



Talent Scout AI Hiring Assistant

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KEYWORDS	ABSTRACT
AI Hiring Assistant, Interview Automation, Large Language Models (LLMs), Question Generation, Answer Evaluation, Langchain, Langgraph, Recruitment Automation, Streamlit, Candidate Assessment	The increasing demand for efficient and scalable recruitment processes has made automated hiring systems an essential requirement for modern organizations. Traditional interview processes rely heavily on manual effort, where recruiters are responsible for screening candidates, asking questions, evaluating responses, and maintaining records. These methods are time-consuming, inconsistent, and difficult to scale when handling a large number of applicants. This project presents the TalentScout AI Hiring Assistant, an intelligent system designed to automate the initial phase of technical interviews using Artificial Intelligence and Large Language Models (LLMs). The system provides an interactive platform where candidates can enter their personal details, skills, and experience, after which it dynamically generates skill-based interview questions tailored to their profile. The core functionality of the system includes automated question generation and answer evaluation. Using an AI-driven workflow, the system generates theoretical interview questions based on selected skills and candidate experience. It then evaluates candidate responses using multiple parameters such as correctness, sentiment, grammatical quality, confidence level, and answer length. These evaluations are performed using LLM-based analysis, ensuring consistent and unbiased assessment. The system is implemented using Python, Streamlit, LangChain, and LangGraph, with SQLite used for data storage. A structured workflow mechanism ensures smooth execution of question generation and evaluation processes. Additionally, an admin panel is provided to view candidate data and interview responses, enabling easy monitoring and analysis. The proposed system reduces manual effort, ensures standardized evaluation, improves efficiency, and enhances the overall recruitment process. By automating repetitive tasks and leveraging AI for intelligent decision-making, the TalentScout AI Hiring Assistant demonstrates the potential of AI-powered systems in transforming traditional hiring workflows into scalable and efficient solutions.

1. INTRODUCTION

1.1 Brief Information

The rapid advancement of digital technologies has significantly transformed various domains, including recruitment and hiring processes. In today's competitive environment, organizations receive a large number of applications for technical roles, making the initial screening and interview process time-consuming and resource-intensive. Traditional recruitment methods rely heavily on manual effort, where recruiters are responsible for reviewing resumes, conducting interviews, evaluating candidate responses, and maintaining records. These processes are often repetitive, inconsistent, and difficult to scale when handling multiple candidates simultaneously.

Conventional interview systems also suffer from subjectivity and lack of standardization. Different interviewers may evaluate candidates based on personal judgment, leading to inconsistent results. Additionally, conducting technical interviews for a large number of candidates requires significant time and effort from skilled professionals, which increases operational costs and delays the hiring process.

With the emergence of Artificial Intelligence (AI) and Large Language Models (LLMs), there is a growing opportunity to automate and enhance recruitment workflows. AI-based systems are capable of understanding natural language, generating meaningful content, and analyzing responses in a structured manner. These capabilities enable the development of intelligent systems that can automate tasks such as question generation, answer evaluation, and candidate assessment.

This project introduces the TalentScout AI Hiring Assistant, an intelligent system designed to automate the initial phase of technical interviews using AI technologies. The system collects candidate information, generates skill-based interview questions, evaluates responses using multiple parameters, and stores the results for further analysis. By leveraging AI, the system ensures consistent, unbiased, and scalable candidate assessment.

The proposed system follows an AI-driven workflow where interview questions are dynamically generated based on candidate skills and experience. Candidate responses are analyzed using LLM-based evaluation techniques, considering factors such as correctness,

sentiment, grammatical quality, confidence level, and answer length. A structured workflow mechanism ensures smooth execution of the entire process, while a database system stores all candidate information and evaluation results.

Overall, the TalentScout AI Hiring Assistant transforms traditional interview processes into an automated, efficient, and intelligent system, reducing manual effort and improving the quality of candidate evaluation.

1.2 Evolution of Recruitment Systems

Recruitment systems have evolved significantly over time, moving from manual processes to intelligent automated solutions. In the early stages, hiring was completely manual, where recruiters collected resumes, conducted face-to-face interviews, and evaluated candidates based on subjective judgment. This approach was time-consuming, inconsistent, and limited in scalability.

With the introduction of digital systems, organizations began using online job portals and basic recruitment software to manage candidate data. These systems improved data storage and accessibility but still required manual effort for screening and evaluation. Recruiters were responsible for shortlisting candidates and conducting interviews, which remained a bottleneck in large-scale hiring.

The next phase involved the use of automated tools such as Applicant Tracking Systems (ATS), which helped in organizing resumes, filtering candidates based on keywords, and scheduling interviews. While these systems improved efficiency, they lacked intelligence and could not evaluate candidate responses or conduct interviews autonomously.

The emergence of Artificial Intelligence marked a major advancement in recruitment systems. AI-enabled platforms introduced features such as resume parsing, candidate ranking, and chatbots for initial interaction. These systems improved efficiency but still required human intervention for technical evaluation.

In recent years, the development of Large Language Models (LLMs) has enabled the creation of fully automated interview systems. These systems can generate questions, understand candidate responses, and evaluate them in real time. The TalentScout AI Hiring Assistant represents this advanced stage of evolution,

where AI is used to automate the interview process and provide consistent and scalable candidate assessment.

1.3 LLM-Based Interview Systems

Large Language Models (LLMs) have revolutionized the way systems interact with human language. These models are capable of understanding context, generating meaningful text, and analyzing responses with high accuracy. In recruitment systems, LLMs are used to automate key processes such as question generation and answer evaluation.

LLM-based interview systems can dynamically generate questions based on candidate skills and experience. Unlike traditional systems that use predefined questions, LLMs create context-aware questions, making the interview process more relevant and adaptive.

Another important feature of LLM-based systems is answer evaluation. The model can analyze candidate responses and provide structured feedback based on multiple parameters such as correctness, sentiment, grammar, confidence, and length. This ensures a comprehensive assessment of both technical knowledge and communication skills.

These systems also support scalability, as they can handle multiple candidates simultaneously without performance degradation. This makes them suitable for large-scale recruitment processes where manual interviews are not feasible.

In the TalentScout AI Hiring Assistant, LLMs are integrated using LangChain and LangGraph frameworks to manage the workflow of question generation and evaluation. The system demonstrates how LLMs can be effectively used to build intelligent and automated interview systems.

1.4 Problem Statement

In the current recruitment process, organizations face several challenges in conducting technical interviews efficiently. Traditional methods rely heavily on manual effort, where recruiters must screen candidates, prepare questions, evaluate answers, and maintain records. This process is time-consuming, inconsistent, and difficult to scale when dealing with a large number of applicants.

Existing systems, such as Applicant Tracking Systems, focus mainly on data management and resume filtering but do not provide intelligent interview capabilities.

They lack the ability to generate dynamic questions or evaluate candidate responses automatically.

Another major challenge is the lack of standardization in candidate evaluation. Different interviewers may assess candidates differently, leading to inconsistent results and potential bias. Additionally, conducting interviews for multiple candidates requires significant time and effort from skilled professionals.

There is also no efficient mechanism to analyze candidate responses in real time and provide structured evaluation. Manual evaluation is prone to errors and delays, reducing the overall efficiency of the hiring process.

Therefore, there is a need for an intelligent system that can automate the interview process, generate skill-based questions, evaluate candidate responses consistently, and store results for analysis. The system should be scalable, efficient, and capable of reducing manual effort while maintaining accuracy.

This project addresses these challenges by proposing the **TalentScout AI Hiring Assistant**, an AI-based system that automates the initial phase of technical interviews using LLMs and workflow-based processing, providing a scalable and efficient solution for modern recruitment needs.

2. LITERATURE SURVEY

The recruitment domain has undergone significant transformation with the integration of digital technologies and artificial intelligence. Traditional hiring processes have gradually evolved into automated and intelligent systems aimed at improving efficiency, accuracy, and scalability. This chapter reviews existing approaches related to recruitment systems, AI-based hiring, LLM-driven question generation, and automated evaluation systems, strictly in the context of the **TalentScout AI Hiring Assistant**.

2.1 Traditional Recruitment Systems

Traditional recruitment systems primarily rely on manual processes for candidate screening and evaluation. Recruiters typically collect resumes, shortlist candidates based on qualifications, and conduct interviews to assess technical knowledge and communication skills. These interviews are often conducted face-to-face or through virtual platforms.

In such systems, interview questions are usually predefined and may not be dynamically adjusted based on candidate skills or experience. Evaluation is performed manually by interviewers, which can lead to inconsistencies due to subjective judgment. Additionally, maintaining records of candidate performance requires manual documentation, making the process time-consuming and prone to errors.

Another limitation of traditional systems is their inability to handle large volumes of candidates efficiently. As the number of applicants increases, it becomes difficult for recruiters to conduct detailed evaluations for each candidate. This results in delays in the hiring process and reduced overall efficiency.

These challenges highlight the need for automated systems that can assist in question generation, candidate evaluation, and data management.

2.2 AI in Recruitment and Hiring

Artificial Intelligence has been widely adopted in recruitment to improve efficiency and reduce manual workload. AI-based systems are capable of analyzing candidate data, automating repetitive tasks, and providing intelligent insights for decision-making.

In modern hiring systems, AI is used for tasks such as resume screening, candidate ranking, and chatbot-based initial interactions. These systems help in filtering candidates based on predefined criteria, reducing the time required for shortlisting.

AI also enables automation of interview-related tasks. Instead of relying entirely on human interviewers, AI systems can generate questions and analyze responses. This reduces dependency on manual processes and ensures consistency in evaluation.

However, many AI-based recruitment systems focus mainly on screening and data analysis, while the interview process itself often remains partially manual. There is still a need for systems that can fully automate the interview process, including question generation and answer evaluation.

The TalentScout AI Hiring Assistant addresses this gap by using AI not only for automation but also for intelligent evaluation of candidate responses.

2.3 LLM-Based Question Generation Systems

Large Language Models (LLMs) have introduced a new approach to generating interview questions. Unlike

traditional systems that use static question banks, LLM-based systems can generate dynamic and context-aware questions.

These systems take inputs such as skill domain and experience level to generate relevant theoretical questions. This ensures that the questions are tailored to the candidate's profile, improving the quality of assessment.

LLM-based question generation systems also provide flexibility, as they can generate a wide variety of questions without the need for manual updates. This makes them suitable for applications where adaptability and scalability are important.

However, most existing implementations focus only on generating questions and do not include complete evaluation mechanisms. They lack integration with workflows that can handle both question generation and answer assessment in a structured manner.

In the TalentScout AI Hiring Assistant, LLMs are used not only for question generation but also integrated into a workflow that ensures smooth interaction between different stages of the interview process.

2.4 Automated Candidate Evaluation Systems

Automated evaluation systems aim to assess candidate responses without human intervention. These systems analyze answers based on predefined metrics such as correctness, language quality, and relevance.

Earlier systems used rule-based approaches or keyword matching techniques, which were limited in their ability to understand context. These methods often failed to accurately evaluate complex or descriptive answers.

With advancements in AI, modern systems use LLMs to evaluate responses more effectively. These models can understand the meaning of the answer, analyze its structure, and provide detailed evaluation scores.

Despite these advancements, many systems still evaluate answers using a single parameter, such as correctness, and do not provide a comprehensive assessment. Additionally, integration between question generation and evaluation is often missing.

The TalentScout AI Hiring Assistant improves upon these limitations by evaluating candidate responses using multiple parameters, including correctness, sentiment, grammar quality, confidence, and answer

length. This ensures a more complete and reliable assessment of candidate performance.

3. PROPOSED SYSTEM

The proposed system, **TalentScout AI Hiring Assistant**, introduces an AI-driven solution to automate the initial phase of technical interviews. The system is designed to reduce manual effort, ensure consistent evaluation, and improve scalability.

The process begins with the candidate entering personal details, skills, and experience through a user interface. The system then selects a set of skills and generates interview questions dynamically using an AI model.

A key feature of the system is its **workflow-based architecture using LangGraph**, which controls the flow between different operations. Based on the input state, the system decides whether to generate a question or evaluate an answer.

Candidate responses are evaluated automatically using multiple parameters such as correctness, sentiment, grammar quality, confidence, and length. The evaluation is performed using a Large Language Model, ensuring structured and unbiased assessment.

All candidate data and evaluation results are stored in a database for future reference. An admin panel is provided to view candidate details and interview responses.

This system provides a complete automated solution for conducting and evaluating technical interviews.

Advantages of Proposed System

The proposed system offers several advantages:

- **Automation of Interview Process**
Eliminates the need for manual question generation and evaluation.
- **Dynamic Question Generation**
Questions are generated based on candidate skills and experience.
- **Consistent Evaluation**
All candidates are evaluated using the same criteria.
- **Reduced Time and Effort**
Automates repetitive tasks, saving time for recruiters.
- **Scalability**
Can handle multiple candidates simultaneously.

- **Structured Workflow Management**
LangGraph ensures proper flow between question generation and evaluation.
- **Comprehensive Evaluation**
Evaluates answers based on multiple parameters.
- **Efficient Data Management**
Stores candidate details and responses in a database.

3.1 System Architecture

The system follows a modular architecture consisting of multiple components that work together to perform the interview process.

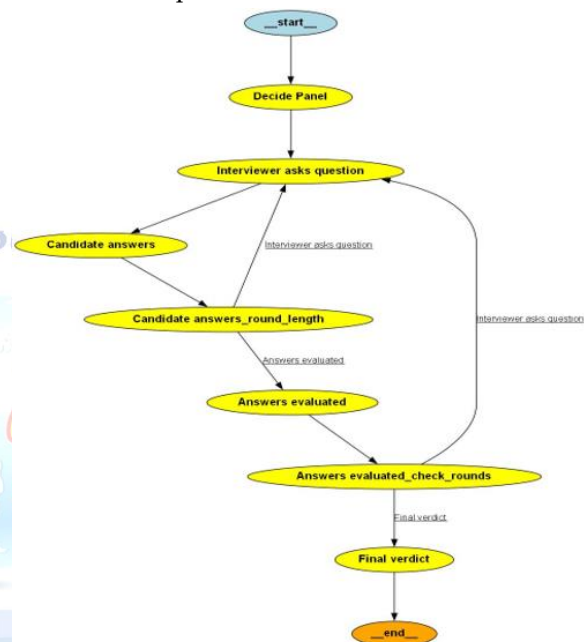


Fig 1: Overall System Architecture

3.2 UML Diagrams

UML diagrams are used to visually represent the structure and behavior of the system. They help in understanding system components, relationships, and workflow.

Fig 6.3 UML Sequence Diagram - Candidate Assessment Flow

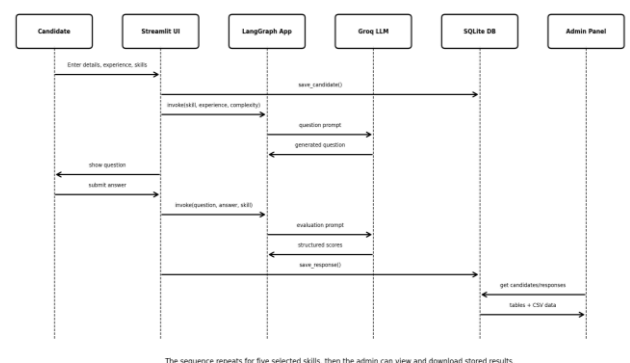


Fig 2: System Architecture Proposed Workflow

3.3 Class Diagram

The class diagram represents the static structure of the system. It shows the main classes, their attributes, and relationships.

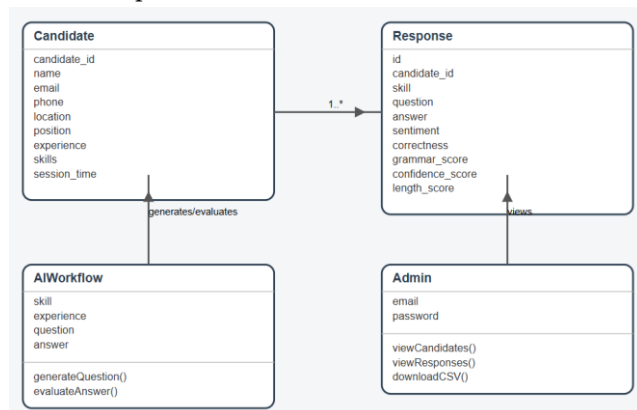


Fig 3: Class Diagram

3.4 Sequence Diagram

The sequence diagram represents the step-by-step flow of interaction between the candidate, system components, AI model, database, and admin panel.

Job Application(Web)

First Name: Enter First Name

Last Name: Enter Last Name

Email: Enter Email

Job Role: Select

Address: Enter Address

City Name: Enter City

PinCode: Enter PinCode

Date: 06-06-2023

Upload Your CV: No File Chosen

Fig 4: Sequence Diagram

4. RESULTS

System Inputs

The system accepts candidate information and interview-related inputs through the Streamlit candidate interface.

System Outputs

The system generates outputs for both candidates and administrators.

Interview/Question (UI)

Skill:

Question: Display OOP concepts in Python

Answer:

Student Answer:

Discussion

The TalentScout AI Hiring Assistant demonstrates how AI can be used to support recruitment workflows. The system does not replace final human decision-making, but it helps automate the initial screening stage.

Name	Date	Number of Members	Impressions	CTR	Status	Actions
SDP	03/25/24 - 18:45	345	23,078	40.5%	Pending	Refresh
Submissions Process_Module	03/25/24 - 12:30	4,464	14,238	45.6%	Active	Refresh
Academic Documents	03/24/24 - 10:20	1,746	6,543	33.7%	Active	Refresh
Compliance Audit Regs	03/23/24 - 10:55	483	53,628	34.1%	Cancelled	Refresh
Customer Support Tickets	03/23/24 - 04:30	3,346	8,768	23.7%	Cancelled	Refresh
Inventory Supply Logistics	03/22/24 - 17:15	3,635	16,464	37.2%	Active	Refresh
Project Team Tracking	03/22/24 - 11:40	2,745	67,457	53.8%	Active	Refresh
Training Management Learning	03/21/24 - 14:05	5,532	100,345	21.5%	Active	Refresh
Resource Task Allocation	03/21/24 - 09:20	2,843	126,986	11.2%	Delay	Refresh
Data Analysis Reporting	03/21/24 - 09:15	11,024	67,093	34.6%	Delay	Refresh

The use of LangGraph improves workflow control by routing between question generation and answer evaluation. The Groq LLM provides intelligence for generating questions and evaluating responses. SQLite ensures simple and reliable data storage.

5. CONCLUSION

The TalentScout AI Hiring Assistant successfully demonstrates an automated approach for conducting initial technical interviews using artificial intelligence and workflow-based design.

The system collects candidate details, processes technical skills, generates interview questions, evaluates candidate answers, and stores results in a structured format. The use of a **LangGraph-based workflow** ensures smooth execution by dynamically routing between question generation and answer evaluation. This makes the system more organized and efficient compared to traditional methods.

The integration of the **Groq Large Language Model** enables intelligent question generation and multi-parameter answer evaluation. Unlike manual interviews, the system provides consistent evaluation

using defined metrics such as correctness, sentiment, grammar quality, confidence, and length score.

The use of **Streamlit** provides a simple and user-friendly interface for both candidates and administrators. The **SQLite database** ensures efficient storage and retrieval of candidate data and responses. The admin panel allows easy monitoring and downloading of interview results.

Overall, the system reduces manual effort, improves consistency, and provides a scalable solution for the initial stage of technical recruitment. It can handle multiple candidates and ensures a structured interview process.

FUTURE WORK

Although the system performs effectively, there are several enhancements that can be implemented to improve functionality and real-world applicability.

1. Multi-Level Interview System

The current system conducts only one level of interview. In the future, it can be extended to multiple rounds such as:

- Basic screening
- Technical round
- Advanced problem-solving round

2. Voice-Based Interaction

The system currently uses text-based input. It can be enhanced by integrating:

- Speech-to-text for candidate answers
- Text-to-speech for question delivery

This will make the system more interactive and closer to real interview environments.

3. Video Interview Integration

Future versions can include:

- Video-based interview support
- Facial expression analysis
- Behavior analysis

This will improve candidate assessment beyond textual answers.

4. Advanced Analytics Dashboard

The admin panel can be enhanced with:

- Graphical performance reports
- Candidate ranking system
- Comparative analysis

This will help recruiters make better decisions.

5. Cloud Deployment

Currently, the system runs locally. It can be deployed on cloud platforms to:

- Support large-scale users
- Enable remote access
- Improve system availability

6. Integration with Job Portals

The system can be integrated with job platforms to:

- Automatically fetch candidate applications
- Start interviews directly after application submission

7. Improved Evaluation Accuracy

The evaluation system can be enhanced by:

- Training domain-specific models
- Using larger datasets for better scoring
- Reducing false evaluation cases

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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