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AI System Report: Hirevue's AI-Driven Assessment Tool

Fanyi Zhou[1]

[1] School of Social Sciences & Law, University College Dublin, Belfield, Dublin 4, Ireland

Correspondence: Fanyi Zhou, School of Social Sciences & Law, University College Dublin, Belfield, Dublin 4, Ireland.

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Abstract

Hirevue, a leading technology company in human resources, utilizes AI to optimize recruitment processes through its sophisticated assessment platform. This platform employs machine learning to analyze video interviews, evaluating both verbal and non-verbal cues to predict candidates' traits and competencies. Continuous algorithmic enhancements, including the integration of advanced technologies such as RoBERTa for NLP, highlight Hirevue's dedication to accuracy and fairness in candidate evaluations. The system is designed to streamline recruitment, enhance hiring quality, and boost efficiency, demonstrated by notable time savings and improved employee retention across various implementations. Nonetheless, ethical concerns regarding transparency and bias in AI-driven assessments necessitate ongoing scrutiny and mitigation efforts.

Keywords: AI-driven assessment, machine learning, recruitment technology, Hirevue, bias mitigation

1. Introduction

Hirevue is a technology company which provides recruit management platform and applies artificial intelligence in the human resource sector. Its AI-driven assessment tool allows companies to find the best candidates and streamline the hiring procedures through using machine learning to analyse video interviews of candidates. Hirevue's primary application is to enhance the efficiency and objectivity of the hiring process. This report will explore the operation, objectives, and implications of Hirevue's AI system.

2. The State of the Art

The state of the art in Hirevue's technology involves advanced machine learning algorithms that can collect and analyse candidates' data like speech patterns and word choice to predict their personal traits, performance and competences. (See Figure 1)

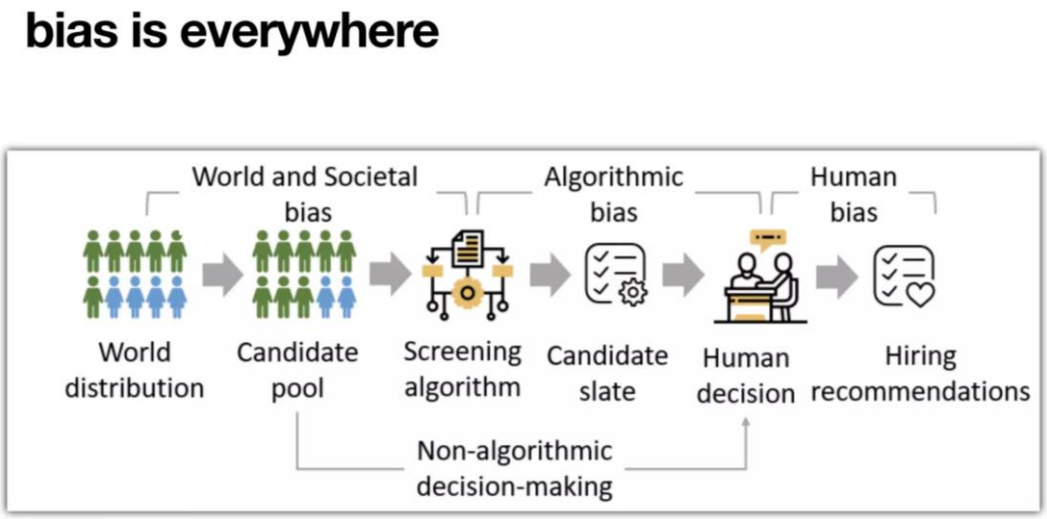

Figure 1. A High-Level Schematic for A Hybrid System for Hiring

Note: From "What you see is what you get? the impact of representation criteria on human bias in hiring" by Peng et al., 2019 (https://doi.org/10.1609/hcomp.v7i1.5281)

Here are some key components of Hirevue's technology.

Firstly, Video Interview Analysis technology allows Hirevue to assess thousands of verbal and non-verbal cues including tones, speech styles and even the choice of words.

Secondly, Machine Learning Algorithms can evaluate candidates' a range of competences and generate some "employability scores". This analysis is based on "Competence Models" trained on data collected from previous data from interviews and games.

Additionally, to adapt to the development of technology and the growing needs of users, Hirevue has been updating its algorithms continuously. According to Zuloaga (2021), Hirevue has tested and ultimately implemented a new third-party vendor for speech transcription called Rev.ai, which can increase accuracy in transcribing English and non-native English speakers with a variety of accents. When it comes to NLP, Hirevue's language model was adapted from a RoBERTa model, which is state-of-the-art and widely used across different industries. However, rather than adopting the input language features of RoBERTa, Hirevue adjusted the neural network on data to adapt more specific interview contexts. Furthermore, Hirevue also optimized their bias mitigation procedure. Instead of ongoing input removal and reassessment, they directly incorporate fairness factors into model optimization during training. Zuloaga (2021) reported that the ability to predict work-related abilities has increased by an average of nearly 40% through upgrading their system and using state-of-the-art technologies. Moreover, several other systems that are similar to Hirevue also advanced the state of the art. For instance, Pymetrics uses neuroscience-based games and artificial intelligence to assess various cognitive and emotional traits of candidates. This tool solely relies on inherent traits instead of historical data to avoid bias. Gowrabhathini et al. (2024) tested and found that Deep ResNet, a cutting-edge deep learning architecture can dramatically enhance and strengthen human resource management practices.

3. Objective of AI-Driven Assessment System

3.1 Streamline the Recruitment Process

AI-driven assessment systems can automate the initial screening of candidates through video interviews, which speed up the process and save a lot of time. According to Dixon (2017), the use of the predictive system in recruitment process can save up to 23 hours of manual labor per week. Because HM takes longer to screen and pre-screen candidates. From My Anatomy Integration (2023) suggested that AI tools can be used to evaluate candidates' skills, personal traits and experience objectively to speed up hiring cycles.

3.2 Enhancing the Quality of Hire

Through upgrading and advancing algorithms, these systems aim to match candidates more accurately to the specific requirements, contributing to better job performance and long-term success of new hires. Hirevue reported that Red Sox, a sales company saw a 30% increase in promotion rates because they can build an incredible team quickly with Hirevue.

From Sharma (2021), machine learning can ensure sustainability of the solution through learning and upgrading,

and advanced analytics can provide precision in defining who to hire.

4. Data

Hirevue's AI system utilizes a variety of data types to evaluate candidates' competencies. Here are some data types and sources. (See Table 1)

Table 1. Data Required for HireVue's AI System

Data Types	Sources
Video and Audio	Interviews and games
Textual Data	Resumes and answers to text-based questions
Behavioral Data	Real-time decision-making and problem-solving behavior
Training Data	Historical Data

On top of that, there are also some different ways to get the data.

Direct Input from Candidates: Most of the data is sourced from candidates directly, including videos, audios and interaction data with the system.

Third-Party Data Providers: Hirevue also integrates data from external sources to evaluate candidates for roles requiring specific checks or additional data.

Historical Employment Data: Learning machine will be fed in past data, including characteristics of successful and unsuccessful employees.

5. Pattern

Before evaluating candidates' competencies, AI system need to learn patterns that correlate specific verbal and non-verbal cues such as tone of voice, word choice, speech patterns and other communication nuances from past successful employees. After Hirevue dropped facial and body language monitoring in 2021, the features extracted from the data mainly include verbal features such speech patterns, word choice and language and content analysis. For instance, tempo, pitch, and pauses which might indicate nervousness, confidence, or thoughtfulness. And what the candidates say in response to questions may reflect their thinking processes and problem-skills.

6. Action

Hirevue's learning machine is capable of scoring candidates based on their performances in interview assessments. These "employability scores" are used to rank candidates, helping HR to simplify the screening process. Additionally, LM can generate detailed feedback reports for companies to understand the strengths and weakness of candidates comprehensively.

7. Evaluation

There is no doubt that Hirevue's learning machine system can benefit to streamlining the process, increasing efficiency, and enhancing the scalability. For instance, from Hirevue's investigation, National Safety Apparel (NSA) accelerated its interview process by five times and hiring speed by four times. This company also reduced its cost per hire by 20%, while increasing employee retention by 10%.

However, there are also some risks and challenges. The core of the ethical issue is the "employability" scores calculated by AI algorithms. The lack of transparency may lead to bias concerns. Harwell (2019) described this AI-driven assessment technology as "profoundly disturbing" and "opaque", because candidates cannot see how their data is processed in this Blackbox. The biases mainly stem from training data. If the training data fed in algorithms comes from a specific group, LM may try to favor the characteristics of that group and overlook other underrepresented communities. Wald (2019) mentioned that feeding Hirevue LM past data means that some characteristics of all good employees were labeled. However, if some marginalised groups' data was not fed in, they will have no chance to be employed. Firstly, disability bias should be considered. Guo et al. (2020) found that most of the speech recognition technologies are not capable of understanding atypical speech, which may disadvantage deaf people. Besides, detecting personal traits by speech pattern can also lead to discrimination for people with mental illness such as depression and anxiety. Based on this, regular bias audits which mainly detect training data, decision-making and outcome may benefit in mitigating the potential biases. Moreover, enhancing transparency and tell candidates how their data was used, protected and processed can avoid privacy issues as well as discrimination concerns.

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