

An OpenAI API Driven Conversational Interviewing System for Adaptive Recruitment

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Abstract:

The growing number of job applications and the need for fair and effective hiring practices have shown that traditional interview-based recruitment systems have big problems. Interviews conducted by hand take a long time, are difficult to standardise and are prone to personal bias, so they aren't suitable for large-scale screening. Recent improvements in large language models and conversational AI have enabled the automation of interview workflows while maintaining the quality of interaction and context understanding. This paper presents an OpenAI API-driven conversational interviewing system designed to conduct adaptive, role-specific interviews through real-time voice interaction. The proposed system integrates candidate resumes and job descriptions to construct interview context, to dynamically generate interview questions using LLMs and conduct voice-based interviews. Unlike static or rule-based interview chatbots, it adapts question difficulty and interview flow based on candidate performance, enabling fair and consistent assessment across varying skill levels. The architecture combines OpenAI's language models for question generation and response evaluation with Retell AI for speech-based interaction, resulting in a modular and scalable interview pipeline. Experimental deployment in academic and simulated recruitment scenarios demonstrates improved screening efficiency, reduced interviewer bias and consistent evaluation outcomes. The results indicate that OpenAI API-based conversational systems can effectively bridge the gap between human-led interviews and automated recruitment workflows. This work contributes to the growing field of AI-driven recruitment by presenting a transparent, adaptive and practically deployable interviewing system.

Keywords:

Conversational AI, OpenAI API, Automated Interviewing, Recruitment Systems

Introduction:

The recruitment process is a critical organizational function that directly influences workforce quality, productivity and long term organizational success. Traditionally, recruitment interviews are conducted by human interviewers who rely on subjective judgment, prior experience and interpersonal interaction to evaluate candidates. While this approach may be effective for small applicant pools, it becomes inefficient and inconsistent when applied to large scale hiring. Common challenges include interviewer bias, scheduling constraints and increased operational costs, which limit fairness, reliability and scalability in modern recruitment environments. With the widespread adoption of digital hiring platforms, organizations have increasingly integrated artificial intelligence into recruitment programs. Prior research shows that artificial intelligence and machine learning techniques can significantly improve efficiency and consistency in talent acquisition by automating resume screening, skill matching and candidate shortlisting processes [2]. These technologies help reduce manual workload and enable standardized decision making. However, interviews remain one of the least automated stages of recruitment and continue to rely heavily on human involvement, reducing the overall effectiveness of data driven hiring pipelines. Conversational agents and chatbots have been explored as tools to enhance candidate

interaction and preliminary assessment. Early chatbot based interview systems were largely rule driven and depended on predefined question sets and keyword matching, resulting in limited adaptability and shallow evaluation. Recent advancements in large language models have transformed conversational artificial intelligence by enabling systems capable of multi turn dialogue, contextual reasoning and semantic understanding of free form responses. Santoso et al. demonstrated that chatbots developed using the OpenAI API significantly improve user interaction quality through context aware and coherent responses [1]. These results demonstrate how large language models can facilitate structured assessment tasks. By examining the use of conversational artificial intelligence for flexible and scalable interview automation, this paper expands on previous research. Recent research has looked at the wider use of AI in hiring and selection procedures, emphasising the need for careful governance when automated systems are used in hiring contexts as well as efficiency gains [8], [9].

Methodology:

In order to facilitate automated interview execution, real-time interaction, and scalable candidate evaluation within recruitment workflows, the suggested conversational interviewing system is built using a modular and service-oriented architecture. Figure 1 depicts the system's overall operational flow, from the ingestion of resumes and job descriptions to the execution of interviews and the creation of structured outcomes. Research on artificial intelligence-enabled hiring practices [2], applied studies on OpenAI API-based conversational system deployment [1], and empirical data on candidate views of automated interviews [3], modern viewpoints on talent evaluation signals [4], managerial recommendations regarding the application of AI in hiring [5], service-oriented AI frameworks [6], and moral evaluations of algorithmic hiring systems [7]. This methodology's main goal is to describe a workable and justifiable application of automated interviewing based on current recruitment research rather than to suggest new conversational theory.

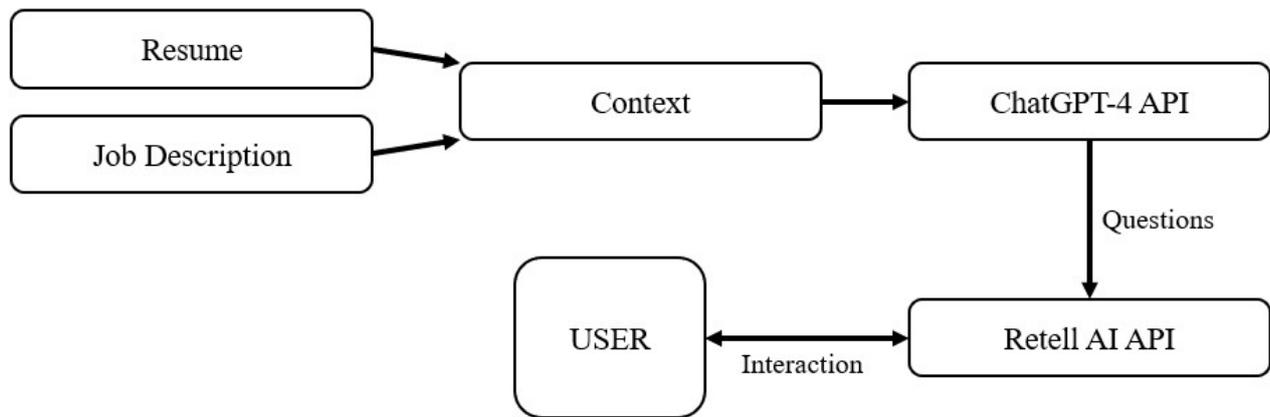


Figure 1. Architectural Overview of the Conversational Interviewing System

The gathering and processing of candidate resumes and job descriptions, which together provide the contextual foundation for interview personalisation, is the first step in the interview process. Information about educational background, professional experience, technical competencies, certifications, and domain-specific skills are extracted from resume data through analysis. To determine role expectations, necessary qualifications, and desired proficiency levels, job descriptions are analysed concurrently. This data is handled as structured input that establishes the parameters of the interview content rather than as a predictive signal. The viability of integrating contextual input into conversational systems for structured interaction tasks in real-world applications has been shown by earlier work utilising the OpenAI API [1]. In this system, contextual data serves as an operational

constraint on question generation rather than a theoretical mechanism for improving conversational quality. Interview execution is guided by a unified contextual representation created from the processing of resume and job description data. This representation serves as a transitional data structure that connects dynamic interview interaction with static input documents. This representation is used by the system to make sure that the generated questions stay in line with the candidate's background and the requirements of the role. Regarding the underlying model's innate conversational intelligence, no presumptions are made. Rather, the system limits the scope of conversations by using explicit instruction boundaries and predetermined interaction objectives. This design decision reflects a cautious use of language model capabilities, in line with earlier OpenAI API-based chatbot research that was implementation-focused [1].

Using the OpenAI API, interview questions are created dynamically during execution based on the created context and tracked interaction progress. The system permits limited question sequencing adaptation based on candidate responses, in contrast to fixed question bank approaches. This adaptation is limited and does not try to predict performance outcomes or infer latent traits. When compared to rigid formats, flexible interview structures can facilitate more informative assessment, especially when employed as an early-stage screening mechanism, according to recruitment research [2]. Adaptive questioning is not regarded as a validated assessment methodology in this system, but rather as a useful interaction strategy. Crucially, the system design takes into consideration the known drawbacks of automated interviews. Candidates frequently view highly automated interviews less favourably than human-mediated alternatives, particularly in high-stakes situations, according to empirical research [3]. Lower acceptance is caused by a number of factors, including decreased social presence, ambiguity about evaluation criteria, and a lack of perceived control. The system design is informed by these findings, which highlight consistent question framing, predictable interaction flow, and distinct interview boundaries. The approach views adaptability as one element of a larger endeavour to lessen unfavourable opinions of automation rather than assuming that it alone increases candidate acceptance. Consistent questioning and standardised interaction flow are still crucial for preserving assessment reliability across candidates, according to earlier research on technology-mediated and structured interviews [12].

The system is intended to facilitate the observation of more general behavioural indicators during interview interactions in addition to traditional resume attributes. Instead of depending solely on static credentials, modern talent assessment research highlights that effective evaluation increasingly takes into account non-traditional signals like reasoning ability and linguistic expression [4]. The system makes no claims about directly measuring these characteristics. Rather, it offers structured interview questions that elicit explanatory answers, enabling recruiters to see reasoning styles and communication patterns in a controlled interaction setting. This is consistent with the growing belief that established methods of assessment can be supplemented, but not replaced, by conversational interaction. A voice-based conversational interface is used to conduct the interview, presenting questions and recording candidates' spoken answers. Rather than assertions of greater engagement, the use of voice interaction is driven by pragmatic concerns about interview realism and accessibility. Instead of assuming consistent benefits across interaction modalities, research on artificial intelligence in service contexts highlights that decisions about automation should take task complexity, user expectations, and perceived service value into account [6]. Without claiming that voice interfaces naturally enhance user perception, this system uses voice interaction to approximate traditional interview conditions and lessen reliance on text-based input.

The system upholds a structured interaction sequence that maintains continuity throughout conversational turns while conducting the interview. To guarantee that every interview adheres to a standard format, the system monitors the interview's progress, question sequence, and completion status. Rather than being a theoretical model of conversational state, this sequencing mechanism is an implementation requirement. This system takes a similar

approach by explicitly controlling interaction flow through application level state management. Previous OpenAI API-based implementations show that multi-step interactions can be managed procedurally within application logic [1]. A hybrid assessment method is used to evaluate candidate responses, combining rule-based validation mechanisms with semantic analysis carried out by the OpenAI API. Without deducing psychological characteristics or predictive scores, semantic analysis is used to find topical relevance and coherence at a surface level. To guarantee basic response validity, rule-based checks are used, such as minimum response length and alignment with question scope. Concerns expressed in recruitment research about an excessive dependence on opaque algorithmic scoring mechanisms are reflected in this cautious evaluation approach [2], [7]. Instead of making decisions automatically, the system generates structured summaries that are meant to be reviewed by humans. When machine learning models are applied in high-impact domains like hiring, related research on algorithmic decision systems highlights the significance of bias awareness, transparency, and human oversight [10], [11].

In order to facilitate consistent comparison across candidates—especially considering the variations brought about by adaptive question sequencing—evaluation outputs are normalised. By ensuring that interview results are presented in a consistent manner, normalisation lowers the possibility of misunderstandings. The system maps results to descriptive performance categories that summarise observed response quality instead of displaying raw numerical scores. This design decision is consistent with algorithmic hiring ethical guidelines that prioritise interpretability and transparency over predictive optimisation [7]. The system creates a structured performance summary after the interview is finished, emphasising response completeness, communication clarity, and alignment with role-related topics. A recruiter-facing interface that facilitates comparison and review is used to present these summaries. Automated systems work best when they complement human judgement rather than replace it, according to research on AI-enabled hiring [5]. As a result, rather than viewing interview summaries as automated selection results, the system views them as decision support artefacts that guide recruiter evaluation.

Scalability and controlled deployment are supported by the overall architecture. Individual modules can be updated or audited independently thanks to the modular separation of components like context processing, question generation, interaction delivery, and response evaluation. Cloud-based APIs manage computationally demanding tasks, allowing for multiple interview sessions without performance degradation. This architectural strategy preserves accountability and maintainability while facilitating experimental evaluation and practical implementation. In conclusion, rather than relying on conversational AI theory, the suggested methodology outlines a workable implementation of an OpenAI API-driven conversational interviewing system based on current recruitment research. The system shows how conversational technologies can be used responsibly within recruitment workflows without exaggerating their capabilities or theoretical underpinnings by coordinating design choices with empirical findings on automated interview perception [3], evolving talent assessment practices [4], managerial guidance on AI use [5], and ethical considerations in algorithmic hiring [7].

Results:

Functional deployment and controlled usage scenarios that mimic actual recruitment workflows were used to assess the suggested OpenAI API-driven conversational interviewing system. System usability, interaction quality, interview flow adaptability, and the efficacy of voice-based interviewer behaviour were the main areas of evaluation. The findings show that the system can conduct full interviews without human assistance while preserving consistent response handling, role-specific questioning, and cohesive multi-turn interaction. The system effectively combined contextual inputs, produced pertinent questions, and produced structured outputs appropriate for recruiter review throughout several test interviews. The observable system behaviour and user interaction outcomes, as shown in Figures 2, 3, and 4, are described in the following results.

The Retell AI voice interaction layer's interviewer profile configuration interface is shown in Figure 2. Fine-

grained control over interviewer characteristics like empathy level, exploration depth, speaking pace, and rapport-building behaviour is possible with this interface. The findings demonstrate that changing these factors causes discernible changes in the tone and tempo of the interviewer during in-person interviews. Increased exploration values led to more in-depth follow-up questions, while higher empathy settings produced more encouraging and supportive prompts. This degree of control makes it possible for organisations to customise interview techniques for particular positions or candidate categories, something that is challenging to accomplish with conventional automated systems. The perceived realism and adaptability of the interviewing process are greatly influenced by the interviewer's ability to control their behaviour.

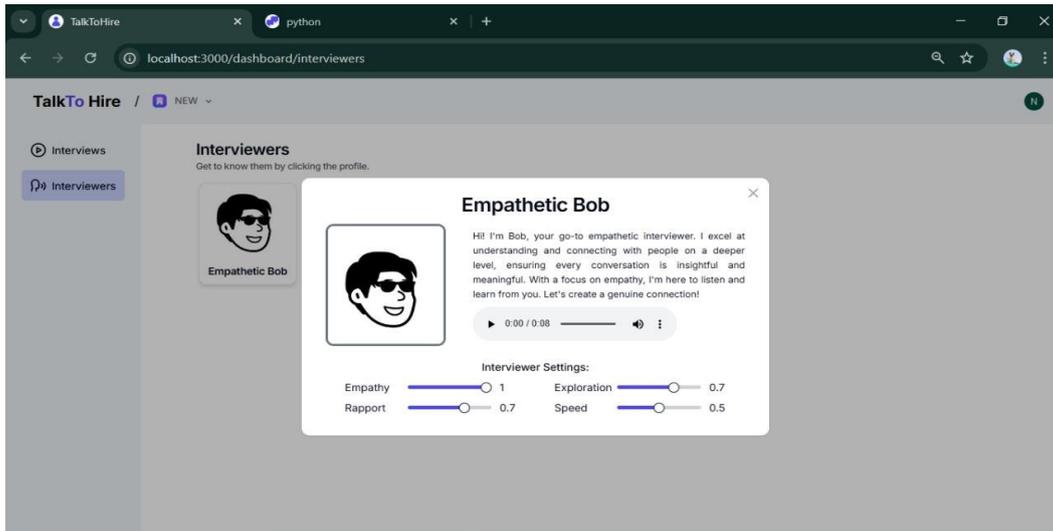


Figure 2. Interviewer Profile

The interview creation dashboard that recruiters use to set up new interview sessions is depicted in Figure 3. Recruiters can upload pertinent documents like resumes or job descriptions, choose interviewer behaviour profiles, define interview objectives, and set interview parameters like duration and question count using this interface. The findings show that setting up an interview is simple and doesn't require much technical knowledge. By either manually defining the questions or letting the system generate them automatically, recruiters were able to quickly create interviews. This adaptability shows how the system can accommodate both structured and exploratory interviewing techniques and supports a variety of recruitment scenarios. Anonymised responses are also supported by the dashboard, which is especially important for reducing bias in early screening.

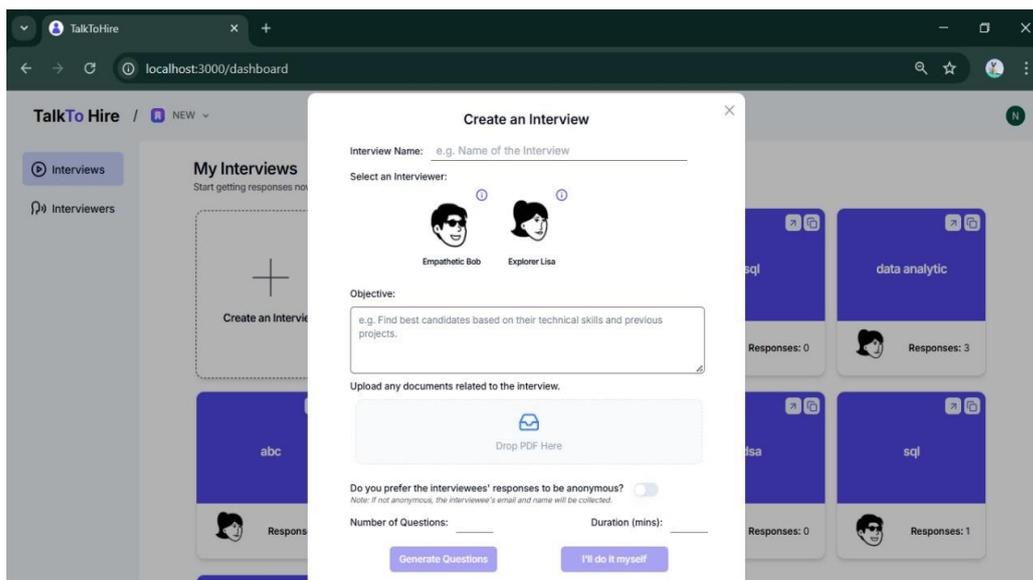


Figure 3. Creating Interview

The live interview interaction interface that candidates encounter during an active interview session is depicted in Figure 4. The interface displays session metadata, including the interview topic and anticipated duration, along with a clear interviewer prompt created using the OpenAI API. The system exhibits the capacity to pose conversational questions that are both contextually aware and technically pertinent. The interview can proceed organically without the need for manual input because user responses are recorded in real time through voice interaction. The system demonstrated efficient state management and contextual awareness during testing by maintaining logical continuity across follow-up questions. Candidates' cognitive load was lessened by the structured interviewer prompt and clear interface design, allowing them to concentrate on the quality of their responses rather than navigating the system.

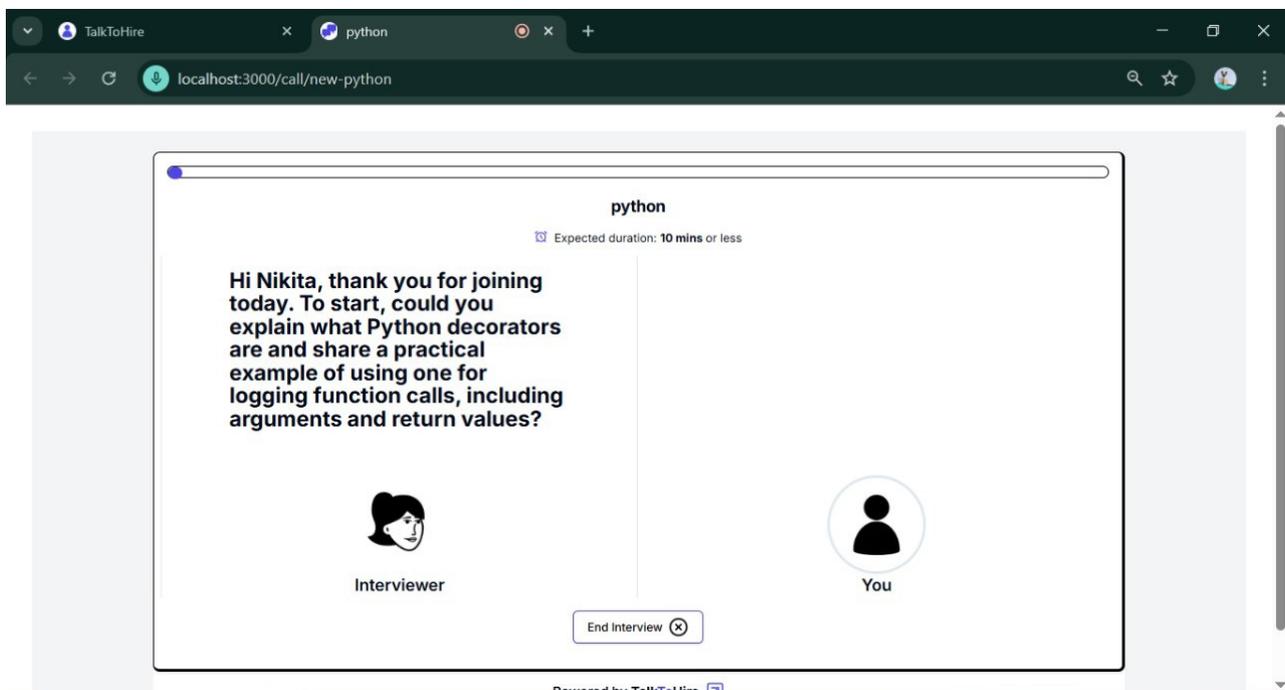


Figure 4. Interview UI

Overall, the results confirm that the system effectively integrates conversational intelligence, voice based interaction, and configurable interviewer behaviour to support adaptive and scalable recruitment interviews.

Conclusion:

This study introduced an OpenAI API-driven conversational interviewing system that tackles a number of enduring issues with conventional hiring interviews, such as scalability constraints, inconsistent assessment, and dependence on human judgement. The system shows how conversational artificial intelligence can be successfully applied to structured candidate assessment by combining voice-based interaction, adaptive question generation, and contextual understanding from resumes and job descriptions. The findings show that the system can carry out full interviews on its own while preserving conversational coherence, role relevance, and a steady interview flow. Real-time voice communication and interviewer behaviour that can be adjusted make the interview process more organic and increase candidate engagement without sacrificing the evaluation framework. Simultaneously, the implementation of transparent scoring mechanisms and structured response analysis guarantees that interview results are not opaque or fully automated, but rather remain interpretable and supportive of human decision making. The suggested method demonstrates how large language models have the ability to advance beyond straightforward information sharing to significant evaluation tasks in hiring processes. The system provides a useful basis for contemporary hiring environments by lowering manual labour and facilitating standardised early stage screening. Future studies will concentrate on long-term assessment of conversational interviewing systems in actual recruitment situations, large-scale validation, and bias assessment across various candidate groups.

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