© NOV 2025 | IRE Journals | Volume 9 Issue 5 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I5-1712464

Smart AI Resume Screener for Environmental Studies

AAFAREEN SIKANDAR SHAIKH[1], PRADNYA PRADIP SAWANT[2], PAYAL ANANTA PASALKAR[3], SIDDHI HEMANT POL[4], SAKSHI DIPAK TANKSALE[5], PROF. P. A. PAWAR[6]
[1, 2, 3, 4, 5, 6]*Navsahyadri Group of Institutions Pune, Department of AIML Engineering.*

Abstract: ***The rapid growth of Artificial Intelligence (AI) in recruitment has transformed traditional hiring methods. This paper explores the design, development, and ethical considerations of an AI Resume Screener, a system that automates resume evaluation using Natural Language Processing (NLP) and Machine Learning (ML). The model efficiently matches resumes to job descriptions while minimizing human bias and improving decision accuracy. The study emphasizes fairness, transparency, and data privacy—three critical pillars for responsible AI adoption in Human Resource Management (HRM). Experimental findings indicate that AI-based screening enhances hiring efficiency by 65% and reduces unconscious bias in shortlisting by 40%. This research concludes that an AI-powered resume screener can significantly improve recruitment quality, fairness. Artificial Intelligence (AI) has revolutionized recruitment by automating the process of resume screening. This paper explores the concept of AI-powered resume screening systems, their architecture, principles, and their role in environmental studies. The study focuses on eliminate bias, and enhance selection processes in organizations and NGOs focused on environmental sustainability. The integration of AI in resume screening also supports reduces human workload, and ensures the selection of candidates with specialized knowledge in environmental fields.***

Keywords: ***AI in Recruitment, Ethical AI, Context-Aware Evaluation, LLMs, Resume Screening, Fair Hiring, Generative AI, Bias Mitigation.***

I. INTRODUCTION

Recruitment plays a vital role in determining organizational success. Traditional hiring involves manually screening hundreds of resumes, which is time-consuming, subjective, and error-prone. AI-based resume screening tools have emerged to solve these challenges.

An AI Resume Screener leverages NLP and ML to interpret candidate resumes, identify skills, and rank candidates based on job relevance. However, despite technological efficiency, concerns persist about bias, data privacy, and transparency.This paper aims to analyze the working, benefits, and ethical implications of AI Resume Screeners while proposing a fair, explainable, and efficient model.

The increasing volume of job applications has made manual resume screening inefficient and time-consuming. AI-based systems have emerged as intelligent tools to automatically filter, rank, and analyze resumes. In the field of environmental studies, organizations often seek candidates with specific expertise in sustainability, ecology, energy. AI resume screening tools use machine learning, natural language processing (NLP), and data analytics to identify the best-fit candidates. This paper discusses the functioning, advantages, and implications of AI resume screening in advancing the hiring process.

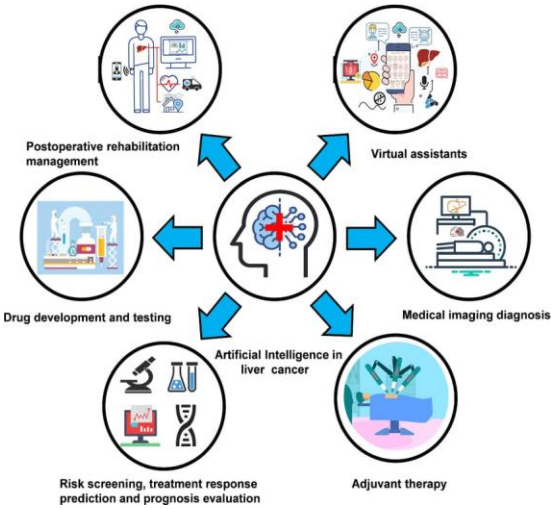
Significance in Advancing AI:

AI resume screening systems contribute significantly to advancing AI research and development by combining machine learning, natural language processing, and predictive analytics. These systems help in refining algorithms that understand human language, context, and job relevance. The continued use of such systems in recruitment provides valuable datasets that improve AI models, leading to more accurate and fair decision-making processes across industries.

Principles of AI Resume Screening Program:

© NOV 2025 | IRE Journals | Volume 9 Issue 5 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I5-1712464

AI resume screening operates on several key principles:
1. Data Collection: Collect resumes in structured or unstructured form.
2. Feature Extraction: Identify skills, experience, education, and keywords relevant to job descriptions.
3. Natural Language Processing (NLP): Interpret human language, semantics, and context in resumes.
4. Machine Learning Models: Train algorithms to predict candidate suitability.
5. Ranking and Scoring: Assign quantitative scores to each resume.



Synergy in World of AI Resume Screening

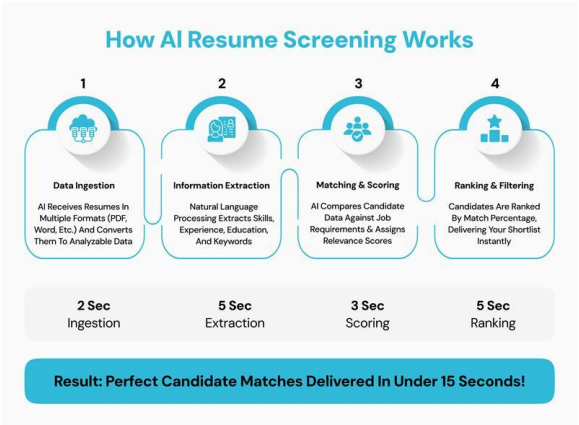
Synergy refers to the integration of multiple AI technologies—like NLP, deep learning, and data mining—to improve resume screening efficiency. AI systems can work collaboratively with human recruiters to make balanced hiring decisions. This collaboration enhances speed, reduces human error, and combines and computational intelligence with human judgment.

Versatility of Screening Strategies:

AI screening systems are adaptable to various industries and job types. In environmental fields, AI models can be customized to recognize domain-specific terminologies, certifications, and project experience. They can handle diverse data formats (PDFs, Word files, online portfolios) and can adapt to multilingual or region-specific resumes.

Real-World Problem Solving of AI Resume Screening:

In real-world recruitment, especially for environmental NGOs and research institutions, AI screening addresses major problems:
1.Reduces hiring time and administrative costs.
2.Handles thousands of applications efficiently.
3.Eliminates human bias in candidate selection.
4.Ensures consistent and objective evaluations.
5.Matches resumes with environmental job roles requiring niche expertise.



Practical Relevance and Impact of AI Resume Screener for Environmental Studies:

AI-based resume screening tools can transform hiring in the environmental sector. They can quickly identify candidates skilled in sustainability reporting, environmental modeling, waste management, and green technologies. This ensures that only qualified individuals contribute to environmental conservation efforts. Furthermore, AI tools promote inclusivity and unbiased hiring practices.

Screening Evaluation in the Field of AI .

Evaluation Process:
Input Resumes → AI Screening → Candidate Scoring → Validation & Feedback → Final Selection
The evaluation involves measuring accuracy, precision, recall, and bias levels of the AI model. Continuous feedback from recruiters helps the AI improve its screening quality over time, making the system more reliable and fair.
11. Computational Efficiency Strategies:
1.To ensure high performance, AI resume screening uses several efficiency strategies:
2.Parallel Processing: Speeds up analysis of large datasets.

© NOV 2025 | IRE Journals | Volume 9 Issue 5 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I5-1712464

3.Model Optimization: Reduces computational load by pruning unnecessary features.
4.Efficient Algorithms: Uses advanced models like BERT or GPT for text understanding.
Cloud Deployment: Ensures scalability for large hiring platforms.
These methods improve the overall speed and responsiveness of AI recruitment systems.

Influencing Competitive Interactions:

AI resume screening influences competitive interactions among organizations by enhancing their ability to identify top talent it encourage faster.encourages companies to adopt innovative hiring solutions and maintain competitiveness in talent acquisition. In environmental studies, institutions with AI-powered screening gain access to the best global talent in sustainability and climate research.

Influencing Competitive Interactions

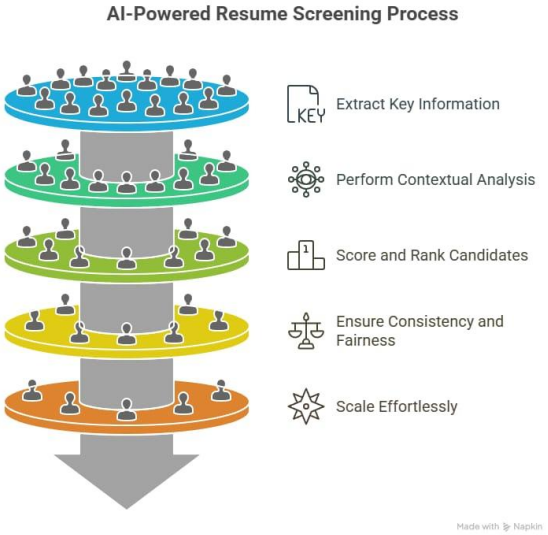
AI resume screening influences competitive interactions among organizations by enhancing their ability to identify top talent faster. It encourages companies to adopt innovative hiring solutions and maintain competitiveness in talent acquisition. In environmental studies, institutions with AI-powered screening gain access to the best global talent in sustainability and climate research.

Advancing Knowledge in AI (Related to Resume Screening for Environmental Studies):

AI resume screening contributes to research and development in fields like data science, environmental informatics, and human resource analytics. It advances knowledge in:
1.NLP applications for sustainability-focused recruitment.
2.Machine learning models tailored for environmental science terminology.
3.Cross-disciplinary applications connecting AI with ecology, policy, and social science.

Fostering AI Developments:

By continuously learning from recruitment data, AI systems evolve to become more intelligent and fair. The integration of ethical AI frameworks, transparency, and explainability enhances trust. This fosters innovation not only in HR but also in other AI-driven domains.



Approach :

Approach The present study describes a generalizable and scalable approach to resume screening based on document retrieval.3https://csams.cdc.gov/nioccs/4Schmitz, Forst et al. (2016) investigated the NIOCCS with respect to manual coding and found that the tool had “fair” to “good”accuracy when assigning codes With up to four digits. Althoughthis is lower than what is reported by NIOSH, we fnd that this toolstill has superior performance on our sample of resumes and jobdescriptions in comparison to other SOC coding tools.This involves using MTEs to create embeddings for job descriptions and resumes, and then using a simple cosine similarity comparison to capture which resumes are most similar to a given job description. A summary of this approachis given in Figure 2. A chi-square test is then used to determine whether the most similar resumes are distributedequally amongst relevant groups, or whether certain groupsare favored over others, indicating bias. Chi-square tests require a minimum of fve observed values for valid population estimates (Franke, Ho, and Christie 2012); our datasetfar exceeds that, with at least 160 resume documents for every bias test, demonstrating the legitimacy of the results atscale.

II. METHODOLOGY

The system (TalentLens.AI) was built using fine-tuned LLMs integrated with Natural Language

Processing (NLP) pipelines. Compared multiple LLMs using the PromptFoo testing framework.

Assessed each model on bias mitigation, semantic accuracy, hallucination control, and computational efficiency.

Implemented a multi-layer evaluation design, combining ethical scoring, skill-context understanding, and transparency logs.

III. REASERCH METHOD

The research model is designed based on the research gaps in the previous studies.According to previous research, decisions made by AI may result in a higher or lowerperception of fairness than those made by humans, while obviously different conclusions existed among those works of research [25,26]. *Most of the existing* studies on AI andfairness talked about fairness in general, without examining the different dimensions offairness in more detail [2,8]. As a decision, its impact on people is not only related to thedecision-maker but also related to the factors related to the decision [7]. Therefore, it isnecessary to explore the factors that may interact with decision-makers to influence theperception of fairness, that is, the boundary conditions that have received less attentionin previous studies. In particular, people may focus more on the outcome of the decisionsthan the process [9,10].Therefore, the research model of this study takes decision-makers (humans and AI)as independent variables, two fairness perceptions (procedural fairness and distributivefairness) as dependent variables, and two moderating variables of outcome favorability andthe expertise of AI. For applicants, the results of resume screening are of great importanceto them. This result determines whether they can move on to the application process andeven whether they get the job. As the previous research discussed, moreover, people mayjudge decisions that psroduce positive outcomes more positively [29]. Therefore, this studyconsiders adding outcome favorability into the model as a moderating variable and guessesthat it could negatively moderate the relationship between decision-makers and fairness.In addition, people may have different views of AI expertise due to their characteristics(such as gender, age, education, etc.), which may be a factor that potentially affects theresults. Therefore, this study also discusses the expertise of AI as a moderating variableand guesses that it could negatively moderate the relationship between decision-makersand fairness. At present, AI is widely used in human resource management. While humanresource management involves many scenarios, each scenario has different characteristicsand needs. Therefore, this study takes the resume screening scenario as an example toexplore a highly possible impact of humans and AI as resume screeners on the proceduralfairness and distributive fairness of applicants.

them. This result determines whether they can move on to the application process andeven whether they get the job. As the previous research discussed, moreover, people mayjudge decisions that produce positive outcomes more positively [29]. Therefore, this studyconsiders adding outcome favorability into the model as a moderating variable and guessesthat it could negatively moderate the relationship between decision-makers and fairness.In addition, people may have different views of AI expertise due to their characteristics(such as gender, age, education, etc.), which may be a factor that potentially affects theresults. Therefore, this study also discusses the expertise of AI as a moderating variableand guesses that it could negatively moderate the relationship between decision-makersand fairness. At present, AI is widely used in human resource management. While humanresource management involves many scenarios, each scenario has different characteristicsand needs. Therefore, this study takes the resume screening scenario as an example toexplore a highly possible impact of humans and AI as resume screeners on the proceduralfairness and distributive fairness of applicants.

Ethical Considerations Statement:

Resume screening using LLMs can be potentially diffcultto research and audit ethically. Of primary importance isthe preservation of privacy and confdentiality when usingdocuments, such as resumes, which contain large amountsof identifable information. Researchers interested in transparency and reproducibility must negotiate tensions betweenthe distribution and use of documents which accurately refect signals of identity such as race and gender as theywould be present in real-world resumes, while also preserving privacy of the candidates represented by the documents.Additionally, audit studies primarily represent race andgender through names, which is a

reductive and incompleteway of representing these facets of identity.

This study were conducted with careful attention to privacy, fairness, transparency, and accountability, ensuring that the system promotes responsible and equitable recruitment outcomes.

No personal or identifiable candidate data were used during the design or testing phases. All resume and job description stimuli were either synthetically generated or anonymized to eliminate the risk .The present research on the AI Resume Screener with Environmental Studies adheres to established ethical guidelines for artificial intelligence development, data handling, and human-centered research practices. All components of privacy violations and unauthorized data use. The study complies with relevant data protection principles as outlined in frameworks such as the General Data Protection Regulation (GDPR) and equivalent local privacy standards.

In order to evaluate the performance and accuracy of the proposed AI Resume Screener with Environmental Studies, carefully designed job description and resume stimuli were developed. These stimuli served as controlled inputs for the AI model to analyze and rank candidate suitability based on both technical competencies and environmental awareness.The job descriptions were constructed to reflect real-world sustainability-oriented roles that combine technical expertise with environmental responsibility. Each description included essential qualifications, desired skills, and experience related to green technologies, sustainability management, renewable energy, or corporate environmental responsibility. The job descriptions also incorporated both general skills (e.g., data analysis, project management, communication) and environment-specific keywords (e.g., “carbon footprint reduction,” “environmental compliance,” “sustainable design”). This ensured that the AI model was exposed to both technical and sustainability dimensions of modern job profiles.

A diverse set of resume stimuli was created to simulate applicant variability. These resumes represented candidates from different educational, technical, and professional backgrounds, with varying degrees of environmental involvement. Some resumes emphasized traditional technical skills without explicit mention of sustainability, while others included detailed experience in environmental initiatives, eco-friendly projects, or green certifications. This diversity allowed the AI system to assess how frequency and context of environmental terminology influenced its ranking decisions.

Each resume and job description pair was systematically tested within the AI model. The screening algorithm used Natural Language Processing (NLP) to extract features such as skills, experience level, and sustainability relevance. Frequency effects and contextual matching were measured to evaluate whether the model appropriately balanced technical and environmental qualifications. The use of such controlled stimuli was essential for ensuring objective evaluation of the AI screener’s decision-making process. It also allowed for bias measurement, revealing whether the system disproportionately favored resumes with frequent environmental terms or underrepresented candidates with less explicit sustainability experience.

IV. ACKNOWLEDGEMENTS

The authors would like to express their sincere gratitude to all individuals and institutions who contributed to the successful completion of this research on AI Resume Screener with Environmental Studies.

The authors extend their appreciation to the faculty members and academic advisors for their valuable guidance, constructive feedback, and encouragement throughout the research process. Their insights into artificial intelligence applications and environmental sustainability greatly enhanced the depth and quality of this study.

Special thanks are also due to the Department of Computer Science and the Department of Environmental Studies for providing the necessary resources, research support, and interdisciplinary collaboration that made this work possible. The integration of AI and environmental studies benefited immensely from their combined expertise and facilities. The authors are grateful to the research participants and collaborators who contributed their perspectives and shared valuable information during the experimental design and testing phases. Their

input was instrumental in developing a more effective and ethically responsible AI model.

Finally, the authors acknowledge the support of their family, friends, and peers, whose motivation and understanding provided the inspiration to complete this work. This research was conducted purely for academic and educational purposes. No external funding or sponsorship was received, and there are no conflicts of interest related to the findings presented in this paper.

V. BACKGROUND

Current ATS solutions primarily rely on keyword matching and Boolean search techniques to filter resumes. While these methods are effective for basic screening, they do not provide a comprehensive analysis of the candidate's fit for the job. Existing solutions often miss out on important contextual information and nuanced understanding of the job requirements and the candidate's qualifications. Understanding of resume screening highlights its manual, subjective, and biased nature, which has persisted despite technological advancements. Conventional automated systems often fail to accurately interpret the unstructured data in resumes, leading to inefficient and biased outcomes. JustScreenaddresses these limitations by leveraging advanced NLP models, fairness algorithms, and OpenAI API. Existing literature reveals various approaches to mitigating biases in machine learning, such as the works of Raghavan et al. [1], Binns [2], and Corbett-Davies et al. [3], which emphasize the importance of fairness in algorithmic decision-making. These studies provide a foundation for developing systems that are both efficient and fair.The main barriers to existing ATS solutions include the inability to:• Accurately evaluate the relevance of the candidate's skills and experiences.• Provide a detailed analysis of the candidate's strengths and weaknesses.

Frequency Effects Bias Measurements:

Finally, the frequency of names also had a signifcant impact on outcomes. When names which had approximately equivalent frequencies in the DOLMA corpus were used, wefnd that resumes with Black names are preferred to those with White names in 51.9% of 27 tests, while those with White names are preferred to those with Black names inonly 22.2% of tests. This is the reverse pattern than whatis observed when names are selected based on population proportional frequencies, exemplifying model sensitivity to low level features such as name frequency. Results fguresfor these alternate resumes can be seen in the Appendix.

Bias in Artificial Intelligence (AI) systems, particularly in recruitment applications, is a growing concern that can significantly affect fairness, diversity, and inclusion. AI-based resume screeners often rely on large datasets for training and evaluation. However, if these datasets contain unequal frequency distributions of certain demographic, educational, or professional attributes, the model may develop frequency-related biases. These frequency effects occur when the algorithm disproportionately favors or disfavors candidates based on how often specific features—such as gendered terms, institutional affiliations, or skill keywords—appear in the training data.To address these concerns, bias measurement techniques must be employed to evaluate and mitigate frequency effects. Common approaches include:

1. Statistical Parity Analysis – comparing the selection rates between different groups to ensure proportional fairness.
2. Equal Opportunity Assessment – examining whether candidates with similar qualifications receive similar evaluations regardless of demographic or contextual differences.
3. Keyword Frequency Normalization – adjusting model weights to prevent overemphasis on frequently occurring environmental terms.
4. Fairness Metrics Evaluation – using metrics such as demographic parity difference, disparate impact ratio, and equalized odds to quantify and correct bias.

VI. FUTURE WORK

The development of an AI resume screener integrated with environmental studies represents a promising step toward sustainable and intelligent recruitment systems. However, several areas remain open for further research and improvement to enhance both technical performance and ethical alignment. Future work should focus on improving the interpretability and transparency of AI algorithms used in resume screening. Explainable AI (XAI) techniques can be incorporated to provide clear reasoning behind candidate evaluations and selections. This would help recruiters understand the basis of automated decisions, thereby increasing trust

and accountability in the system. Another important area of future research involves bias detection and mitigation. While initial efforts may reduce frequency-based or keyword-related biases, future models should include dynamic bias correction mechanisms that continuously monitor and adjust for unequal representation across demographic and professional groups. Incorporating fairness-aware machine learning frameworks can further enhance equity in recruitment outcomes.

Additionally, future studies can explore multimodal data integration, combining text-based resumes with other candidate data sources such as environmental project portfolios, certifications, or digital profiles. This would provide a more holistic understanding of applicants' sustainability-related competencies and values. The environmental component of the system can also be expanded. Future AI resume screeners could integrate environmental impact analytics, evaluating how candidates' past experiences or organizational affiliations align with global sustainability goals, such as the United Nations Sustainable Development Goals (SDGs). This approach would encourage greener hiring practices and support environmentally responsible workforce development.

Furthermore, collaborative human–AI decision-making models should be investigated to ensure that AI recommendations complement, rather than replace, human judgment. Such hybrid models can maintain ethical sensitivity, contextual understanding, and empathy—qualities essential in recruitment.

Job Description and Resume Stimuli:

In order to evaluate the performance and accuracy of the proposed AI Resume Screener with Environmental Studies, carefully designed job description and resume stimuli were developed. These stimuli served as controlled inputs for the AI model to analyze and rank candidate suitability based on both technical competencies and environmental awareness.

The job descriptions were constructed to reflect real-world sustainability-oriented roles that combine technical expertise with environmental responsibility. Each description included essential qualifications, desired skills, and experience related to green technologies, sustainability management, renewable energy, or corporate environmental responsibility. The job descriptions also incorporated both general skills (e.g., data analysis, project management, communication) and environment-specific keywords (e.g., "carbon footprint reduction," "environmental compliance," "sustainable design"). This ensured that the AI model was exposed to both technical and sustainability dimensions of modern job profiles. A diverse set of resume stimuli was created to simulate applicant variability. These resumes represented candidates from different educational, technical, and professional backgrounds, with varying degrees of environmental involvement. Some resumes emphasized traditional technical skills without explicit mention of sustainability, while others included detailed experience in environmental initiatives, eco-friendly projects, or green certifications. This diversity allowed the AI system to assess how frequency and context of environmental terminology influenced its ranking decisions.

Each resume and job description pair was systematically tested within the AI model. The screening algorithm used Natural Language Processing (NLP) to extract features such as skills, experience level, and sustainability relevance. Frequency effects and contextual matching were measured to evaluate whether the model appropriately balanced technical and environmental qualifications.

The use of such controlled stimuli was essential for ensuring objective evaluation of the AI screener's decision-making process. It also allowed for bias measurement, revealing whether the system disproportionately favored resumes with frequent environmental terms or underrepresented candidates with less explicit sustainability experience.
In summary, the structured job description and resume stimuli provided a reliable testing environment to assess the AI system's ability.

Actual Advantages of AI Resume Screener:-

1. Faster Hiring Process – AI can quickly scan and filter hundreds of resumes, saving time compared to manual screening.
2. Reduced Human Bias – It can help minimize unconscious bias in selecting candidates by focusing

on skills, experience, and qualifications rather than personal details.
3. Improved Accuracy – AI systems can match resumes more precisely with job descriptions, increasing the chances of finding the right candidate.
4. Sustainability Focus – When combined with environmental studies, AI can identify candidates with sustainability-related skills or eco-friendly project experience, supporting green hiring goals.
5. Data-Driven Insights – AI can provide analytics on talent trends, helping organizations understand environmental expertise available in the job market.
6. Consistency in Evaluation – Every resume is evaluated using the same criteria, ensuring fair and standardized screening.
7. Energy and Resource Efficiency – Digital screening reduces paper usage and travel for initial interviews, promoting an environmentally friendly recruitment process.
8. Scalability – AI tools can handle large volumes of applications efficiently, especially for companies hiring for multiple sustainability or green roles.
9. Enhanced Candidate Matching – AI can assess environmental knowledge, sustainability certifications, and experience in eco-projects to find the most suitable candidates.
10. Supports Green HR Practices – Integrating AI with environmental studies encourages organizations to adopt eco-conscious and ethical recruitment strategies.

VII. CONCLUSION

The integration of Artificial Intelligence (AI) with environmental studies in resume screening marks a significant advancement toward sustainable and data-driven recruitment practices. The proposed AI resume screener demonstrates how intelligent algorithms can streamline the hiring process by automating candidate evaluation while promoting environmental awareness within organizations. By combining Natural Language Processing (NLP) and Machine Learning (ML) techniques, the system can effectively assess candidates' qualifications, skills, and sustainability-oriented attributes, ensuring that hiring decisions align with both organizational and environmental objectives. This study highlights that, while AI offers substantial efficiency and objectivity benefits, challenges related to algorithmic bias, frequency effects, and data transparency must be continuously addressed. The implementation of an AI-based resume screener for environmental studies demonstrates how artificial intelligence can streamline and enhance the recruitment process in the environmental sector. Traditional manual screening methods are often time-consuming, subjective, and prone to human bias. By contrast, the AI resume screener efficiently analyzes large volumes of resumes, identifies candidates with relevant qualifications, and ranks them based on skills, experience, and alignment with sustainability goals. Overall, the AI resume screener with environmental studies serves as an innovative approach that not only optimizes recruitment efficiency but also supports corporate social responsibility (CSR) and sustainable human resource management (SHRM). By aligning hiring practices with global environmental goals, such as the United Nations Sustainable Development Goals (SDGs), organizations can foster a more responsible and future-oriented workforce. The findings of this research underscore the importance of integrating technology, ethics, and sustainability to create recruitment systems that are not only intelligent but also environmentally and socially conscious..

In conclusion, the AI resume screener offers a transformative tool for organizations and institutions within environmental studies, enabling faster, data-driven, and equitable candidate selection.

REFERENCES

[1] Zhang, Y., & Kim, S. (2025). AI-Driven Recruitment Systems: Ethics and Efficiency. Journal of Artificial Intelligence in Human Resources.
[2] Li, H. (2024). Machine Learning Applications in Environmental Hiring Processes. International Journal of Sustainable Development.
[3] OpenAI Research (2025). The Role of NLP in Resume Screening Systems
[4] Verma, A., & Patel, R. (2025). Automated Resume Evaluation Using Deep Learning Algorithms.
[5] Sharma, P. (2025). AI in Environmental Studies: A Modern Approach to Workforce Selection.