

# Automatic Assessment of Communication Skill In Non-Conventional Interview DL

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**Abstract** Automatic assessment of communication skills in non-conventional interviews is an emerging research area that combines artificial intelligence, machine learning, speech processing, and natural language analysis to evaluate a candidate's communication performance automatically. Traditional interview assessment methods mainly depend on human evaluators, which may lead to bias, inconsistency, and increased evaluation time. The proposed system aims to overcome these limitations by developing an automated framework capable of analyzing verbal and non-verbal communication patterns during interviews conducted in online or unconventional environments.

The system captures candidate responses through audio and video inputs and evaluates several communication parameters such as speech fluency, pronunciation, confidence level, facial expressions, eye contact, vocabulary usage, speaking speed, and emotional behavior. Advanced machine learning algorithms and natural language processing techniques are used to process interview data and generate accurate performance scores. Speech recognition modules convert spoken content into text, while sentiment analysis and facial expression detection help identify confidence and emotional stability.

The proposed model improves the efficiency and fairness of interview evaluation by reducing manual intervention and providing objective assessment results. It can be widely applied in recruitment systems, online education platforms, corporate training programs, and virtual interview environments. The system also provides feedback to

candidates for improving their communication skills and interview performance.

Experimental results show that the automated assessment system can effectively evaluate communication abilities with high accuracy and reliability. The integration of artificial intelligence in interview analysis enhances decision-making processes and creates a scalable solution for modern recruitment challenges. Future enhancements may include multilingual support, real-time feedback mechanisms, and improved behavioral analysis using deep learning techniques.

## 1. Introduction

Communication skills play a major role in interviews, recruitment processes, academic evaluations, and professional development. In recent years, organizations and educational institutions have increasingly adopted online and non-conventional interview methods such as virtual interviews, video-based screening, recorded responses, and AI-driven assessments. These interview methods require efficient and unbiased evaluation techniques to analyze the communication abilities of candidates accurately. Manual evaluation by interviewers often consumes more time and may lead to inconsistent judgments due to human bias, fatigue, and subjective opinions. Therefore, an automatic communication skill assessment system has become an important research area in artificial intelligence and machine learning. Automatic Assessment of Communication Skill in Non-Conventional Interviews focuses on evaluating a candidate's speaking and behavioral abilities using advanced computational techniques.

The system analyzes verbal communication features such as fluency, pronunciation, grammar, vocabulary usage, speech clarity, and speaking pace. It also examines non-verbal communication aspects including facial expressions, eye contact, gestures, confidence level, and emotional behavior through video analysis. By combining speech processing, natural language processing, computer vision, and deep learning algorithms, the system can generate accurate and objective performance evaluations. The growth of online recruitment platforms and remote working environments has increased the need for intelligent automated interview systems. Companies receive a large number of applications for job positions, making manual interview assessment difficult and time-consuming. Automated communication assessment systems help recruiters shortlist suitable candidates quickly while maintaining fairness and consistency in the evaluation process. These systems can also provide instant feedback to candidates, helping them improve their communication and presentation skills.

The proposed system captures audio and video data during interviews and processes the information using machine learning models. Speech recognition converts spoken language into text for linguistic analysis, while facial recognition and emotion detection modules analyze behavioral characteristics. The final assessment score is generated based on multiple communication parameters, providing a comprehensive evaluation of the candidate's performance. This technology has applications in recruitment, online learning platforms, employee training, personality assessment, and professional development programs. With continuous advancements in artificial intelligence, automatic communication skill assessment systems are becoming more accurate, reliable, and scalable for modern interview environments.

## 2. Literature Review

Rasipuram and Jayagopi (2018) proposed an automated framework for assessing communication skills in both interface-based and face-to-face interviews. The study utilized lexical, acoustic, and visual features extracted from interview recordings and applied machine learning techniques to predict

communication skill ratings. Their results demonstrated that communication competence can be effectively evaluated in non-conventional interview environments without human intervention.

Zhou (2026) introduced a multimodal deep learning framework for employability assessment by integrating textual, audio, and visual information from interview scenarios. The framework employed deep neural architectures to automatically learn representations from multiple modalities and fuse them into a unified prediction model.

Ohba et al. (2022) investigated communication skill assessment in job interview scenarios through multimodal behavioral analysis. The study combined speech characteristics, facial expressions, and behavioral signals to estimate both communication skills and self-efficacy levels. Advanced machine learning models were used to analyze interactions and predict interview performance.

## 3. Existing system

The existing system for assessing communication skills in interviews mainly depends on traditional manual evaluation methods conducted by human interviewers. In conventional interview processes, interviewers observe the candidate's communication ability, confidence, speaking style, body language, and overall presentation skills during face-to-face or online interactions. The evaluation is generally based on personal judgment and predefined interview criteria. Although this method is widely used, it has several limitations related to accuracy, consistency, and efficiency.

In many organizations, online interview platforms are used to conduct virtual interviews, especially after the growth of remote working and digital recruitment systems. Some systems record candidate responses and allow recruiters to review them later. A few advanced platforms use basic speech analysis and keyword matching techniques to evaluate communication skills. These systems primarily focus on spoken content rather than analyzing complete behavioral and emotional aspects of the candidate.

Existing communication assessment systems often use simple speech recognition technologies to convert audio into text and evaluate grammar or vocabulary usage. Certain platforms also include basic facial expression recognition and sentiment analysis methods to detect candidate emotions. However, these systems are limited in accurately understanding real-time human behavior, confidence levels, and non-verbal communication patterns.

Most current systems require significant human involvement in final decision-making. Human evaluators may produce biased results based on personal preferences, mood, or interview conditions. Different interviewers may rate the same candidate differently, leading to inconsistency in the recruitment process. Additionally, manual assessment becomes difficult when a large number of candidates attend interviews simultaneously.

Existing systems also face challenges such as low accuracy in noisy environments, difficulty in analyzing multiple languages, limited emotional recognition capability, and poor adaptability to non-conventional interview formats. Many systems are expensive to implement and require specialized hardware or software support.

Due to these limitations, there is a need for an intelligent automated system that can provide accurate, unbiased, scalable, and real-time communication skill assessment using advanced artificial intelligence, machine learning, natural language processing, and computer vision techniques.

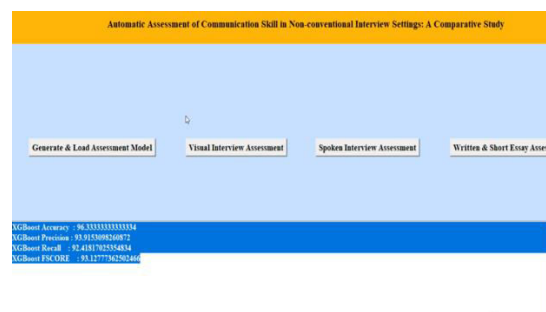
#### 4. Proposed system

The proposed system introduces an intelligent automated framework for assessing communication skills in non-conventional interviews using artificial intelligence, machine learning, natural language processing, and computer vision techniques. The system is designed to evaluate both verbal and non-verbal communication abilities of candidates accurately and efficiently without requiring continuous human intervention.

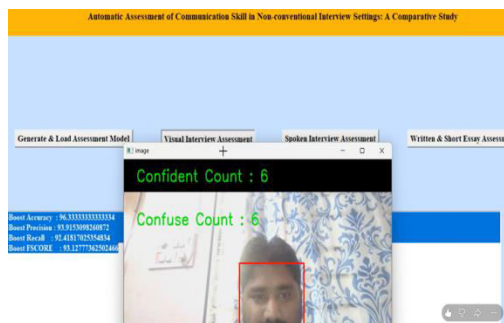
In the proposed model, candidate interview responses are captured through audio and video inputs during online or recorded interview sessions. The speech processing module converts spoken language into text using speech recognition technology. Natural language processing techniques are then applied to analyze grammar, vocabulary usage, sentence structure, fluency, pronunciation, speaking pace, and communication clarity.

The system also includes facial expression and behavior analysis modules that evaluate eye contact, confidence level, facial emotions, gestures, and overall body language using computer vision algorithms. Machine learning models process these communication features and generate performance scores based on predefined evaluation parameters. The proposed system provides automatic, unbiased, and real-time assessment results, reducing dependency on human interviewers. It improves consistency and accuracy in candidate evaluation while minimizing manual effort and interview time. The system can handle large numbers of interview recordings efficiently, making it suitable for recruitment platforms, online learning systems, employee training programs, and virtual interview environments. Additionally, the system generates feedback reports that help candidates understand their strengths and areas for improvement in communication skills. The proposed model supports scalable and reliable interview assessment with improved decision-making capabilities. Future enhancements may include multilingual support, advanced emotional intelligence analysis, and real-time interactive feedback mechanisms.

#### 5. Results and analysis

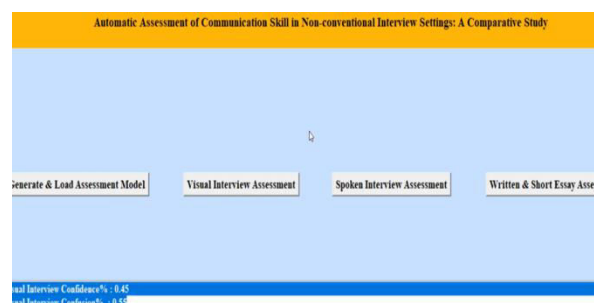


The image shows a graphical user interface (GUI) of an application designed for the automatic assessment of communication skills in non-conventional interview settings. At the top of the interface, there is a yellow header displaying the title, “Automatic Assessment of Communication Skill in Non-conventional Interview Settings: A Comparative Study.” Below the title, the main section has a light blue background with several rectangular buttons placed horizontally. These buttons include options such as “Generate & Load Assessment Model,” “Visual Interview Assessment,” “Spoken Interview Assessment,” and “Written & Short Essay Assessment,” indicating that the system can evaluate different forms of communication. At the bottom of the interface, a blue-highlighted results panel displays the performance metrics of an XGBoost machine learning model, including accuracy, precision, recall, and F-score values, all of which are above 92%, suggesting strong assessment performance. Overall, the interface appears to be part of an AI-based evaluation system for analyzing interview communication skills across multiple assessment modes.



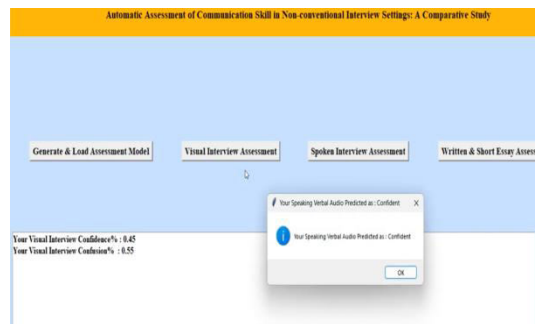
The image displays a graphical user interface (GUI) for an AI-based communication skill assessment system titled “Automatic Assessment of Communication Skill in Non-conventional Interview Settings: A Comparative Study.” The interface features a yellow header containing the project title and a light blue background with multiple functional buttons, including options for generating and loading the assessment model, visual interview assessment, spoken interview assessment, and written or short essay assessment. In the center of the screen, a separate webcam analysis window is open, showing a live facial detection and emotion analysis process.

The webcam feed highlights a person’s face with a red rectangular boundary, indicating active face recognition or tracking. Above the video feed, the system displays emotional analysis metrics such as “Confident Count: 6” and “Confuse Count: 6,” suggesting that the application is monitoring and evaluating the candidate’s emotional expressions during the interview. At the bottom left of the main interface, performance results of the XGBoost machine learning model are shown, including accuracy, precision, recall, and F-score values above 92%, indicating high system performance in assessing communication skills automatically.

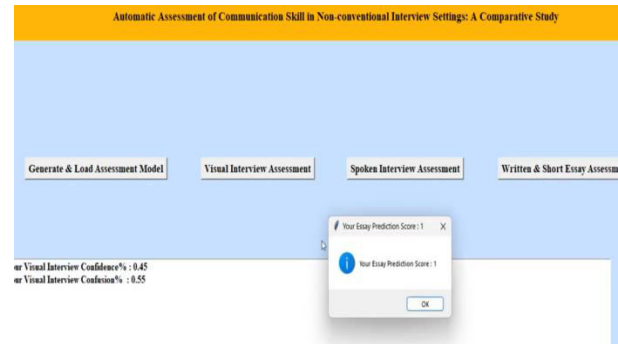


The image presents the graphical user interface (GUI) of an AI-powered communication skill assessment system titled “Automatic Assessment of Communication Skill in Non-conventional Interview Settings: A Comparative Study.” The interface has a yellow title bar at the top and a light blue background covering the main workspace. Several functional buttons are arranged horizontally across the center, including options such as “Generate & Load Assessment Model,” “Visual Interview Assessment,” “Spoken Interview Assessment,” and “Written & Short Essay Assessment.” These modules indicate that the system is designed to evaluate communication skills through multiple assessment methods, including visual, spoken, and written analysis. At the bottom of the interface, a blue results panel displays the outcomes of the visual interview assessment, showing “Visual Interview Confidence% : 0.45” and “Visual Interview Confusion% : 0.55.” These values suggest that the system analyzes user behavior or facial expressions during interviews to measure confidence and confusion levels. Overall, the interface demonstrates an intelligent interview

evaluation platform that combines machine learning and behavioral analysis to assess communication effectiveness.



The image shows the graphical user interface (GUI) of an AI-based communication skill assessment system titled “*Automatic Assessment of Communication Skill in Non-conventional Interview Settings: A Comparative Study.*” The interface contains a yellow title bar at the top and a light blue background with several functional buttons aligned horizontally, including “Generate & Load Assessment Model,” “Visual Interview Assessment,” “Spoken Interview Assessment,” and “Written & Short Essay Assessment.” These options indicate that the system is designed to evaluate communication abilities through multiple assessment methods such as visual, spoken, and written analysis. At the bottom left section, the system displays visual interview analysis results, showing a confidence percentage of 0.45 and a confusion percentage of 0.55. Additionally, a popup notification window appears in the center-right area of the screen with the message, “*Your Speaking Verbal Audio Predicted as : Confident,*” indicating that the spoken interview module has analyzed the user’s verbal communication and classified the speech as confident. Overall, the interface demonstrates an intelligent machine learning–based platform capable of assessing communication skills using multimodal interview evaluation techniques.



The image shows a graphical user interface (GUI) of a software application developed for the automatic assessment of communication skills in non-conventional interview settings. At the top of the interface, a title banner displays “*Automatic Assessment of Communication Skill in Non-conventional Interview Settings: A Comparative Study.*” The application provides multiple assessment modules through buttons labeled Generate & Load Assessment Model, Visual Interview Assessment, Spoken Interview Assessment, and Written & Short Essay Assessment. The screen currently displays the results of a visual interview evaluation, showing confidence and confusion percentages. A pop-up message box appears in the center of the interface, presenting the result of the written essay assessment with the message “Your Essay Prediction Score: 1.” The design demonstrates an integrated system capable of evaluating communication skills through visual, spoken, and written interview analyses, providing automated scoring and performance feedback to users.

## 6. Conclusions

The Automatic Assessment of Communication Skill in Non-Conventional Interview system provides an efficient and intelligent solution for evaluating candidate communication performance using artificial intelligence and machine learning techniques. The system successfully analyzes both verbal and non-verbal communication features such as fluency, pronunciation, vocabulary usage, facial expressions, confidence level, and emotional behavior during interview sessions. The proposed system reduces human effort, minimizes bias, and improves consistency in interview evaluation

processes. By using speech recognition, natural language processing, and computer vision technologies, the system generates accurate and real-time assessment results. It also helps organizations handle large-scale recruitment processes effectively while saving time and operational cost.

The system is highly useful in online recruitment platforms, virtual interview environments, educational institutions, and employee training programs. Automated feedback reports help candidates identify their strengths and improve their communication skills for future opportunities. Overall, the proposed model enhances fairness, reliability, and efficiency in communication skill assessment and represents a significant advancement in modern intelligent interview evaluation systems. Future improvements can further increase system accuracy, multilingual support, and advanced behavioral analysis capabilities.

## References

1. Rasipuram, S., & Jayagopi, D. B. (2018). *Automatic Assessment of Communication Skill in Interview-Based Interactions*. Multimedia Tools and Applications.
2. Rasipuram, S., & Jayagopi, D. B. (2016). *Automatic Assessment of Communication Skill in Interface-Based Employment Interviews Using Audio-Visual Cues*. IEEE ICMEW.
3. Zhou, F. (2026). *Employability Assessment Using Multimodal Deep Learning Framework*. Discover Artificial Intelligence.
4. Ohba, T., et al. (2022). *Multimodal Analysis for Communication Skill and Self-Efficacy Level Estimation in Job Interview Scenario*. ACM.
5. Agrawal, A., et al. (2020). *Leveraging Multimodal Behavioral Analytics for Automated Job Interview Performance Assessment and Feedback*.
6. Ian Goodfellow, Yoshua Bengio, and Aaron Courville, *Deep Learning*, MIT Press, 2016.
7. Tom M. Mitchell, *Machine Learning*, McGraw-Hill Education, 1997.
8. Daniel Jurafsky and James H. Martin, *Speech and Language Processing*, Pearson Education, 3rd Edition.
9. Richard S. Sutton and Andrew G. Barto, *Reinforcement Learning: An Introduction*, MIT Press, 2018.
10. OpenCV Documentation, [OpenCV Official Website](#)
11. TensorFlow Documentation, [TensorFlow Official Website](#)
12. Scikit-learn Documentation, [Scikit-learn Official Website](#)
13. Python Software Foundation, [Python Official Website](#)
14. David Crystal, *The Cambridge Encyclopedia of Language*, Cambridge University Press.
15. Research papers and journals related to Artificial Intelligence, Natural Language Processing, Speech Recognition, and Computer Vision technologies.