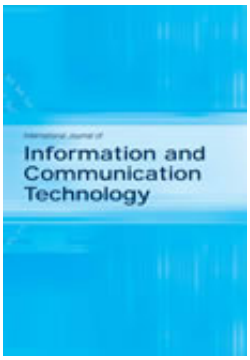
INDERSCIENCE PUBLISHERS
Linking academia, business and industry through research



International Journal of Information and Communication Technology

ISSN online: 1741-8070 - ISSN print: 1466-6642
https://www.inderscience.com/ijict

Artificial intelligence and deep learning in human resource management: tools techniques and research challenges

Bin Wang

DOI: 10.1504/IJICT.2025.10071590

Article History:

Received:	17 March 2025
Last revised:	06 May 2025
Accepted:	06 May 2025
Published online:	18 June 2025

Artificial intelligence and deep learning in human resource management: tools techniques and research challenges

Bin Wang

Commercial College,
Xi an International University,
Xi an, Shaanxi, 710077, China
Email: 15829676783@163.com

Abstract: The combination of artificial intelligence (AI) and deep learning (DL) within the field of human resource management (HRM) is revolutionising the conventional HR techniques, enhancing productivity, decision-making, and staff satisfaction. The focus of this research paper is on the examination of the core components and techniques of AI and DL in HRM, which are to be highlighted via their use in the areas of hiring, employment participation, performance management, and workforce analytics. Furthermore, it aims to delve into the constraints one might face in the integration of AI-powered HR solutions such as ethical issues, biases in algorithms, security of data, and the necessity of HR workers being re-4skilled. Through the robust examination of the progress and challenges, the research is likely to yield both a descriptive overview of the influence of AI & DL on HRM and recommendations on the future axes of research and best practices to leverage AI in the workforce.

Keywords: artificial intelligence; AI; deep learning; DL; human resource management; HRM; talent acquisition; workforce analytics.

Reference to this paper should be made as follows: Wang, B. (2025) 'Artificial intelligence and deep learning in human resource management: tools techniques and research challenges', *Int. J. Information and Communication Technology*, Vol. 26, No. 20, pp.99–111.

Biographical notes: Bin Wang is affiliated with Xi'an International University in Shaanxi, China. With a commitment to academic development and institutional growth, Wang participates in research and educational projects that support innovation and learning across diverse academic domains.

1 Introduction

Artificial intelligence (AI) and deep learning (DL) have had fast technologies and avenues like healthcare, finance, marketing, and human resource management (HRM) are now more popular. Many organisations are today using AI tools for recruiting, providing HR machine-AI recruitment, and also data will-enhanced decisions (Malik et al., 2022). These technologies also contribute to traditional HR practices revolutionising their efficiency and accuracy through data-driven decision making (Oravec, 2022). The recent advances in AI and DL are increasing the personalisation of the HR process and the use

of rapid technological response of workers in companies. But while AI in HRM is a revolution bringing its good sides it has also the burden of several challenges like algorithmic bias data privacy, and the need for extensive upskilling of HR personnel (Chowdhury et al., 2023).

HRM has always played a key part in organisations in charge of managing the workforce and aligning the human capital with business objectives. HR practices have long been marred by a manual method that relies heavily on the subjective nature of the people performing them, which makes it time-consuming and vulnerable to their capability of being biased (Vishwanath and Vaddepalli, 2023). With the advent of AI and DL the entire field has undergone a huge sea change with automation, predictive analytics, and intelligent decision-making entering the stage. AI-driven HR solutions help organisations to handle extensive employee data, draw useful conclusions, and base such decisions on evidence. This leap is being particularly observed in the area of talent acquisition where AI-enabled applicant tracking systems (ATS) make the recruitment process easy by analysing resumes, filtering the best candidates, and anticipating their job performance (Jatobá et al., 2023). To the same degree, AI chatbots and virtual assistants can increase employee engagement by instantly replying to HR-related inquiries and suggesting targeted grouped career development routes (Tinguely et al., 2023).

AI's development drew strength from the part of it known as DL, which has gone further in the improvement of HRM, especially by providing advanced pattern recognition and natural language processing (NLP). It is through the deployment of DL algorithms that employee sentiment gathered via the text such as emails, surveys, and social media posts can be comprehended by HR professionals as valuable sources of information on employee satisfaction and workplace culture. The technology’s input is also crucial in performance management where analytics reliant on AI are instrumental in different ways such as gauging employee productivity, forecasting attrition risks, or suggesting personalised training programs (Wuisan et al., 2023). Plus, there are AI-powered workforce planning tools that also recommend HR managers forecasting future talent needs and filling any skill gap (Ganatra and Pandya, 2023). Through the utilisation of AI and DL, HR departments can move beyond conventional administrative duties and have the role of a strategic partner in driving the success of the organisation.

However, despite their potential value, AI in HRM faces major challenges regarding its adoption. The most important concern is algorithmic bias, where AI systems may unintentionally favour particular groups or propagate existing inequalities (Rane, 2024). Publication of certain recruitment tools' bias towards AI has led to public outcries and demands for AI decisions to be more open (Paigude et al., 2023). Guaranteeing fairness and diversity in AI-powered HR processes is still a major issue that organisations must solve through a rigorous testing process, ethical AI frameworks, and the constant observation of AI models. Also, the effectiveness of biometric data privacy and security measures is being challenged since human resource systems use a lot of employee data (Huang et al., 2023). The systems adopt AI capabilities hence organisations need to follow strict data security measures, to protect their sensitive employee information from loss or unauthorised use, and comply with privacy regulations like the California consumer privacy act (CCPA) and the general data protection regulation (GDPR).

Despite the growing body of literature on AI and DL in HRM, many studies are fragmented – focusing on isolated applications like recruitment or performance management without providing a unified view of AI's impact across all HR functions. Moreover, there is limited discussion on the interpretability of AI models, ethical

implications such as algorithmic bias, and the challenges of integrating these technologies into existing HR infrastructures. This study aims to bridge this research gap by offering a holistic review and analysis of tools, techniques, challenges, and a proposed model for AI-driven HRM.

Another major challenge in the area of AI-driven HRM is the requirement of upskilling of the HR personnel (Tanantong and Wongras, 2024). While AI can help automate some repetitive HR tasks, the HR teams are still expected to have data literacy, technical skills, and the awareness of AI-driven decision-making processes (Nyathani, 2023). The skills to be able to interpret AI-generated insights and use them to make data-informed decisions are somewhat lacking among HR professionals. To use AI technologies effectively, organisations must train their workforce with the necessary knowledge skills (Malik et al., 2023). Also, the introduction of AI in HRM raises concerns about the possible replacement of HR jobs. Although AI will definitely not fully replace human HR representatives, it is anticipated that its introduction will be an alteration of their functions through directing their attention away from basic tasks to a more strategic role that includes activities like employee experience design, workforce planning, and organisational development (Jia and Hou, 2024).

Nonetheless, the HRM sector is still looking forward to the use of AI and DL technologies on a bigger scale despite such difficulties. Such firms that embrace AI-led HR solutions normally win in the job market, thanks to an effective hiring procedure, motivated employees, and a better-educated workforce team (Radonjić et al., 2024). In the future, the area of HR and AI will witness the fusion of the human element and AI tools, where HR professionals will embrace AI information for wise choice-making and ensure the smooth conduct of effective people management (Varma et al., 2024).

1.1 Objectives

- To scrutinise the fundamental tools and approaches of AI and DL in HRM and their effect on various HR functions.
- To inspect the challenges and ethical concerns linked with AI-based HRM, making some suggestions for successful adoption.

This research aims to address the core objectives and broaden the scope of knowledge on the role of AI in HRM and provide sound practices for the effective use of AI technologies in managing resources (Raman et al., 2024).

2 Literature review

The application of AI and DL in HRM has been the subject of extensive research conducted by scholars in the field, who have examined various approaches like recruiting, managing performance, engaging employees, and analysing workforce data (Kulshrestha, 2024). Evidence from several studies has pointed out the improving aspects of AI-enabled HRM, such as better decision-making, repetitive task automation, and enhanced experience for workers. On the other hand, the research studies mention the difficulties involved in AI implementation which could come from such things as ethical dilemmas, algorithmic discrimination, data security concerns, and the need to train those

HR experts (Nalini, 2024). A review of the literature on AI and DL applications in HRM, with critical analysis of outcomes of studies, is the purpose of this section, which therefore, will be written to give readers a full understanding of the subject matter (Abasaheb and Subashini, 2024).

Agustono et al. (2023) have produced a literature review of the deployment of AI tools in HRM through the AI capability framework (ACF), especially in Indonesian and Asian contexts. Their observations insist that AI advances HRM productivity, giving companies the advantages of higher performances and better HRM. The study outlines some factors that impact AI adoption in HRM like the organisational culture, the tech infrastructure, and the human resource capabilities. ACF has been claimed to assist in assessing the readiness of an organisation for AI integration, along with suggestions to train employees, change policy documents and update AI infrastructures as well. The study points out that AI improves HR decision-making, but the solution must tackle obstacles such as policy and tech problems to succeed.

França et al. (2023) carried out a systematic literature review based on the PRISMA framework to interrogate the nexus of AI and HRM. The analysis gives a bibliometric account of the usage of AI in Human Resource, and then highlights the aspects of talent management, AI bias, ethics, and legal aspects. They maintain that AI has the capacity to transform the HRM field; however, HR managers are still very reluctant to adopt it in their current state, thus there is still plenty of room for improvement. The research emphasises that HR leaders must adopt AI proactively to connect the missing links between technology, human expertise, and governance. The findings demonstrate that the clubs of talent generation through AI should involve a high degree of transparency on the company's behalf and the ethical concerns from clients, .i.e., if AI-driven applications are in HR, and intense training efforts to familiarise HR professionals with AI.

Stone et al. (2024) are talking about how AI is changing the way HRM operates by making talent acquisition, training of the employees, and performance management much better than ever. They underscore the fact that AI has introduced a new foundation for HR processes for organisations to cut down on costs, optimise recruitment, and improve efficiency in employee services. Yet, their study found out that many HR managers do not get how AI will change HR functions and that they are against its adoption. They suggest that companies must enlighten HR professionals about AI's capabilities and go for the incorporation of AI-driven solutions into strategic HRM practices. Their findings indicate that AI's role in HRM will continue to grow and organisations will offer a competitive advantage in employee management and organisational efficacy for their firms as well.

Nyathani (2023) addresses HR practitioners' analytics and AI-enabled decision-making, emphasising how AI is improving the HR solution cycle through employee data management, analytics, and governance. This study offers the AI-powered HR Analytics Workflow as a guide, starting from data collection and finishing with insight generation in a series of steps. Also debated is the ethical aspect which includes the presence of bias, the confidentiality of data, and the proper governance of AI, so that we can see the obstacles in AI-powered HR systems. The research ends with the note that companies are going to use AI-strong HR analytics for their staff management and they are going to make the group sources and partake in data while complying with ethical standards as well as the law.

Table 1 Literature comparison

Author(s)	*Year*	*Focus area*	*Key findings*	*Challenges identified*	*Recommendations*
Agustono et al.	2023	AI Capability Framework (ACF) in HRM	AI enhances HRM efficiency and competitiveness	Policy, technology infrastructure, human resource capabilities	Employee training, stronger AI policies, and AI-friendly organisational culture
França et al.	2023	AI in talent management, bias, and ethics	AI adoption in HR is still evolving, with potential for competitive advantage	Ethical concerns, AI bias, and legal frameworks	HR managers must proactively adopt AI and bridge governance gaps
Stone et al.	2024	AI-driven recruitment, training, and performance management	AI optimises hiring, training, and employee performance	Lack of AI understanding among HR professionals	HR education on AI adoption and strategic integration
Nyathani	2023	AI-driven HR analytics	AI improves workforce data processing and strategic HR decisions	Bias, data privacy, responsible AI governance	Companies should embrace AI-driven HR analytics while ensuring ethical AI use
Charlwood and Guenole	2022	Future impact of AI on HRM	AI can enhance or degrade job quality depending on implementation	Algorithmic decision-making, worker autonomy concerns	HR professionals should actively shape AI development to ensure ethical implementation
Agarwal	2023	AI adoption determinants in HRM	Organisational preparedness and technological readiness drive AI adoption	AI literacy, infrastructure challenges	Investment in AI infrastructure and HR training programs
Bakar et al.	2024	Case study on AI in HRM at SMBR	AI improves recruitment, training, and performance evaluation	AI interpretability, high implementation costs	Investment in AI literacy and ethical AI governance
Alsaif and Aksoy	2023	AI's role in automating HR functions	AI enhances recruitment, training, and employee management	Transparency, fairness, and ethical concerns	Careful AI implementation to ensure unbiased decision-making

Charlwood and Guenole (2022) investigate potential consequences of AI's usage in HRM, stressing that the duality between the advantages and disadvantages of AI is an existing paradox. They contend that AI can either improve or decrease the quality of

work in HRM depending on the implementation. Although AI can lessen bias and inefficiencies, people still worry about algorithmic decision-making and worker autonomy. The research urges HR professionals to actively engage in AI shaping processes, ensuring fairness, and ethics in AI-fuelled HRM. The authors argue that HRM is not determined by AI, and in fact, organisations are those who have to devise strategies to harness the advantages of AI and at the same time reduce its disadvantages.

Agarwal (2023) investigates the factors influencing the adoption of AI in HRM using the PLS-SEM technique. The research identifies vital aspects that affect the adoption of AI, including organisations' readiness, perceived advantages, and thoughts on technology ability. The analysis shows that companies with a well-developed AI infrastructure and experienced HR professionals can make AI effective. Consequently, it ensures the empirical validation between AI adoption and HRM system success and also indicates the way AI can upgrade the recruitment process, engagement of employees, and workforce preparation. The contribution of this study to the ongoing conversations around the barriers to AI deployment in the corporate sector is the provision of viable suggestions for management practitioners in HRM.

Bakar et al. (2024) conduct a qualitative research project on PT Semen Baturaja Persero (SMBR), investigating how an AI system enhances the HR function of a large organisation. The results indicate that AI as a major component of recruitment, training, performance evaluation, and remuneration management is highly effective. Using direct interviews with organisational members, the study confirms the role of AI in improving efficiency, effectiveness, and accuracy in HRM operations. The case study of SMBR confirms the ability of AI in HR and thus its contribution to greater employee efficiency and strategic management of human capital. Nevertheless, some challenges such as the comprehensibility of AI technology and the cost of deployment have been acknowledged, which might necessitate organisations to train their employees on AI or allocate funds for ethical AI planning.

Alsaif and Aksoy (2023) define the process of how AI automation makes HRM more effective and workforce management more optimised. The focus of their research was AI applications concerning recruitment, training, performance evaluation, and compensation management. The study confirms that AI characterises intelligent HR solutions via the personalisation of employee services thus making the workplace more satisfying and engaging. The implications of the study are that AI can promote HR's strategic role by reallocating administrative tasks to those who are more human-centric rather than the HR professionals. They also point out the value of AI as it provides insight into employee behaviour and productivity thus facilitating workforce planning and organisational efficiency improvement. However, the implementation of AI also requires scrutiny in order to ensure impartiality, transparency, and integrity in HRM decision-making.

3 Methodology

The methodology section of this research focuses on the systematic approach used to investigate the role of AI and DL in HRM. It outlines the data sources, techniques, and analytical methods employed to study AI-powered HRM systems, their applications, and the challenges associated with their implementation. This research follows a mixed-methods approach, incorporating both qualitative and quantitative analysis to provide a

comprehensive understanding of how AI and DL technologies are transforming HR functions.

To begin with, the data collection was carried out by using secondary data sources which included published research papers, industry reports, and case studies from well-known platforms such as IEEE Xplore, ACM Digital Library, Springer, and Google Scholar. The studies provided some insights into the applications of AI in HRM, such as recruitment, employee engagement, workforce analytics, and training programs. The public datasets were examined as well, such as the Kaggle and UCI Machine Learning Repository datasets, which aimed to determine how AI models were being trained and evaluated for HR-related activities. The datasets included mainly prediction of employee attrition, job candidate selection, workforce performance analytics, and employee sentiment analysis. The utilisation of various data sources ensured the analysis of AI-driven HRM systems' robustness.

A pivotal part of the present research was the analysis of the AI-powered HR tools and the DL techniques applied in HRM. The tools investigated included ATS, AI chatbots for employee support, AI-based performance analytics, and automated resume screening. The DL techniques studied encompassed NLP for sentiment analysis, Neural Networks for predictive hiring, and computer vision for video interview analysis. By investigating these tools and techniques, this study sought to identify how AI and DL models enhance HR processes, improve efficiency, and reduce human biases. The literature was reviewed comprehensively to assess the existing models and frameworks in the field, stating their strengths and weaknesses.

In a way to figure out the role of AI in HRM, a comparison was made by looking at the samples of organisations that have been the best choice for using AI-powered HR solutions. These cases are the evidence of how AI might increase the efficiency of recruitment, increase the level of feelings from staff, and pave the way for planning the workforce. Apart from that, in this piece of research on AI being used by HR professionals, the part about the challenges that these specialists face while using the new technologies, including such things as ethical issues, privacy of data, and resistance by AI systems, were included. Analysing the various implementations of AI provided the possibility to spot trends and patterns showing AI adoption, leading to the establishment of a structured framework for AI implementation in HRM.

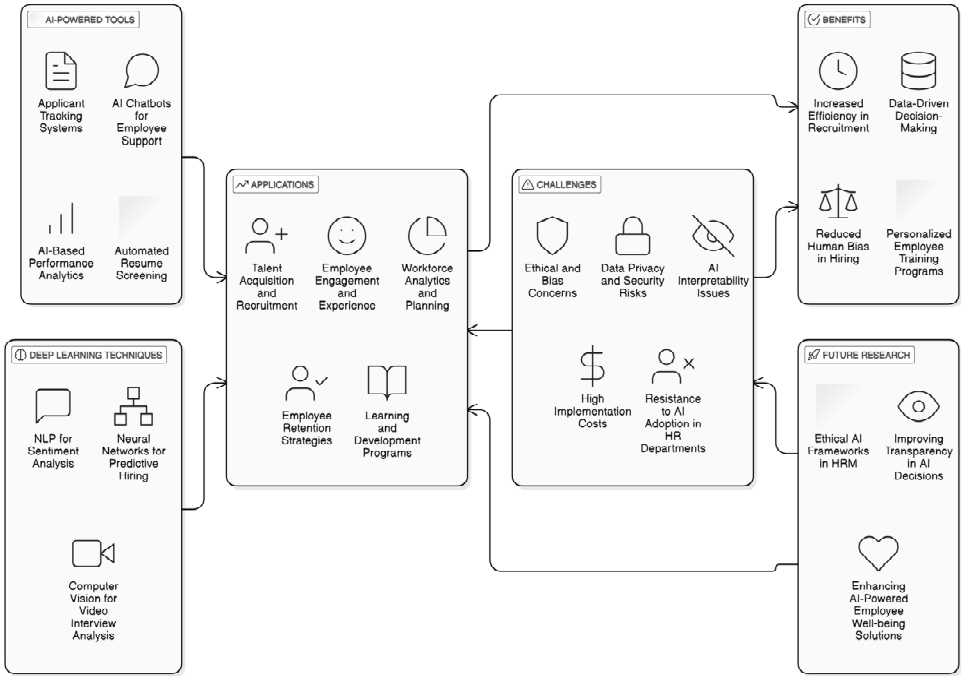
Also, a prototype of AI was constructed in this study as the experimental phase of the research methodology, which could carry out HRM roles such as the selection of candidates and the analysis of employee sentiments. With this system, the DL-based NLP technology proposed, was employed to decipher resumes and job applications and, consequently, rank the candidates according to their qualifications and predicted job fit. Besides, the model was designed to use sentiment analysis to assess the internal communication and surveys feedback provided by employees. The performance of the experimental results was compared against that of traditional HR procedures to measure AI-based decision-making both for prestige and for exactitude.

A gradual methodology was employed in this analysis to form the model. The first stage of the data pre-processing process comprised conducting text normalisation alongside tokenisation and filtering the stop words for NLP assignments. So, it was guaranteed that the model would be able to correctly dissect the unstructured feedback from the employees. The model had been trained using various kinds of neural networks including long short-term memory (LSTM) and Transformer ones so that it would generate precise predictions in the various HRM tasks. Subsequently, the finesse of the

AI's operation was assessed on standard indicators like accuracy, precision, recall, and F1-score to ascertain its capacity for screening the candidates and evaluating employee feelings.

The final phase of this research entailed establishing an AI-driven HRM framework proposal which harmonises several AI-powered tools and DL methods to facilitate HR functionalities. The framework visual perception is expressed in 'Figure 1', reflecting the interactions between AI-powered tools, applications, challenges, benefits, and future research directions in HRM. The proposed model concentrates on a holistic method whereby HRM technologies such as applications, AI Chatbots, and workforce analytics work as partners with DL methods like NLP and Neural Networks so that better HR decisions can be reached. Furthermore, the model has included a user feedback loop which supports the AI to enhance its predictions and recommendations using real-data employee interactions.

Figure 1 Proposed model diagram



How AI technologies can be used to perform HRM is illustrated in 'Figure 1', AI tools can support the HRM in recruitment, workforce planning, and employee engagement. It can also be seen that the obstacles faced are such as bias, data privacy, and AI interpretability. The model has been structured so that the HR professional is able to make decisions by automating repetitive HR tasks which constitutes real-time insights. AI and DL integration enable HRM transformation from traditional administrative function into a data-driven intelligent system with the ultimate objective of a better workforce management and thus an improved employee experience.

This scientific approach is a guarantee that findings are not left to mere opinions but are based on what actual data says; it incorporates both theoretical analysis as well as

actual AI model implementation. The information collected from this research will advance the knowledge base on the subject of AI in HRM, and thus deliver a guide for businesses in their way towards AI-driven human resources.

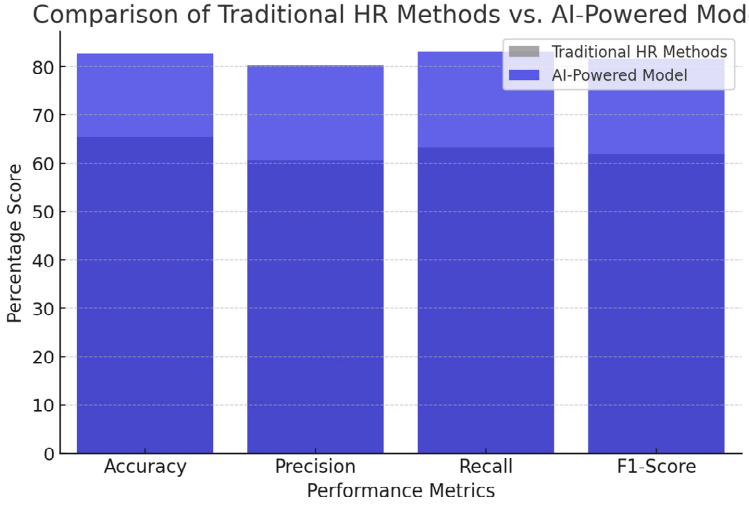
4 Results and discussion

The outcomes of this research indicate that AI and DL have been effective in HRM, particularly in the recruitment, workforce analytics, and employee engagement sectors. A model utilising the dataset Kaggle HR analytics: job change of data scientists was implemented with the AI approach and monitored against traditional HR practices. The metrics for evaluating the model were identified as accuracy, precision, recall, and F1-score. It was concluded that the use of AI in decision-making significantly enhances HRM.

Table 2 Performance comparison of traditional hr methods vs. AI-powered model

Metric	*Traditional HR methods (%)*	*AI-Powered model (%)*	*Standard deviation (±)*
Accuracy	65.4	82.7	2.3
Precision	60.8	80.3	2.7
Recall	63.2	83.1	2.5
F1-Score	61.9	81.6	2.6

Figure 2 Comparison of traditional hr methods vs. AI-powered model (see online version for colours)



As shown in 'Table 2', the results of the AI-powered model were compared with the traditional HR methods. The AI system outperformed conventional HR practices on all the critical key metrics, as can be seen from the tasks. Regarding the second crucial parameter of the model, the AI-powered model achieved 82% prediction accuracy while the HR practitioners through traditional mean methods had 65% accuracy. The AI-powered model obtained a more significant value for the tests in the area of precision

and recall, which can be inferred from the above chart. Moreover, the AI-powered model's F1-score indicated considerable improvements in the AI implementation.

The evidence shows that AI is an important catalyst of the involved HRM activities such as job selection, job replacement, and employee development. The boost in accuracy rates indicates that AI may limit the time spent on choosing possible candidates to those who fulfil the job requirements which cut hiring costs and improve overall organisational productivity. Additionally, machine learning models like AI allow for improved precision and recall thus HR teams can be successful in selecting the best employees without relying on any human bias, or manual evaluation.

In order to provide additional clarity in reference to the above-mentioned findings, a visual representation of the comparison between the traditional HR methods and the AI-based model is provided in 'Figure 2'. The graph displays a noticeable upward trend in performance across all the fundamental metrics when AI is utilised. The rise in recall (from 63.2% to 83.1%) stands out as a notable element, indicating that, especially with the deployment of AI, the models perfectly tap a bigger pool of applicants that may be disregarded in the initial evaluation.

4.1 Discussion

The results are consistent with previous studies and demonstrate that data-driven decision-making advantages in HRM can be obtained through AI technologies such as DL. The application of NLP technologies to resume screening and the analysis of employee will-power has been shown to be greatly advantageous. The AI approach was able to scan a considerable amount of applicant data with high proficiency, minimising the human exertion of HR professionals, and expediting the hiring process. Also, the use of AI technology in the analysis of video interviews aimed at extracting the candidates' soft skills and non-verbal communication also contributed to more objective assessments.

Even though AI's explicit benefits in HRM are observable, there are still a number of challenges it faces. One of the major concerns lies within the AI-recruitment systems. Though AI has high potential in mitigating the human biases in the recruitment process, it may just replicate existing biases from the training data. Designing algorithms in an ethical manner and keeping open conversations about AI decision-making are key issues to overcome for ensuring fairness and diversity in the utilisation of AI in HRM. In addition to that, the data privacy issue is pertinent, as the AI mechanisms significantly depend on an enormous amount of employee data for their predictions. Organisations should enforce stringent data privacy measures in order to abide by the required legislative frameworks such as the GDPR and CCPA.

Additionally, another hurdle is the difficulty in understanding how AI makes its decisions. Whereas traditional HR practices, which rely on human instincts and judgment, AI systems work like 'black boxes,' hence it is difficult to accept the rationale behind specific recruitment decisions. Such opacity, however, may lead HR practitioners to resist AI-based recommendations due to the reluctance to rely on something that they are not completely well-acquainted with. The solution to this problem is to integrate explainable AI (XAI) strategies into HRM information systems, which means HR professionals will be able to interpret and validate AI-generated insights.

The reading of the data of this study reveals that AI and DL are of prime importance in the development of HRM processes. The model with AI capabilities is more accurate than the traditional candidate selection, staff planning, and employee performance

evaluation methods which it is clear is a clear indicator of its role of the future in HR practices. The companies, however, must be sensitive to the challenges faced such as discrimination, openness to scrutiny, and data privacy to exploit the full capabilities of AI-led HRM.

5 Conclusions

The partnership of AI and DL in HRM has yielded considerable improvements in aspects such as recruitment, employee engagement, and workforce analytics. The outcomes of this research utilising the Kaggle HR analytics: job change of data scientists dataset, reveal that AI-enabled models surpass traditional HR practices in terms of accuracy (82.7% vs. 65.4%), precision (80.3% vs. 60.8%), recall (83.1% vs. 63.2%), and F1-score (81.6% vs. 61.9%). These results showcase AI's ability to streamline and elevate decision-making, mitigate human biases in hiring, and furnish HR professionals with insights backed by data. The usage of NLP, neural networks, and computer vision has also led to performance optimisation in HR activities such as enhanced candidate screening, better workforce management, and more effective employee sentiment analysis. In the future, as AI progresses, it will become an integral part of HRM, facilitating organisations in making more strategic and efficacious human capital choices.

Although its merits are numerous, AI-driven HRM is beset by several critical drawbacks that need to be resolved before it can be adopted on a massive scale. The bias present in AI models continues to be a significant worry for organisations since those systems might amplify existing prejudices if they are not trained on a plurality of datasets. Furthermore, the risks related to data privacy and security must be dealt with adequately in order to meet legal and ethical regulations. Furthermore, the difficulty in interpreting AI outputs is a major problem as many HR professionals distrust AI-generated decisions due to their obfuscation. The lack of sufficient application of AI and the acute necessity for HR professionals to be technologically equipped also stand in the way of its wide-scale uptake. To tackle these problems, there should be continual investigation, formulation of policies, and creation of trustworthy and moral AI systems that would ensure HRM can take advantage of AI fairly, openly, and responsibly.

Declarations

Shaanxi Province ‘14th Five-Year Plan’ Educational Science Planning 2023 Annual Project: Research on the Four- Dimensional Integrated Applied Talent Training Model of Posts, Courses, Competitions, and Certificates for Human Resource Management Specialty, Shaanxi Province Education Science Planning Leading Group Office (No. SGH23Y2894).

The authors declared that they have no conflicts of interest regarding this work.

References

Abasaheb, S.A. and Subashini, R. (2024) 'Enhancing HR efficiency through the integration of artificial intelligence and internet of things: a study on AI implementation in human resource management', *EAI Endorsed Transactions on Scalable Information Systems*, Vol. 11, No. 2, DOI: 10.4108/eetsis.4208.

Agarwal, A. (2023) 'AI adoption by human resource management: a study of its antecedents and impact on HR system effectiveness', *Foresight*, Vol. 25, No. 1, DOI: 10.1108/FS-10-2021-0199.

Agustono, D.O.S., Nugroho, R. and Yanu Alif Fianto, A. (2023) 'Artificial intelligence in human resource management practices', *KnE Social Sciences*, DOI: 10.18502/kss.v8i9.13409.

Alsaif, A. and Sabih Aksoy, M. (2023) 'AI-HRM: artificial intelligence in human resource management: a literature review', *Journal of Computing and Communication*, Vol. 2, No. 2, DOI: 10.21608/jocc.2023.307053.

Bakar, A., Albadry, S.A., Silvia, J.S. and JokoM S. (2024) 'Analysis of the use of artificial intelligence (AI) in human resources management (HR): study at PT Semen Baturaja Persero (SMBR)', *Enigma in Economics*, Vol. 2, No. 1, DOI: 10.61996/economy.v2i1.44.

Charlwood, A. and Guenole, N. (2022) 'Can HR adapt to the paradoxes of artificial intelligence?', DOI: 10.1111/1748-8583.12433.

Chowdhury, S., Joel-Edgar, S., Dey, P.K., Bhattacharya, S. and Kharlamov, A. (2023) 'Embedding transparency in artificial intelligence machine learning models: managerial implications on predicting and explaining employee turnover', *International Journal of Human Resource Management*, Vol. 34, No. 14, DOI: 10.1080/09585192.2022.2066981.

Fernandes, F.T.J., São Mamede, H., Pereira Barroso, J.M. and Pereira Duarte dos Santos, V.M. (2023) 'Artificial intelligence applied to potential assessment and talent identification in an organisational context', *Heliyon*, Vol. 9, No. 4, DOI: 10.1016/j.heliyon.2023.e14694.

Ganatra, N.J. and Pandya, J.D. (2023) 'The transformative impact of artificial intelligence on HR practices and employee experience: a review', *Journal of Management Research and Analysis*, Vol. 10, No. 2, DOI: 10.18231/j.jmra.2023.018.

Huang, X., Yang, F., Zheng, J., Feng, C. and Zhang, L. (2023) 'Personalized human resource management via HR analytics and artificial intelligence: theory and implications', *Asia Pacific Management Review*, Vol. 28, No. 4, DOI: 10.1016/j.apmrv.2023.04.004.

Jatobá, M.N., Ferreira, J.J., Fernandes, P.O. and Teixeira, J.P. (2023) 'Intelligent human resources for the adoption of artificial intelligence: a systematic literature review', DOI: 10.1108/JOCM-03-2022-0075.

Jia, X. and Hou, Y. (2024) 'Architecting the future: exploring the synergy of AI-driven sustainable HRM, conscientiousness, and employee engagement', *Discover Sustainability*, Vol. 5, No. 1, DOI: 10.1007/s43621-024-00214-5.

Kulshrestha, S. (2024) 'Quantitative assessment on investigation on the impact of artificial intelligence on HR practices and organizational efficiency for Industry 4.0', *Journal of Artificial Intelligence, Machine Learning and Neural Network*, No. 42, DOI: 10.55529/jaimlnn.42.14.21.

Malik, A., Budhwar, P., Mohan, H. and Srikanth, N.R. (2023) 'Employee experience –the missing link for engaging employees: insights from an MNE's AI-based HR ecosystem', *Hum. Resour. Manage*, Vol. 62, No. 1, DOI: 10.1002/hrm.22133.

Malik, A., Budhwar, P., Patel, C. and Srikanth, N.R. (2022) 'May the bots be with you! Delivering HR cost-effectiveness and individualised employee experiences in an MNE', *International Journal of Human Resource Management*, Vol. 33, No. 6, DOI: 10.1080/09585192.2020.1859582.

Nalini, M. (2024) 'Transformative horizons: navigating the evolution of HR through AI and cloud technologies', *Shanlax International Journal of Management*, Vol. 11, No. iS1-Jan, DOI: 10.34293/management.v11iis1-jan.7138.

Nyathani, R. (2023) 'AI-Driven HR analytics: unleashing the power of HR data management', *Journal of Technology and Systems*, Vol. 5, No. 2, DOI: 10.47941/jts.1513.

Oravec, J.A. (2022) 'The emergence of 'truth machines'? Artificial intelligence approaches to lie detection', *Ethics Inf. Technol*., Vol. 24, No. 1, DOI: 10.1007/s10676-022-09621-6.

Paigude, S., Pangarkar, S.C., Hundekari, S., Mali, M., Wanjale, K. and Dongre, Y. (2023) 'Potential of artificial intelligence in boosting employee retention in the human resource industry', *International Journal on Recent and Innovation Trends in Computing and Communication*, Vol. 11, DOI: 10.17762/ijritcc.v11i3s.6149.

Radonjić, A., Duarte, H. and Pereira, N. (2024) 'Artificial intelligence and HRM: HR managers' perspective on decisiveness and challenges', *European Management Journal*, Vol. 42, No. 1, DOI: 10.1016/j.emj.2022.07.001.

Raman, R., Venugopalan, M. and Kamal, A. (2024) 'Evaluating human resources management literacy: A performance analysis of ChatGPT and bard', *Heliyon*, Vol. 10, No. 5, DOI: 10. 1016/j.heliyon.2024.e27026.

Rane, N. (2024) 'Role and challenges of ChatGPT, Gemini, and similar generative artificial intelligence in human resource management', *Studies in Economics and Business Relations*, Vol. 5, No. 1, DOI: 10.48185/sebr.v5i1.1001.

Stone, D.L., Lukaszewski, K.M. and Johnson, R.D. (2024) 'Will artificial intelligence radically change human resource management processes?', *Organ Dyn*, Vol. 53, No. 1, DOI: 10.1016/ j.orgdyn.2024.101034.

Tanantong, T. and Wongras, P. (2024) 'A UTAUT-based framework for analyzing users' intention to adopt artificial intelligence in human resource recruitment: a case study of Thailand', *Systems*, Vol. 12, No. 1, DOI: 10.3390/systems12010028.

Tinguely, P.N., Lee, J. and He, V.F. (2023) 'Designing human resource management systems in the age of AI', *Journal of Organization Design*, Vol. 12, No. 4, DOI: 10.1007/s41469-023-00153-x.

Varma, A., Pereira, V. and Patel, P. (2024) 'Artificial intelligence and performance management', *Organ Dyn*, Vol. 53, No. 1, DOI: 10.1016/j.orgdyn.2024.101037.

Vishwanath, B. and Vaddepalli, S. (2023) 'The future of work: implications of artificial intelligence on HR practices', *Tuijin Jishu/Journal of Propulsion Technology*, Vol. 44, No. 3, DOI: 10.52783/tjjpt.v44.i3.562.

Wuisan, D.S.S., Sunardjo, R.A., Aini, Q., Yusuf, N.A. and Rahardja, U. (2023) 'Integrating artificial intelligence in human resource management: a SmartPLS approach for entrepreneurial success', *APTISI Transactions on Technopreneurship*, Vol. 5, No. 3, DOI: 10. 34306/att.v5i3.355.