into award papers (top 15%) and other submitted works. The non-award winning papers are subjected to a second round of blind peer review to establish whether they will be accepted to the journal or not. Those papers that are deemed of sufficient quality are accepted for publication in JISAR. Currently the acceptance rate for the journal is approximately 35%.

Questions should be addressed to the editor at [editor@jisara.org](mailto:editor@jisara.org) or the publisher at [publisher@jisara.org](mailto:publisher@jisara.org). Special thanks to members of ISCAP who perform the editorial and review processes for JISARA.

### 2026 ISCAP Board of Directors

Amy Connolly  
James Madison University  
President

Michael Smith  
Georgia Institute of Technology  
Vice President

Jeff Cummings  
Univ of NC Wilmington  
Past President

David Firth  
University of Montana  
Director

Mark Frydenberg  
Bentley University  
Director/Secretary

Leigh Mutchler  
James Madison University  
Director

RJ Podeschi  
Millikin University  
Director/Treasurer

Bryan Reinicke  
Rochester Institute of  
Technology / Director

Jeffrey Babb  
West Texas A&M University  
Director/Curricular Matters

Eric Breimer  
Siena University  
Director/2026 Conf Chair

Tom Janicki  
Univ of NC Wilmington  
Director/Meeting Planner

Xihui "Paul" Zhang  
University of North Alabama  
Director/JISE Editor

Copyright © 2026 by Information Systems and Computing Academic Professionals (ISCAP). Permission to make digital or hard copies of all or part of this journal for personal or classroom use is granted without fee provided that the copies are not made or distributed for profit or commercial use. All copies must bear this notice and full citation. Permission from the Editor is required to post to servers, redistribute to lists, or utilize in a for-profit or commercial use. Permission requests should be sent to Scott Hunsinger, Editor, [editor@jisara.org](mailto:editor@jisara.org).

# JOURNAL OF INFORMATION SYSTEMS APPLIED RESEARCH AND ANALYTICS

## Editors

**Scott Hunsinger**  
Senior Editor  
Appalachian State University

**Thomas Janicki**  
Publisher  
University of North Carolina Wilmington

## 2026 JISARA Editorial Board

Biju Bajracharya  
East Tennessee State University

Jason Price  
Nichols College

Queen Booker  
Metro State

Bryan Reinicke  
Rochester Institute of Technology

Wendy Ceccucci  
Quinnipiac University

Asish Satpathy  
Arizona State University

Biswadip Ghosh  
Metro State University

Dana Schwieger  
Southeast Missouri State University

Russell Haines  
Appalachian State University

Jeff Strain  
Brigham Young University - Hawaii

Melinda Korzaan  
Middle Tennessee State University

Katarzyna Toskin  
Southern Connecticut University

Will Ledbetter  
Perdue University

Karthikeyan Umapathy  
University of North Florida

Li-Jen Lester  
Sam Houston State University

Hayden Wimmer  
Georgia Southern University

Muhammed Miah  
Tennessee State University

David Woods  
University of Miami Regionals

Alan Peslak  
Penn State University

David Yates  
Bentley University

# AI-Enhanced Interview Preparation: A Comprehensive Review of Technical, Behavioral, and Immersive Training Systems

Silvia Sanjana  
ssanjana@students.kennesaw.edu  
Kennesaw State University  
Marietta, GA 30060

Yi Li  
joy.li@kennesaw.edu  
Kennesaw State University  
Marietta, GA 30060

Selena He  
she4@kennesaw.edu  
Kennesaw State University  
Marietta, GA 30060

## Abstract

This systematic review synthesizes advances in AI-driven job interview systems, examining their technological foundations, pedagogical alignment, and effectiveness in supporting professional skill development. Existing platforms range from rule-based and NLP-enhanced systems to immersive VR/AR and avatar-based simulations. Recent progress in large language models (LLMs), multimodal feedback, and photorealistic virtual agents has significantly improved adaptivity, realism, and user engagement. However, current systems remain fragmented, with most focusing on either technical or behavioral skills, offering limited emotional responsiveness, insufficient curriculum alignment, and minimal support for integrated coding environments or plagiarism-aware assessments. By analyzing 44 high-quality studies, this review identifies critical gaps in personalization, real-time multimodal evaluation, and pedagogically structured feedback. It proposes a unified framework incorporating emotionally adaptive avatars, interactive coding simulations, domain-aware questioning, and learner-centered dashboards. This work provides the first systematic integration of technical, behavioral, and immersive dimensions of AI-based interview systems, establishing a foundation for designing intelligent, inclusive, and context-aware platforms that better align academic preparation with real-world hiring expectations.

**Keywords:** Job interview systems, soft skills, coding interviews, AI in education, avatar-based training, virtual reality

**Recommended Citation:** Sanjana, S., Li, Y., He, S., (2026). AI-Enhanced Interview Preparation: A Comprehensive Review of Technical, Behavioral, and Immersive Training Systems. *Journal of Information Systems Applied Research and Analytics*, v19(n3) pp 50-67. DOI# <https://doi.org/10.62273/GJOI3460>

# AI-Enhanced Interview Preparation: A Comprehensive Review of Technical, Behavioral, and Immersive Training Systems

*Silvia Sanjana, Yi Li and Selena He*

## 1. INTRODUCTION

This paper provides a systematic review of the existing job interview systems. Interviewing is a critical competency across diverse domains including technical (Qin et al., 2019), engineering (Senthilkumar et al., 2025), business (Takeuchi & Koda, 2021), healthcare (Lee et al., 2020), education (Geng et al., 2024), and law (Hassan et al., 2023). Employers now expect proficiency not only in domain expertise but also in soft skills such as communication, collaboration, and critical thinking. Yet, formal training remains minimal, with existing programs often costly and accessible primarily to affluent individuals (Nofal et al., 2025). This inequity has driven interest in intelligent and automated systems capable of replicating interviews and providing personalized feedback.

Recent advancements in artificial intelligence and virtual reality (VR) have facilitated the creation of robust interview training systems designed to simulate real interview scenarios. These systems take diverse forms, like AI-powered chatbots (Røed et al., 2023) that engage people in simulated interviews, embodied virtual interviewer avatars sometimes within immersive VR settings (Hassan et al., 2023), and mixed-reality simulations. Chou et al. (2022) typically utilize adaptive feedback such as real-time analysis of a candidate's responses, nonverbal cues, or coding solutions to facilitate user improvement. Significantly, these systems encompass various fields. Virtual interview tutors have been developed for commercial and technical job interviews, medical and healthcare training, such as practicing patient interviews (Rädel-Abläss et al., 2025), legal and law enforcement situations, and soft skill management (Luo et al., 2024). Moreover, as the global employment landscape grows more competitive, there is an urgent necessity to create inclusive, accessible, and efficient strategies for interview preparation and evaluation, allowing candidates from varied backgrounds, including individuals with disabilities or anxiety disorders, to effectively demonstrate their competencies.

Traditional academic assessments such as written exams, multiple-choice tests, and project-based coursework often emphasize theoretical knowledge or technical problem-solving in controlled settings. While effective for measuring content mastery, these forms of evaluation rarely capture the interactive, adaptive, and high-pressure dynamics of job interviews. Similarly, offerings from career development offices, though valuable, are typically optional and resource-limited, prompting the rise of digital platforms for interview preparation. However, these interviewing systems vary greatly in design and focus, with many limited to either technical or behavioral training. A comprehensive understanding of their effectiveness and limitations remains lacking, and few offer personalized, adaptive, or realistic feedback, leaving key aspects of professional readiness under addressed.

This review is motivated by the need to identify what has been achieved, what limitations persist, and how future systems can better support the transition from academic to professional environments. It is guided by five research questions (RQ1-RQ5) concerning technologies, pedagogical strategies, real-world alignment, professional skill support, existing gaps, and technical, pedagogical, and ethical challenges. By consolidating prior work, this study highlights critical gaps including absent integration of technical and behavioral assessments, limited emotional adaptivity, inadequate coding simulations with plagiarism detection, and insufficient personalization and outlines directions for future research.

The rest of the paper is organized as follows: Section 2 outlines the methodology for literature selection and analysis. Section 3 reviews and categorizes existing job interview systems outlining key future research directions. Section 4 analyzes findings based on the research questions. Finally, Section 5 concludes by summarizing the key insights.

## 2. METHODOLOGY

To ensure rigor and transparency, this review adopts a structured methodology comprising three components: the search strategy (scope and reproducibility), the inclusion and exclusion criteria (quality boundaries), and the selection process (multi-stage screening).

### A. Database and Search Strategy

A comprehensive keyword search strategy was designed to identify the most relevant and recent studies for this review. It focused on system types, embodied interaction (e.g., avatars), assessed skills (e.g., soft and technical), interaction modalities (e.g., AR/VR), and feedback mechanisms. A structured query was applied across academic databases to capture high-quality studies, with priority given to peer-reviewed publications and selective inclusion of preprints when they addressed recent advances aligned with the review objectives with potential contributions for their relevancy.

### Sample Keywords

| Category             | Keywords                                                                               |
|----------------------|----------------------------------------------------------------------------------------|
| System Type          | "Intelligent job interview system" OR "interviewing system" OR "mock interview system" |
| Agents               | "Avatar" OR "Virtual agent"                                                            |
| Skills Assessed      | "Soft skills" OR "Communication"                                                       |
| Interview Types      | "Job interview" OR "Mock interview" OR "Coding interview" OR "Soft skill interview"    |
| Feedback Mechanism   | "Personalized feedback" OR "Adaptive feedback"                                         |
| Immersive Technology | "AR" OR "Augmented Reality" OR "VR" OR "Virtual Reality"                               |
| Skills Emphasis      | "Communication" OR "Soft skills" OR "Coding skill" OR "Technical skill"                |

### B. Inclusion and Exclusion Criteria

The inclusion criteria were designed to prioritize peer-reviewed research studies relevant to the development of Job Interview systems. However, high-quality preprints and early-stage publications were also considered when they contributed substantially to emerging trends or recent technological advancements. These were

critically appraised for relevance and quality before inclusion. We included studies that:

- (1) Presented or evaluated Job Interview platforms.
- (2) Presented or evaluated Job Interview platforms focusing on Augmented Reality, Virtual Reality, and Gamification.
- (3) Integrated avatar-based or embodied conversational agents.
- (4) Offered mock coding interviews or simulated roleplay interactions.
- (5) Provided personalized or adaptive feedback mechanisms and studies were excluded if they:
  - (a) Not written in English.
  - (b) Focused solely on general e-learning.

### C. Selection Process

The literature selection process followed a systematic four-stage PRISMA approach (Mutter et al., 2021), as illustrated in the flowchart (Figure 1).

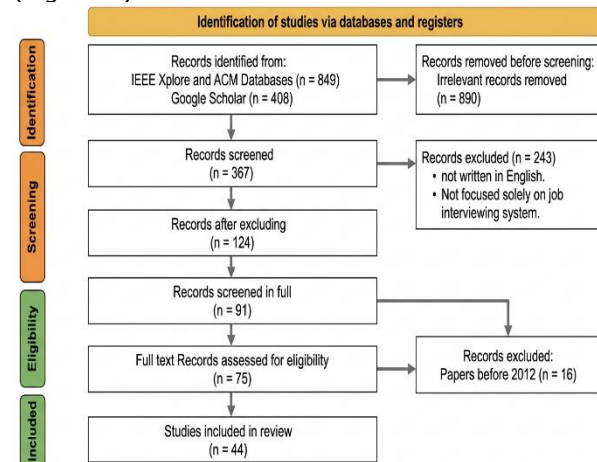


Figure 1: Paper Selection Process

Identification Phase: An initial pool of 1257 records were retrieved through comprehensive database searches across IEEE Xplore and ACM Digital Library (n = 849) and Google Scholar (n = 408) using a predefined set of related keywords as specified before. Prior to formal screening, 890 records were excluded for irrelevance based on manual inspection of titles and abstracts. This review relies on IEEE Xplore, ACM Digital Library, and Google Scholar as primary databases. While this ensured strong coverage of computing and AI-focused publications, the exclusion of broader indexing services such as Scopus and Web of Science may have omitted some interdisciplinary studies. However, the inclusion of Google Scholar helped mitigate this limitation by retrieving relevant works.

**Screening Phase:** A total of 367 articles were subjected to title and abstract screening. Of these, 243 records were excluded for failing to meet the inclusion criteria. This resulted in 124 potentially relevant records progressing to the next stage.

**Eligibility Assessment:** Full texts of 91 studies were reviewed in detail to determine their suitability for inclusion. At this stage, an additional 16 papers were excluded due to being published prior to 2012, as they did not reflect the recent advances in AI, natural language processing, and immersive technologies. The remaining 75 studies were evaluated against the full inclusion criteria. This threshold ensured that it included works aligned with the technological advancements most relevant to current and future interview training systems.

**Inclusion Phase:** Following a rigorous assessment, 44 studies were determined to meet all predefined inclusion criteria and were selected for detailed analysis in this systematic review. This assessment went beyond basic

inclusion criteria and considered factors such as methodological soundness (clarity of design, evaluation approach), technological relevance (use of AI, VR/AR, or feedback mechanisms), and contribution to the research questions. Preprints were included only if they demonstrated clear methodological transparency and novel contributions.

Having established the methodological foundation and selection criteria, the following section is organized along three dimensions: technological approaches, skills assessed, and interaction modalities to provide a comprehensive understanding of the current landscape of AI-enhanced interviewing systems.

### 3. REVIEW OF INTERVIEW TRAINING SYSTEMS

This review first categorizes interview training systems by (1) "Technological Approaches" (2) "Skills Assessed", and (3) "Modality".

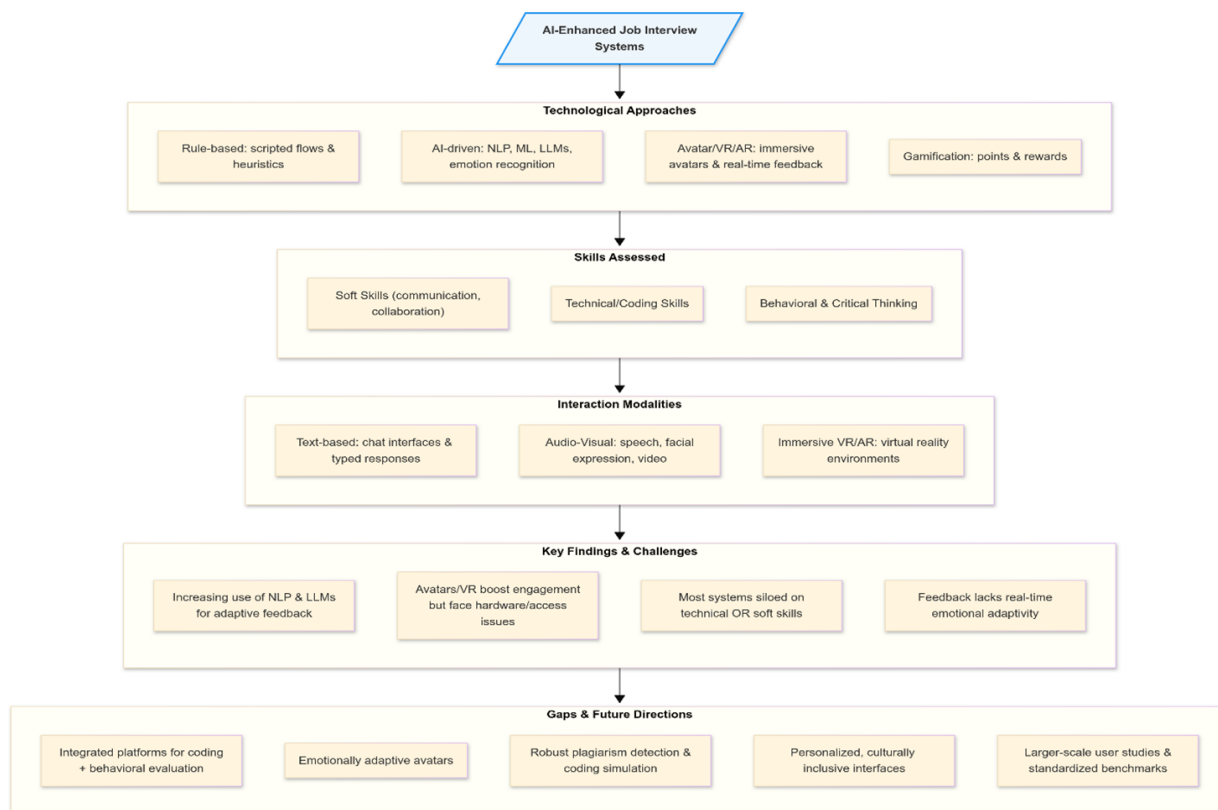


**Figure 2: Overview of AI-Enhanced Job Interview Systems: Taxonomy and Future Directions**

A high-level taxonomy of AI-enhanced interview systems is shown in Figure 2. This diagram summarizes how existing systems are categorized and where research gaps emerge. It provides a taxonomy of AI-enhanced job interview systems across five dimensions: technologies, skills, modalities, challenges, and future directions. It identifies four main technological approaches rule-based, AI-driven (NLP/LLMs), immersive VR/AR, and gamification which were used to assess soft, technical, and behavioral skills. Here, interaction modalities include text-based, audio-visual, and immersive environments.

Key challenges include limited real-time emotional feedback, skill-specific system silos, and accessibility issues in VR. Future directions emphasize the need for integrated platforms, emotionally adaptive avatars, plagiarism detection, culturally inclusive interfaces, and large-scale evaluations with standardized benchmarks

### **A. Technological Approaches**

*i. Rule-based Systems:* Early efforts in virtual interview training often relied on rule-based or scripted approaches. Rule-based systems employ scripted dialogue and decision trees to ensure predictable interactions. Early examples include ERICA, which used keyword detection for follow-up questions but lacked adaptability (Kawahara et al., 2021), and semi-automated multi-agent interviewing with partial ML support (Kawai et al., 2022). Other efforts applied rule-based templates with NLP for question generation (Pandey et al., 2023), conversational chatbots with state-transition models (Boudjani et al., 2023), finite state machines for social cue detection (Baur et al., 2013), and hybrid Theory of Mind models (Belkaid et al., 2014). These systems provide structure but remain rigid, non-adaptive, and limited in scalability.

While rule-based systems laid the foundation for automated interviewing, their limited flexibility led to the development of more adaptive AI-driven approaches that support dynamic interaction and personalized feedback.

*ii. Intelligent Systems (AI-driven):* The advent of Artificial Intelligence (AI) has significantly reshaped job interview preparation, enabling systems that integrate natural language processing (NLP), computer vision, and large language models (LLMs) for dynamic evaluation. Early platforms such as Big Interview (Fulk et al., 2022) and NexInterview (S et al., 2025)

illustrate how NLP and generative AI can support structured mock interviews. Building on these foundations, systems like CIRVR (Adiani et al., 2022) and ITEM (Nofal et al., 2025) incorporate virtual reality and real-time feedback to deliver personalized, adaptive training.

A central trend is the shift from static, rule-based approaches to adaptive agents powered by LLMs and multimodal cues. For example, GPT-4o has been applied in technical interviews with high realism (Gomez et al., 2025), yet these implementations often neglect emotion awareness and plagiarism detection. Similarly, Gemini-based adaptive questioning (Rai, 2025) advances interactivity but lacks affective sensing.

Fairness and transparency have also emerged as critical concerns. Pathak et al. (2024) demonstrate that asynchronous, LLM-driven video interviews can enhance demographic fairness, though delayed feedback and reliance on a single modality limit effectiveness. Complementary approaches integrate inclusivity tools such as gaze-tracking in VR (Adjani et al., 2022), yet hardware demands and limited feedback remain barriers. Likewise, video simulation with analytics has supported language training (Jarvis et al., 2024), though it remains domain specific. Nofal et al. (2025) further combines VR, LLMs, and bias-testing frameworks to create bias-aware practice, though fidelity is constrained by the absence of gaze or head tracking.

Expanding beyond evaluation, several systems employ predictive and multimodal models. NLP-CNN pipelines have been explored for soft-skill and personality prediction, albeit with generic feedback (Rao et al., 2025). Voice-first, role-specific simulations extend Gemini applications (S et al., 2025), yet real-time analytics and expressiveness are limited. Other innovations include vision-speech fusion for emotion recognition (Golande et al., 2025), graph-based skill-targeted questioning (Qin et al., 2024), and speaker-willingness recognition for adaptive questioning (Nagasawa et al., 2023), though each faces constraints in validation, flexibility, or scope.

Beyond the systems reviewed above, recent advances in multimodal foundation models such as GPT-4o's native audio-visual capabilities and Google's Gemini architecture enable simultaneous processing of text, speech, and visual input within a single model, reducing integration complexity and latency. Agentic AI

frameworks, where LLMs autonomously plan and execute multi-step interview workflows, represent an emerging paradigm that could enable fully autonomous adaptive interviewers capable of adjusting difficulty, topic, and questioning style in real time based on candidate performance. While these technologies are still maturing and have limited representation in the peer-reviewed literature captured by our review window, they signal important directions for future system design.

Collectively, these systems affirm the potential of AI to enhance confidence, self-assessment, and accessibility. However, persistent limitations including limited personalization, underdeveloped affective sensing, and the absence of standardized benchmarking underscore the need for larger-scale evaluations and rigorous validation.

*iii. Avatar-based / Immersive VR/AR-based Systems:* AI-powered interview simulators are increasingly adopting avatars and extended reality to deliver immersive and interactive experiences. By moving beyond static interfaces and text-based exchanges, these systems aim to provide dynamic, lifelike simulations that enhance user engagement and skill transfer (Nofal et al., 2025; Sahani et al., 2025).

To illustrate, Nofal et al. (2025) introduced a VR-based platform built with Oculus Quest and Unity, where animated avatars and ChatGPT-generated questions were used to assess communication, leadership, and domain knowledge through sentiment-driven scoring and bias analysis. Although the system proved effective in controlled studies, it remains constrained by its dependence on high-end hardware, the absence of gaze tracking, and the lack of large-scale validation. Building on this trajectory, Sahani et al. (2025) presented a scalable web-based platform with a 3D avatar created using React.js and Three.js. While it demonstrated high question accuracy (~95%), robust speech-to-text performance (>90%), and measurable gains in user confidence (80%), its limited realism, absence of multilingual capacity, and lack of expert-curated content reduce its applicability in broader contexts.

In parallel, several systems have sought to broaden accessibility. AIVATAR (Bachhav et al., 2023) integrates 3D avatars with aptitude testing and instant textual feedback to reduce interview anxiety in low-stakes practice environments. Yet, despite its promise, the

platform remains conceptual, with no empirical validation and limited non-verbal cue integration. Extending this line of research, Hassan et al. (2023) developed a multimodal platform for investigative interviews across VR, desktop, and audio formats. Their findings indicate that VR fosters stronger presence and realism compared to other modalities; however, binary feedback, reliance on proprietary APIs, and synthesized voices limit its utility. Similarly, Røed et al. (2023) used a fine-tuned GPT-3 to simulate conversations with a child avatar, showing that personalized feedback significantly improved questioning strategies skills directly transferable to interview contexts.

At the same time, efforts have also focused on enhancing realism. Ashrafi et al. (2024) employed Unreal Engine, MetaHuman, and Convai to develop avatars across VR, AR, and desktop environments. While the system captures physiological signals to detect anxiety, it still lacks real-time coaching, and its AR features remain incomplete. Likewise, Hasan et al. (2023) introduced SAPIEN, a demo platform with emotionally expressive 3D agents powered by LLMs and multilingual speech technologies. Despite its potential for communication training, its short sessions, limited conversational memory, and lack of empirical evaluation restrict practical adoption.

Taken together, Avatar-based and immersive VR and AR systems improve realism and personalization, but accessibility, nonverbal analysis, and validation remain key challenges.

*iv. Gamification-based Systems:* Gamification has emerged as a powerful strategy in the design of modern job interview systems. By incorporating game elements such as points, achievements, interactive simulations, and immersive environments, these systems aim to enhance candidate engagement, reduce interview anxiety, and deliver more meaningful assessments. This review explores recent developments in gamification-based job interview systems, summarizing the technological approaches and key contributions of several published works. Table 1 in Appendix A depicts an overview of gamification-based systems.

The reviewed systems collectively highlight the diverse application of gamification in job interview settings. Some platforms, like the Metahuman-based VR system (Ashrafi et al., 2024) and the agent-based VR training, prioritize immersion and realism to build

candidate confidence, while others, like Conversate (Daryanto et al., 2025) and the cognitive assessment tool, integrate adaptive simulations and machine learning to personalize feedback and scoring. Despite the varied approaches, all these systems converge on the goal of making interview preparation more interactive, insightful, and equitable.

## B. Skills Assessed

*i. Soft Skills:* Table 2 in Appendix A below presents a comparative overview of prominent AI-powered systems designed for job interview preparation, with a particular emphasis on soft skills and competency-based assessment. Each system is evaluated across multiple dimensions, including its primary skill focus, underlying AI technologies, input modalities, feedback mechanisms, and notable strengths and limitations. This structured comparison offers insights into how different platforms approach interview readiness through multimodal interaction, adaptive feedback, and targeted soft skill development, while also highlighting existing gaps in non-verbal analysis, empirical validation, and immersive realism.

*ii. Technical and Coding Skills:* Over the past few years, a growing body of research has explored how AI-based systems can simulate, assess, and enhance technical interviews, particularly for roles requiring coding and problem-solving skills. This review in Table 3 in Appendix A depicts recent academic work on AI-driven interview systems designed for technical and coding roles, summarizing the innovations, methodologies, and implications of each.

The reviewed systems collectively demonstrate how AI enhances technical interviews through adaptive questioning and multimodal evaluation.

*iii. Behavioral and Critical Thinking Skills:* Some systems extend beyond communication by targeting behavioral readiness and critical thinking. For instance, Conversate, developed by Daryanto et al. (2025), employed dialogic reflection, while STAR-based evaluations (Siswanto et al., 2022) scaffold structured behavioral responses. Adaptive questioning (Nagasawa et al., 2023) and bias-testing

frameworks (Nofal et al., 2025) also prompt reasoning beyond surface-level answers. However, explicit support for these skills remains limited compared to technical and soft-skill training.

## C. Modality

*Text-based and Multimodal Interviewing Systems:* The reviewed AI-based job interview systems in Figure 3 were categorized based on their primary interaction modalities: Text-based systems primarily rely on typed input and output, enabling question delivery and response evaluation via chat-like interfaces. Textual systems include Anaza et al. (2023), Ashrafi et al. (2024), Bachhav et al. (2023), Chou et al. (2022), Hasan et al. (2023), Mishra et al. (2024), Namratha et al. (2024), Nofal et al. (2025), Rao et al. (2025), Sahani et al. (2025), Senthilkumar et al. (2025), and Wilkie and Rosendale (2024).

Audio-visual systems integrate spoken input and/or output, often enhancing realism by incorporating speech recognition (e.g., Google STT, DeepSpeech) and text-to-speech (TTS) engines (e.g., Amazon Polly, Google TTS). Audio-based systems have been presented by Anaza et al. (2023), Ashrafi et al. (2024), Bachhav et al. (2023), Chou et al. (2022), Hasan et al. (2023), Namratha et al. (2024), Nofal et al. (2025), Rao et al. (2025), Røed et al. (2023), Sahani et al. (2025), Senthilkumar et al. (2025), Siswanto et al. (2022), and Wilkie and Rosendale (2024).

Visual modalities are represented by Anaza et al. (2023), Ashrafi et al. (2024), Bachhav et al. (2023), Chou et al. (2022), Hasan et al. (2023), Namratha et al. (2024), Nofal et al. (2025), Røed et al. (2023), Sahani et al. (2025), Senthilkumar et al. (2025), and Wilkie and Rosendale (2024).

Text-based systems are efficient but limited. Audio improves verbal interaction but depends on reliable speech processing. Video increases realism at higher computational and privacy costs. Together, they show a tradeoff between accessibility and realism.

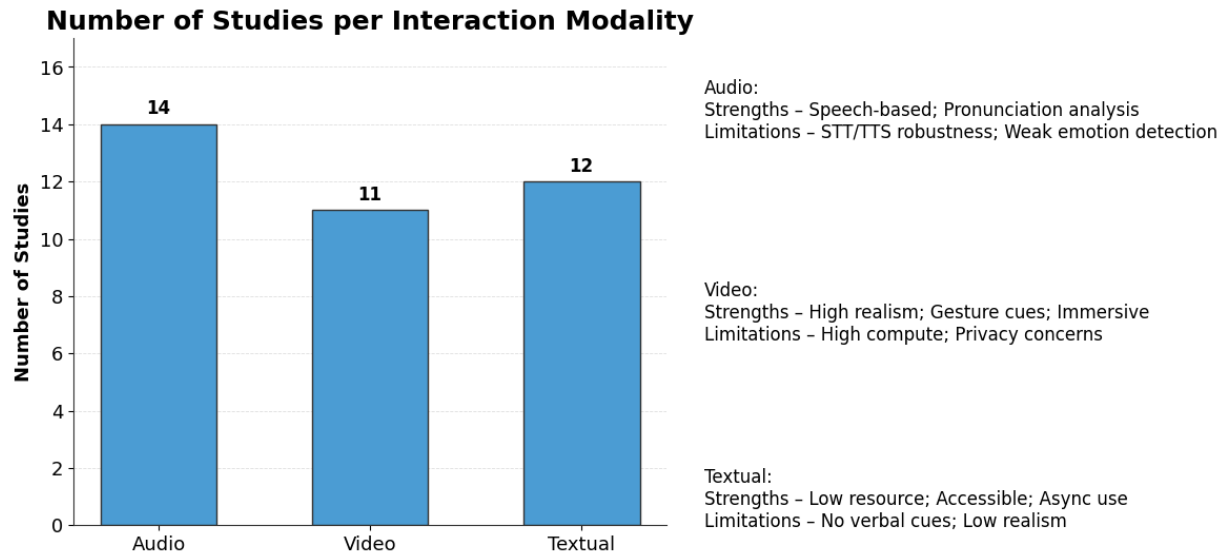


**Figure 3: Summary of Job Interview System based on their primary interaction modalities**

This section focused on text-based and multimodal systems, while immersive VR/AR treated as a distinct modality was discussed earlier under Technological Approaches (Section 3.A.iii).

By synthesizing existing interviewing systems, this systematic review makes significant contributions. Compared to previous reviews that are either technically narrow e.g., Barpute et al. (2024) or ethically focused like Hunkenschroer and Luetge (2022), or have insufficient system diversity and technical depth e.g., Abedi (2022) which lacks breadth in reviewed platforms and ignores cutting-edge LLM/VR-based tools, our review takes a comprehensive approach by integrating the evaluation of both coding and soft skills, feedback mechanisms, and immersive interaction modalities (VR/AR/avatar), reflecting the multidimensional demands of real-world job interviews. Furthermore, our review bridges the gap between educational training and industry expectations, an area largely overlooked by prior surveys.

Notably, in this process the authors discovered several critical research gaps, including the absence of comprehensive systems capable of concurrently evaluating technical coding skills and behavioral competencies, inadequate real-time emotionally adaptive feedback, limitations in avatar-driven interactions, insufficient adaptability to varying professional and user contexts, lack of specialized support for realistic

coding interview simulations, insufficient attention to plagiarism detection and limited personalized interviewing experiences. This paper identifies several key future research directions essential for advancing interview preparation systems. Specifically, progress should focus on:

- Integrating technical and behavioral assessments, enabling holistic evaluations that capture both domain expertise and interpersonal competencies.
- Enhancing avatar realism and emotional responsiveness, thereby fostering more authentic and immersive candidate-interviewer interactions.
- Providing real-time adaptive feedback, ensuring that learners receive personalized guidance aligned with their evolving performance.
- Developing robust coding simulations with plagiarism detection, to uphold integrity and rigor in technical skill assessment.
- Designing authentic, participatory mock interviews, mirroring real-world hiring practices and supporting experiential learning.

Collectively, these directions guide the development of intelligent, inclusive platforms that replicate real-world interview complexity while enhancing candidate readiness through personalized and adaptive

training. The prospective architecture Systems from the present context is transformation in AI-Driven Interview illustrated in Figure 4.

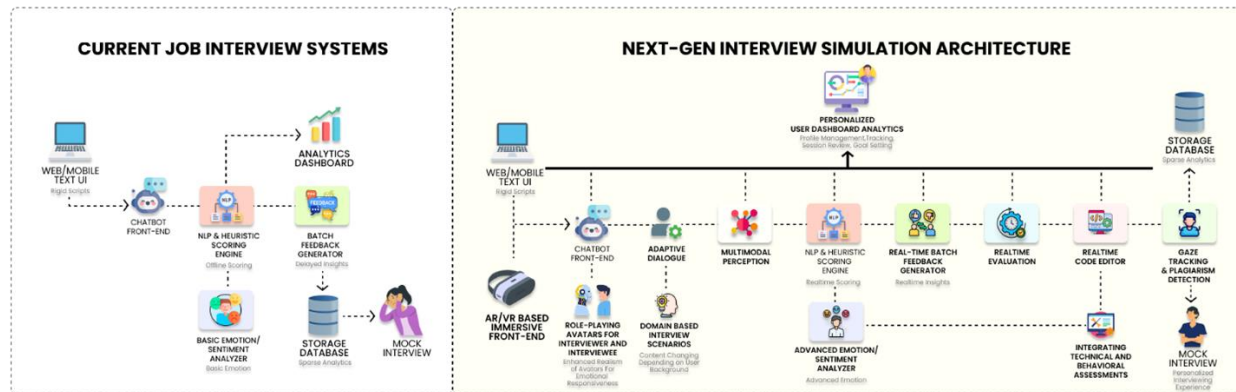


**Figure 4: Architectural trajectory of AI-driven interview systems**

Here, this figure 4 illustrates the evolution from conventional job interview systems to proposed next-generation AI-driven interview simulation architecture. The left side depicts current systems that primarily rely on web/mobile text-based user interfaces, and chatbot front ends powered by offline NLP and heuristic scoring. These systems often provide delayed batch feedback, rely on basic sentiment analysis, and support only limited user analytics and mock interview functionality. In contrast, the right side presents a next-generation architecture that integrates AR/VR-based immersive interfaces, emotionally responsive role-playing avatars, domain-based adaptive dialogue, and multimodal perception. Real-time scoring, evaluation, and feedback are supported by advanced NLP models and sentiment analyzers. Technical assessments are conducted through an embedded real-time code editor with integrated gaze tracking and plagiarism detection. A personalized user dashboard enables analytics-driven session review, goal tracking, and profile management. Collectively, these enhancements enable more engaging, adaptive, and realistic interview simulations that holistically assess both technical and behavioral competencies.

The following section interprets the reviewed interviewing systems through the framework of the five research questions.

#### 4. ANALYSES OF RESEARCH QUESTIONS

**A. RQ1: What are the key features, technologies, and pedagogical strategies employed in existing job interviewing systems?**

Section 3 outlines the technological evolution of

job interview systems, classifying them into four primary categories: rule-based, AI-driven, avatar-based/immersive, and gamification-enhanced platforms. Rule-based systems rely on scripted logic and predefined keyword triggers, offering reliable and consistent interactions but lacking adaptability and personalization. In contrast, AI-driven systems leverage advanced techniques such as natural language processing, computer vision, and LLMs to enable real-time, multimodal evaluation. These platforms provide detailed, context-aware feedback on candidate performance, encompassing verbal, nonverbal, and emotional dimensions, thereby supporting a more comprehensive assessment of interview readiness.

Each category offers distinct affordances but exhibit varied levels of pedagogical integration. Rule-based systems align with behaviorist pedagogy, emphasizing scripted interactions and fixed feedback, though they lack adaptability and depth. Intelligent systems employing NLP and LLMs enable dynamic, real-time feedback aligned with formative and adaptive learning principles, but few consistently incorporate structured pedagogical scaffolding. Immersive platforms support experiential learning through realistic simulations, reflecting constructivist ideals; however, they often neglect structured reflection and personalized guidance. Gamified systems enhance engagement but typically lack instructional depth, with feedback and learning pathways remaining underdeveloped.

So, technically robust but pedagogically limited, these systems require adaptive, learner-centered strategies to enable effective and transferable learning.

**B. RQ2: To what extent do existing job interview systems in the computing field bridge the gap between academic training and real-world hiring expectations?**

The review finds a moderate alignment between job interview systems and real-world expectations. Some systems offer realistic whiteboard style coding simulations and behavioral analysis, bridging academic exercises with practical hiring practices. However, a significant portion of platforms still focus narrowly on either behavioral or technical aspects, failing to present the integrative complexity of actual job interviews.

A few systems have made strides toward realism and engagement and integrate dialogic feedback and transcript annotation, encouraging reflective learning aligned with real-world communication tasks. Nonetheless, many reviewed systems lack authentic, industry-driven evaluation models and employer-aligned performance metrics.

**C. RQ3: How do these systems support different aspects of professional development, including communication skills, critical thinking, and behavioral readiness?**

Soft skills development is increasingly embedded in intelligent and immersive systems. AI-enhanced platforms like *SAPIEN* and *InterviewPal* incorporate sentiment analysis, speech modulation, and facial emotion recognition to deliver multimodal feedback (Hasan et al., 2023; Namratha et al., 2024). This allows candidates to reflect not only on what they say, but also how they say it, a key component of behavioral readiness.

Critical thinking is indirectly supported through scenario-based questioning, adaptive follow-up prompts, and STAR model-based evaluations. Yet, explicit support for reflective learning and metacognitive feedback is present in only a few systems (e.g., *Conversate*), indicating an underexplored opportunity for systems to scaffold users' self-regulated learning processes (Daryanto et al., 2025).

Overall, systems integrating emotion-aware AI and adaptive feedback mechanisms are more likely to foster deep skill development and sustained user engagement.

**D. RQ4: What gaps exist in the current systems that future research must address to build intelligent, context-aware, and career-aligned interview preparation platforms?**

Our analysis highlights several underexplored directions in the development of job interview simulation systems. Notably, there is a lack of platforms that integrate mock coding and behavioral interviews in a unified environment, despite the prevalence of hybrid formats in real-world hiring processes particularly for computing students. Furthermore, current systems show limited alignment with computing education, missing opportunities to embed interview training into curriculum-relevant activities like code reviews or plagiarism detection.

Real-time coding environments remain largely neglected, with most systems offering non-interactive assessments that fail to simulate live technical interviews. The importance of real-time mock coding interview lies in their continued relevance for assessing core technical competencies. Major technology employers still rely on live coding interviews to assess core competencies such as algorithmic reasoning, problem decomposition, and decision making under ambiguity. At present, software engineering roles are shifting toward higher level responsibilities, including system design, debugging, code review, all of which still depend on strong foundational coding ability. From an educational perspective, computing curricula must prepare students for both current hiring practices and industry expectations, which further strengthens the value of real-time, proctored coding environments in interviewing systems.

Although avatars are increasingly used in interview training, their contribution to soft skill development remains limited by weak emotional expressiveness, adaptability, and feedback quality. Emotionally adaptive feedback is also uncommon, as few systems use multimodal signals to generate dynamic, personalized responses. In addition, most platforms lack content adaptation based on user interests or prior performance, reducing relevance and long-term engagement. These limitations highlight important opportunities for future research and innovation.

**E. RQ5: What are the major challenges and limitations (technical, pedagogical, ethical) faced by these systems in achieving sustained learning impact and user trust?**

From a technical perspective, many systems face challenges such as latency in real-time multimodal processing, limited scalability, and unstable integration across core components, including speech-to-text, natural language processing, and computer vision. Pedagogically,

feedback mechanisms are often generic, lacking the granularity and adaptability required for personalized learning paths or formative assessment. Ethically, major concerns persist around potential privacy risks associated with the collection of sensitive multimodal user data. Together, these challenges hinder the effectiveness, fairness, and trustworthiness of current systems, posing significant barriers to their widespread adoption and long-term impact in educational and professional settings.

## 5. CONCLUSION

This article presented a systematic review of AI-driven interview systems, synthesizing research across four technological approaches rule-based, intelligent, avatar-based immersive, and gamification. By examining assessed skills and interaction modalities, the review provided a holistic account of how current systems simulate interviews, deliver feedback, and support professional skill development. A central contribution of this work is its integration of technical and behavioral perspectives, which prior reviews have largely treated in isolation. In doing so, the study establishes a comprehensive foundation for aligning interview preparation platforms with both academic training and employer expectations. This review is the first to systematically integrate technical, behavioral, and immersive perspectives in interview systems.

The analysis shows that advances in NLP, LLMs, and immersive VR and AR have improved realism and adaptivity, but the field remains fragmented. Key limitations include weak personalization, limited affective and multimodal feedback, scarce empirical validation, and a lack of standardized benchmarks. For Information Systems and Computer Information Systems education, these findings highlight both the promise and the current limits of intelligent interview simulations for career readiness. Future systems should integrate real-time coding tasks, plagiarism-aware assessment, affective feedback, culturally inclusive multilingual design, and rigorous benchmarking to support fairness and transparency. A notable limitation of the existing literature is the limited empirical validation across the systems. Many platforms remain at the prototype or demonstration stage, with evaluations based on small sample sizes, short-duration studies, and non-standardized metrics. The field would benefit significantly from large-scale, longitudinal studies that employ standardized evaluation frameworks to establish robust evidence of system effectiveness on learning

outcomes, interview performance, and career readiness.

By synthesizing the existing literature, identifying critical gaps, and outlining research directions, this review establishes a roadmap for the next generation of intelligent, inclusive, and context-aware interview preparation systems. Such systems are essential for bridging the gap between academic preparation and professional hiring demands in an increasingly competitive global employment landscape.

## 6. REFERENCES

- Adiani, D., Itzkovitz, A., Bian, D., Katz, H., Breen, M., Hunt, S., ... & Sarkar, N. (2022). Career interview readiness in virtual reality (CIRVR): A platform for simulated interview training for autistic individuals and their employers. *ACM Transactions on Accessible Computing (TACCESS)*, 15(1), 1–28. <https://doi.org/10.1145/3505560>
- Anaza, E., Mabrey, P., Sato, M., Miller, O., & Thompson, J. (2023). Improving student interview preparation through collaborative multimodal mock-interview assignments. *Sport Management Education Journal*, 17(2), 164–176. <https://doi.org/10.1123/smej.2021-0021>
- Ashrafi, N., Vona, F., Ringsdorf, C., Hertel, C., Toni, L., Kailer, S., ... & Voigt-Antons, J. N. (2024, October). Enhancing job interview preparation through immersive experiences using photorealistic, AI-powered Metahuman avatars. In *2024 IEEE International Symposium on Mixed and Augmented Reality Adjunct (ISMAR-Adjunct)* (pp. 345–346). IEEE. <https://doi.org/10.1109/ISMAR-Adjunct64951.2024.00083>
- Bachhav, P. K., Khandale, O. S., & Karnavat, S. R. (2023, November). AIVATAR: Scrutinizing interview readiness platform with intelligent assessment and aptitude. *International Research Journal of Modernization in Engineering Technology and Science*, 5(11), 1900–1903. [https://www.irjmets.com/uploadedfiles/paper/issue\\_11\\_november\\_2023/46469/final/fin\\_irjmets1700472402.pdf](https://www.irjmets.com/uploadedfiles/paper/issue_11_november_2023/46469/final/fin_irjmets1700472402.pdf)
- Barpute, J. V., Wattamwar, O., Pakjade, S., & Diwate, S. (2024, December). A survey of AI-driven mock interviews using GenAI and machine learning (InterviewX). In *2024 4th*

- International Conference on Ubiquitous Computing and Intelligent Information Systems (ICUIS) (pp. 217–224). IEEE. <https://doi.org/10.1109/ICUIS64676.2024.10866631>
- Abedi, M. (2022). Towards a reference architecture of AI-based job interview systems. *Ecole Polytechnique de Montréal*. <https://publications.polymtl.ca/10215/>
- Baur, T., Damian, I., Gebhard, P., Porayska-Pomsta, K., & André, E. (2013, September). A job interview simulation: Social cue-based interaction with a virtual character. In 2013 International Conference on Social Computing (pp. 220–227). IEEE. <https://doi.org/10.1109/SocialCom.2013.39>
- Belkaid, M., & Sabouret, N. (2014). A logical model of theory of mind for virtual agents in the context of job interview simulation. *arXiv preprint arXiv:1402.5043*. <https://doi.org/10.48550/arXiv.1402.5043>
- Boudjani, N., Colas, V., Joubert, C., & Amor, D. B. (2023, May). AI chatbot for a job interview. In 2023 46th MIPRO ICT and Electronics Convention (MIPRO) (pp. 1155–1160). IEEE. <https://doi.org/10.23919/MIPRO57284.2023.10159831>
- Chou, Y. C., Wongso, F. R., Chao, C. Y., & Yu, H. Y. (2022, April). An AI mock-interview platform for interview performance analysis. In 2022 10th International Conference on Information and Education Technology (ICIET) (pp. 37–41). IEEE. <https://doi.org/10.1109/ICIET54416.2022.9753837>
- Daryanto, T., Ding, X., Wilhelm, L. T., Stil, S., Knutsen, K. M., & Rho, E. H. (2025). Conversate: Supporting reflective learning in interview practice through interactive simulation and dialogic feedback. *Proceedings of the ACM on Human-Computer Interaction*, 9(1), 1–32. <https://doi.org/10.1145/3701188>
- Dascalescu, S., Dumitran, A. M., & Vasiluta, M. A. (2025). Leveraging generative AI for enhancing automated assessment in programming education contests. *arXiv preprint arXiv:2506.05990*. <https://doi.org/10.48550/arXiv.2506.05990>
- Dougherty, Q., & Mehta, R. (2025, May). Proving the coding interview: A benchmark for formally verified code generation. In 2025 IEEE/ACM International Workshop on Large Language Models for Code (LLM4Code) (pp. 72–79). IEEE. <https://doi.org/10.1109/LLM4Code66737.2025.00014>
- Fulk, H. K., Dent, H. L., Kapakos, W. A., & White, B. J. (2022). Doing more with less: Using AI-based Big Interview to combine exam preparation and interview practice. *Issues in Information Systems*, 23(4), 118–127. [https://doi.org/10.48009/4\\_iis\\_2022\\_118](https://doi.org/10.48009/4_iis_2022_118)
- Geng, W., Zhou, C., & Bian, Y. (2024). Change gently: An agent-based virtual interview training for college students with great shyness. *Virtual Reality*, 29(1), 12. <https://doi.org/10.1007/s10055-024-01076-y>
- Gomez, N., Batham, S. S., Volonte, M., & Do, T. D. (2025). Virtual interviewers, real results: Exploring AI-driven mock technical interviews on student readiness and confidence. *arXiv preprint arXiv:2506.16542*. <https://doi.org/10.48550/arXiv.2506.16542>
- Hasan, M., Ozel, C., Potter, S., & Hoque, E. (2023, September). SAPIEN: Affective virtual agents powered by large language models. In 2023 11th International Conference on Affective Computing and Intelligent Interaction Workshops and Demos (ACIIW) (pp. 1–3). IEEE. <https://doi.org/10.1109/ACIIW59127.2023.10388188>
- Hassan, S. Z., Sabet, S. S., Riegler, M. A., Baugerud, G. A., Ko, H., Salehi, P., ... & Halvorsen, P. (2023). Enhancing investigative interview training using a child avatar system: A comparative study of interactive environments. *Scientific Reports*, 13(1), 20403. <https://doi.org/10.1038/s41598-023-47368-2>
- Hunkenschroer, A. L., & Luetge, C. (2022). Ethics of AI-enabled recruiting and selection: A review and research agenda. *Journal of Business Ethics*, 178(4), 977–1007. <https://doi.org/10.1007/s10551-022-05049-6>

- Jarvis, A., Ho, A., & Lim, G. (2024). Impressing artificial intelligence: Automated job interview training in professional English subjects. *RELC Journal*. Advance online publication. <https://doi.org/10.1177/00336882241245449>
- Kawahara, T., Inoue, K., & Lala, D. (2021). Intelligent conversational android ERICA applied to attentive listening and job interview. *arXiv preprint arXiv:2105.00403*. <https://doi.org/10.48550/arXiv.2105.00403>
- Kawai, H., Muraki, Y., Yamamoto, K., Lala, D., Inoue, K., & Kawahara, T. (2022, September). Simultaneous job interview system using multiple semi-autonomous agents. In *Proceedings of the 23rd Annual Meeting of the Special Interest Group on Discourse and Dialogue (SIGDIAL)* (pp. 107–110). ACL. <https://doi.org/10.18653/v1/2022.sigdial-1.12>
- Lee, J., Kim, H., Kim, K. H., Jung, D., Jowsey, T., & Webster, C. S. (2020). Effective virtual patient simulators for medical communication training: A systematic review. *Medical Education*, 54(9), 786–795. <https://doi.org/10.1111/medu.14152>
- Leutner, F., Codreanu, S. C., Brink, S., & Bitsakis, T. (2023). Game-based assessments of cognitive ability in recruitment: Validity, fairness and test-taking experience. *Frontiers in Psychology*, 13, 942662. <https://doi.org/10.3389/fpsyg.2022.942662>
- Luo, X., Wang, Y., Lee, L. H., Xing, Z., Jin, S., Dong, B., ... & Hui, P. (2024). Using a virtual reality interview simulator to explore factors influencing people's behavior. *Virtual Reality*, 28(1), 56. <https://doi.org/10.1007/s10055-023-00934-5>
- Mishra, P. K., Arulappan, A. K., Ra, I. H., Rose, G., & Lee, Y. S. (2024, November). AI-driven virtual mock interview development. In *2024 Joint 13th International Conference on Soft Computing and Intelligent Systems and 25th International Symposium on Advanced Intelligent Systems (SCIS & ISIS)* (pp. 1–4). IEEE. <https://doi.org/10.1109/SCISISIS61014.2024.10760210>
- Mutter, B. A., Tetzlaff, J., Moher, D., & Altman, D. G. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71. <https://doi.org/10.1136/bmj.n71>
- Nagasawa, F., Okada, S., Ishihara, T., & Nitta, K. (2023). Adaptive interview strategy based on interviewees' speaking willingness recognition for interview robots. *IEEE Transactions on Affective Computing*. Advance online publication. <https://doi.org/10.1109/TAFFC.2023.3309640>
- Namratha, M., Lokesh, R., Bhat, P., Srikanth, N., & Gagan, M. (2024, April). InterviewPal—Elevating interview automation with deep learning and natural language processing perspectives. In *2024 International Conference on Emerging Technologies in Computer Science for Interdisciplinary Applications (ICETCS)* (pp. 1–6). IEEE. <https://doi.org/10.1109/ICETCS61022.2024.10543368>
- Nofal, A. B., Ali, H., Hadi, M., Ahmad, A., Qayyum, A., Johri, A., ... & Qadir, J. (2025). AI-enhanced interview simulation in the metaverse: Transforming professional skills training through VR and generative conversational AI. *Computers and Education: Artificial Intelligence*, 8, 100347. <https://doi.org/10.1016/j.caeai.2024.100347>
- Pandey, R., Chaudhari, D., Bhawani, S., Pawar, O., & Barve, S. (2023, March). Interview bot with automatic question generation and answer evaluation. In *2023 9th International Conference on Advanced Computing and Communication Systems (ICACCS)* (Vol. 1, pp. 1279–1286). IEEE. <https://doi.org/10.1109/ICACCS57279.2023.10112918>
- Pathak, G. (2024, June). Asynchronous AI interviews for technical roles: Improving candidate experience and reducing interview fatigue. *International Journal of Novel Research and Development*, 9(6), f140–f149. <http://ijnrd.org/papers/IJNRD2406504.pdf>
- Qin, C., Zhu, H., Shen, D., Sun, Y., Yao, K., Wang, P., & Xiong, H. (2023). Automatic skill-oriented question generation and recommendation for intelligent job interviews. *ACM Transactions on Information*

- Systems, 42(1), 1–32.  
<https://doi.org/10.1145/3604552>
- Qin, C., Zhu, H., Zhu, C., Xu, T., Zhuang, F., Ma, C., ... & Xiong, H. (2019, July). DuerQuiz: A personalized question recommender system for intelligent job interview. In *Proceedings of the 25th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining* (pp. 2165–2173). ACM.  
<https://doi.org/10.1145/3292500.3330706>
- Prajwal, R., Divya, D., Gowda, H. K., & Hemalatha, K. L. (2023). AI interview agent for predicting communication skills and personality traits. *International Journal of Engineering Research & Technology (IJERT)*, 11(8), RTCSIT–2023.  
<https://doi.org/10.17577/IJERTCONV11IS08018>
- Rädel-Ablass, K., Schliz, K., Schlick, C., Meindl, B., Pahr-Hosbach, S., Schwendemann, H., ... & Miersch, C. (2025). Teaching opportunities for anamnesis interviews through AI-based teaching role plays: A survey with online learning students from health study programs. *BMC Medical Education*, 25(1), 259. <https://doi.org/10.1186/s12909-025-06756-0>
- Rai, A. N. (2025, March 17). AI mock interview chatbot using Gen AI. *International Journal of Science, Engineering and Technology*, 13(2), 189–197. [https://www.ijset.in/wp-content/uploads/IJSET\\_V13\\_issue2\\_242.pdf](https://www.ijset.in/wp-content/uploads/IJSET_V13_issue2_242.pdf)
- Rao, G. S., Jaiganesh, M., & Parida, P. K. (2025, April). AI-powered virtual job interview simulator using natural language processing. In *2025 8th International Conference on Trends in Electronics and Informatics (ICOEI)* (pp. 1413–1421). IEEE.  
<https://doi.org/10.1109/ICOEI65986.2025.11013504>
- Røed, R. K., Baugerud, G. A., Hassan, S. Z., Sabet, S. S., Salehi, P., Powell, M. B., ... & Johnson, M. S. (2023). Enhancing questioning skills through child avatar chatbot training with feedback. *Frontiers in Psychology*, 14, 1198235.  
<https://doi.org/10.3389/fpsyg.2023.1198235>
- S, P., Siranjeevi, K., Kumar, N. V., Pathmesh, G., & Ponnarasu, A. (2025, May). NexInterview—AI-driven mock interview preparation platform. *International Journal of Advanced Research in Science, Communication and Technology*, 5(7), 26835.  
<https://www.ijarsct.co.in/Paper26835.pdf>
- Sahani, K. K., Khan, M. S., Khatwani, S., Gupta, S., & Dubey, A. (2025). A smart interview simulator using AI avatars and real-time feedback mechanisms (AI avatar for interview preparation). *International Journal of Engineering Technologies and Management Research*, 12(5), 66–75.  
<https://doi.org/10.29121/ijetmr.v12.i5.2025.1618>
- Sahu, A., Khare, R. K., Singh, Y. R., & Sahu, Y. (2025, June). AI interviewer using generative AI. In *International Conference on Advances and Applications in Artificial Intelligence (ICAAAI 2025)* (pp. 1231–1240). Atlantis Press.  
[https://doi.org/10.2991/978-94-6463-738-0\\_94](https://doi.org/10.2991/978-94-6463-738-0_94)
- Senthilkumar, K., Ranjith, S., Sivasakthi, M., & Ramvignesh, R. (2025, March). AI-based mock interview system using natural language processing. In *2025 International Conference on Advanced Computing Technologies (ICoACT)* (pp. 1–6). IEEE.  
<https://doi.org/10.1109/ICoACT63339.2025.11005032>
- Siswanto, J., Suakanto, S., Andriani, M., Hardiyanti, M., & Kusumasari, T. F. (2022). Interview bot development with natural language processing and machine learning. *International Journal of Technology*, 13(2), 274–285.  
<https://doi.org/10.14716/ijtech.v13i2.5018>
- Takeuchi, N., & Koda, T. (2021, September). Job interview training system using multimodal behavior analysis. In *2021 9th International Conference on Affective Computing and Intelligent Interaction Workshops and Demos (ACIIW)* (pp. 1–3). IEEE.  
<https://doi.org/10.1109/ACIIW52867.2021.9666270>
- Golande, S. V., Dandage, P., Jadhav, A., Mohite, P., & Shahane, A. (2025). Mock interview evaluator powered by AI. *Excel Journal: Technology, Engineering, & Management Research*, 12(2), 1–9.  
[https://www.researchgate.net/publication/391976964 MOCK\\_INTERVIEW\\_EVALUATOR\\_POWERED\\_BY\\_AI](https://www.researchgate.net/publication/391976964 MOCK_INTERVIEW_EVALUATOR_POWERED_BY_AI)

Vardarlier, P. (2023). A system that allows users to have a job interview experience. *Sustainability*, 15(22), 16031. <https://doi.org/10.3390/su152216031>

Wilkie, L., & Rosendale, J. (2024). Efficacy and benefits of virtual mock interviews:

Analysing student perceptions of digital employment preparations. *Journal of University Teaching and Learning Practice*, 21(1), 177-195. <https://doi.org/10.53761/rvtxt659>

## APPENDIX A Tables

| Papers                  | Gamification                                                                     | Technology                                                                                                | Strengths                                                     | Limitations                                                    |
|-------------------------|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|----------------------------------------------------------------|
| (Ashrafi et al., 2024)  | Immersive Metahuman avatars in VR/AR/desktop                                     | Unreal Engine (Metahuman), Convai (Chatbot), Meta Quest 3, Empatica Embrace+ (biosensor), TTS/STT modules | Photorealism, emotional impact tracking, comparative analysis | No real-time feedback, lacks adaptive coaching, AR in progress |
| (Daryanto et al., 2025) | Adaptive LLM-based simulation with dialogic feedback                             | Web app with GPT-3.5/4 and transcript annotation                                                          | Realistic, interactive simulation, dialogical feedback        | Lacks multimodal feedback, not domain-specific                 |
| (Vardarli et al., 2023) | Gamified scoring through points and achievements, immersive VR-based simulations | Web-based system, NLP, emotion and gesture analysis, VR headset, chatbot, sensors                         | Gamified scoring, immersive UX, NLP & emotion tracking        | Feedback general, no validation study                          |
| (Leutner et al., 2023)  | Cognitive ability assessment via games (Shapedance, Numerosity)                  | Machine learning (Ridge Regression with Bias Penalization), ICAR, CRT, HireVue platform                   | Valid and fair cognitive scoring, positive user feedback      | Concerns over face validity, narrow task types                 |
| (Geng et al., 2024)     | Immersive VR agents and biofeedback                                              | VR headset with EEG/ECG-enabled virtual agents                                                            | Reduced anxiety, improved performance, multimodal             | Requires biofeedback hardware, small sample                    |

**Table 1: Summary of Recent Advancements in Gamification-Based Job Interview Systems**

| Papers                       | Soft Skill Focus                                                                                           | Key AI Technologies Used                                                                                                                                                       | Strengths                                                         | Limitations                                         |
|------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------------------|
| (Rao et al., 2025)           | Technical, behavioral, situational questions; response relevance, semantic coherence, sentiment, keywords. | GPT/BERT, semantic similarity, sentiment analysis, and Google Speech-to-Text (STT) for speech-to-text.                                                                         | Scalable, adaptive QG, heatmap feedback, role-based scoring       | No emotion recognition, limited non-verbal feedback |
| (Senthil Kumar et al., 2025) | Fluency, coherence, and knowledge are assessed through verbal communication and behavioral observation.    | Speech-to-Text (Mozilla DeepSpeech), Text-to-Speech (Google TTS, Amazon Polly), Natural Language Processing (GPT, T5, BERT, RoBERTa), and Computer Vision (OpenCV, MediaPipe). | Multimodal feedback (verbal and behavioral), real-time evaluation | Limited scenario variation                          |

| <b>Papers</b>           | <b>Soft Skill Focus</b>                                                                                                                                                           | <b>Key AI Technologies Used</b>                                                                                                                                                                                                                  | <b>Strengths</b>                                                                                                         | <b>Limitations</b>                                          |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| (Nofal et al., 2025)    | Leadership, communication, and domain knowledge; quantitative reliability metrics; and bias analysis                                                                              | Unity 3D + OpenXR for the VR environment, ChatGPT for question generation and feedback, Wit. AI for Text-to-Speech, Whisper. AI for Speech-to-Text, BART/topic modeling & Distil-BERT for semantic similarity, and RoBERTa for the scorer model. | Bias analysis, consistent scoring, VR immersion, real-time feedback                                                      | Hardware intensive, no gaze detection, lab-only testing     |
| (Sahani et al., 2025)   | Key qualities for effective communication and professional aptitude, emphasizing clear expression, topical relevance, and proficiency in both technical and interpersonal skills. | GPT-3, Whisper, Google STT/TTS, React.js                                                                                                                                                                                                         | Immersive, scalable 3D avatar interface with real-time, multi-modal feedback. High STT/TTS accuracy, low latency (<2.5s) | No non-verbal analysis lacks multilingual support           |
| (Bachhav et al., 2023)  | Common hiring assessments include general job-skill Q&A, soft-skill simulations, and aptitude tests (covering logical and verbal reasoning).                                      | STT, TTS, web-based layered architecture                                                                                                                                                                                                         | Aptitude test, realistic Q&A, anxiety reduction                                                                          | No validation study, no emotional feedback, no coding tasks |
| (Chou et al., 2022)     | Intrinsic and DISC personality traits, along with facial emotions, head poses, speaking rate, amplitude, and pitch, contribute to interview performance.                          | Linear regression for scoring, Gamma distribution, and Automatic Relevance Determination (ARD).                                                                                                                                                  | Personality/behavioral modeling, asynchronous simulations                                                                | No live interaction, no adaptive feedback                   |
| (Namratha et al., 2024) | Factors assessed include content accuracy, response delivery, emotional state (via facial expressions), confidence levels (through voice analysis), and sentiment.                | NLP, along with Transformer-based models for STT conversion, and Convolutional Neural Networks (CNNs) for image analysis                                                                                                                         | Emotion & voice analysis, adaptive feedback                                                                              | Generic scoring models, unclear personalization logic       |
| (Siswanto et al., 2022) | Evaluation of competency levels using the STAR model (Behavioral Event Interview) based on predefined categories.                                                                 | NLP techniques, such as tokenization, stop-word removal, stemming, and part-of-speech tagging. Machine Learning methodologies, including Bayesian inference and TF-based weighting                                                               | Real-time competency evaluation, scalable                                                                                | Behavior only via text, lacks audiovisual feedback          |

| Papers               | Soft Skill Focus                                                                                                      | Key AI Technologies Used                                                                         | Strengths                                                 | Limitations                                       |
|----------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------|
| (Hasan et al., 2023) | Language learning, mental health, public speaking, social skill development, and emotionally expressive communication | Large Language Models (LLMs), STT, TTS, emotion modeling, and avatars (within a 3D game engine). | Multilingual, emotion-aware avatar, personalized coaching | Short duration, no memory persistence, demo stage |

**Table 2: Summary of Interview Systems Focused on Soft Skills**

| Papers                    | Main Features                                                                                  | Technologies Used                                               | Strengths                                                              | Limitations                                                         |
|---------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------------------------|---------------------------------------------------------------------|
| (Sahu et al., 2025)       | Generates coding questions from resumes; cheat detection; live editor                          | LLMs (GPT), facial/voice analysis, behavioral metrics           | Context-aware question generation, cheat detection, interactive coding | Facial/voice model performance unclear, lacks soft skill evaluation |
| (Gomez et al., 2025)      | Whiteboard-style technical interviews, code and voice analysis                                 | Multimodal NLP, whiteboarding tools, and feedback systems       | Realistic simulation, high user engagement, multimodal analysis        | No emotion detection, lacks plagiarism control                      |
| (Qin et al., 2024)        | Generates skill-aligned technical questions using deep learning and graph-based recommendation | Skill entity mining, question generation, neural ranking models | High relevance of Questions, user skill adaptability, modular design   | Limited soft skill integration, rule-based rigidity in places       |
| (Dougherty et al., 2025)  | Coding interview benchmark with formal verification                                            | Formal methods, Lean 4, coding benchmark creation               | Verified test cases, benchmarking standard for interviews              | No user interaction features, lacks AI/NLP analysis                 |
| (Dascalescu et al., 2025) | Generates edge case test cases for coding contests                                             | LLMs, test case generation, code evaluation                     | Complement human test design, increases grading accuracy               | Not a traditional interview system, no behavioral component         |
| (Chou et al., 2022)       | Mock interview platform for tech and behavioral evaluation                                     | AI evaluation models (unspecified), behavioral scoring          | Dual focus on technical and behavioral, asynchronous simulation        | No live feedback, lacks scenario customization                      |

**Table 3: Summary of Recent Advancements in Technical Job Interview Systems**