ARAŞTIRMA

ARTIFICIAL INTELLIGENCE SUPPORTED CAREER PLATFORM MODEL: A PROPOSAL FOR ADAPTIVE DEVELOPMENT IN COMPANIES AND TALENTS

Yapay Zeka Destekli Kariyer Platformu Modeli: Şirketler ve Yeteneklerde Eşleşme ve Gelişim İçin Bir Sistem Önerisi

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Özet

Bu çalışma, iş arayanlar ve işverenler arasında etkin bir köprü oluşturan, yapay zeka tabanlı bir insan kaynakları platformunun geliştirilmesini ele almaktadır. Platform, iş arayanların yeteneklerini ve becerilerini derin öğrenme ve doğal dil işleme gibi modern yapay zeka algoritmalarıyla analiz ederek, işverenlerin belirlediği spesifik gereksinimlere en uygun adayları önermektedir. Ayrıca, kullanıcıların kariyer gelişimini desteklemek amacıyla, işverenlerin ihtiyaç duyduğu yetkinlikler doğrultusunda kişiselleştirilmiş öğrenme ve gelişim fırsatları sunmaktadır. Sistem, iş ilanları ve başvuruları çok boyutlu bir şekilde değerlendirerek bir puanlama mekanizması kullanmakta ve en uygun eşleşmeleri sağlayarak hem iş arayanların hem de işverenlerin süreç memnuniyetini artırmayı hedeflemektedir. Çalışmada, geliştirilen platformun mimarisi, işleyiş mekanizmaları, algoritmik modelleri ve kullanıcı deneyimine katkıları detaylı bir şekilde incelenmiş; aynı zamanda bu teknolojinin insan kaynakları süreçlerine kazandırdığı operasyonel verimlilik, tarafsızlık ve karar verme süreçlerindeki hız gibi avantajlar vurgulanmıştır. Elde edilen bulgular, yapay zeka destekli İK platformlarının sektör üzerindeki dönüştürücü etkisini göstermekte ve gelecekteki uygulamalara yönelik stratejik bir rehber niteliği taşımaktadır. Ayrıca uygulamanın hem özel sektör hem de kamu yönetimi alanında ihtiyaçlara cevap verebileceği öngörülmektedir.

Anahtar Kelimeler: *Yapay Zeka, İnsan Kaynakları, Kariyer Platformu, Eğitim Modülü, Makine Öğrenimi*

Abstract

This study addresses the development of an Artificial Intelligence-based human resources platform that effectively bridges the gap between job seekers and employers. Through analysing the skills and abilities of job seekers with modern artificial intelligence algorithms such as deep learning and natural language processing, the platform recommends the most suitable candidates for the specific requirements of employers. It also provides personalised learning and development opportunities in line with the competencies required by employers to support the career development of users. This system, which evaluates job adverts and applications in a multidimensional way, uses a scoring mechanism and aims to increase the process satisfaction of both job seekers and employers by providing the most appropriate matches. The architecture, functioning mechanisms, algorithmic models and contributions to the user experience of the developed platform are analysed in detail in this study; at the same time, the advantages that this technology brings to human resources processes such as operational efficiency, impartiality and speed in decision-making processes are emphasised. Through these findings, the study reveals the transformative impact of AI-supported HR platforms on the sector and serves as a strategic guide for future applications. The implementation is also expected to meet the needs of both the private sector and public administration.

Keywords: *Artificial Intelligence, Human Resource, Career Platform, Learning Module, Machine Learning*

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INTRODUCTION

In the modern business world, professional Human Resources Management (HRM) plays a key role in helping organisations achieve a sustainable competitive advantage. A proper assessment of employees' competences and potential not only improves operational efficiency, but also contributes significantly to the achievement of strategic goals. Nevertheless, conventional recruitment processes are often time-consuming, manual and subjective, which can be counterproductive for both employers and job seekers. Insufficient effective analysis of large candidate pools and biases in decision-making processes make it difficult to identify suitable candidates (Yawalkar, 2019: 20-24). This may cause employers to experience various difficulties in finding candidates that meet their needs and may negatively affect organisational performance in the long run.

Advancements in artificial intelligence (AI) technologies in recent years offer powerful tools to overcome these challenges by transforming HRM processes. Moreover, the integration of advanced technologies such as big data analytics, machine learning (ML), deep learning (DL) and natural language processing (NLP) has the potential to make recruitment processes faster, unbiased and efficient (Tambe et al., 2019: 15-42). For instance, thanks to big data analytics, structured and unstructured data collected from candidates' resumes can be analyzed by AI algorithms to provide in-depth information about candidates' competencies. These analytical processes make it easier for employers to identify the most suitable candidates for their specific needs and significantly reduce the error rate in the process. Furthermore, such technologies support not only recruitment processes but also the career development of job seekers by optimizing their learning and development opportunities (Jain, 2018: 56-59).

While AI significantly enhances candidate screening, its limitations in capturing human emotions and contextual nuances should be acknowledged. Data sets used for training may inherently contain biases, and the critical human factors–such as emotional intelligence, interpersonal skills and cultural fit–might not be fully captured by quantitative algorithms. Recognizing these potential shortcomings is crucial to provide a balanced perspective on the transformative potential of AI in HRM.

Through this paper, research aims to comprehensively analyse how an artificial intelligence-based human resources platform optimises the matching processes between job seekers and employers and its contributions to these processes. In the developed platform, the skills and abilities of job seekers are evaluated with artificial intelligence algorithms such as NLP, ML and DL to determine the most suitable candidates for employers' criteria. In addition, it aims to increase the professional skills of job seekers by providing personalised learning and development suggestions in line

with the requirements defined by employers. This platform is not only a recruitment tool, but also an innovative solution that contributes to the learning and development ecosystem.

The significance of the study lies in providing a comprehensive understanding of the transformational effects that the integration of AI technologies into HRM processes can have on the business world. The wastage of time, high costs and biases inherent in traditional methods can be significantly reduced by the systematic nature of AI. The analysis of textual data from candidates' CVs using NLP techniques, for example, allows for a more detailed assessment of their competencies and experience. This makes it possible to achieve a more effective match between job seekers and employers. Furthermore, AI's impartial assessment mechanisms support the achievement of diversity and inclusion goals and contribute to raising ethical standards in recruitment processes (Zhu, 2020).

The research scope includes a detailed discussion of the architecture, functioning and benefits of the developed AI-based HR platform. In this regard, the components of the platform, data collection and processing processes, performance evaluation of algorithms and user experience will be analyzed in depth. The contributions of the platform's learning and development modules to the professional advancement of job seekers, as well as their operational and strategic impact on employers, will also be assessed. In this scope, we aim not only to provide a theoretical framework, but also to demonstrate the effectiveness of AI-based HR solutions in the light of practical applications and real-world results.

It is expected that the findings will show that AI-based HR platforms can transform recruitment processes in an objective and efficient manner. Through techniques such as big data analytics and machine learning, such platforms are expected to accelerate the candidate selection process and provide more accurate results. By presenting both a theoretical and practical perspective on the integration of artificial intelligence into HRM processes, the study aims to provide valuable insights on how these technologies can be used as a strategic tool in the business world. Moreover, ethical concerns such as data privacy, algorithmic bias and fair use are also gaining importance in AI-based recruitment processes. Notably, the protection of candidate data and the transparency of assessment algorithms are critical conditions for the widespread use of the platform.

RELATED WORKS

Mainstream integration of Artificial Intelligence (AI) into Human Resource Management (HRM) is transforming organizational processes, moving traditional methods to a data-driven and technologically advanced framework. With sophisticated algorithms such as big data analytics, machine learning (ML) and natural language processing (NLP), AI is

able to analyze job seekers' competencies, qualifications and behavioral characteristics in detail, enabling candidate recommendations that are perfectly aligned with employers' needs. According to Yawalkar (2019: 20-24), the role of AI in reducing biases in recruitment processes and creating more objective decision-making mechanisms is emphasized. From the creation of candidate profiles to the automation of interview processes and the prediction of employee performance, AI-enabled systems provide operational accuracy and cost-effectiveness through a wide range of applications (Vrontis et al., 2022: 1237-1266). However, while several studies highlight the efficiency of AI in HR, others caution against potential biases and ethical pitfalls that may arise from the reliance on historical data sets, which can perpetuate existing inequities.

With the integration of AI into recruitment processes, time and resources are saved in talent management and human resource acquisition, significantly increasing the effectiveness of organizations. By automating time-consuming tasks such as candidate screening, pre-screening and interview scheduling, AI-enabled recruitment platforms reduce the administrative burden on HR professionals (Tambe et al., 2019: 15-42). They also enable job postings to reach a wider audience, increasing the diversity of the candidate pool and improving the efficiency of recruitment processes (Khatri et al., 2020: 365-376). In a framework for the strategic applicability of AI in HRM, Jia et al. (2018) demonstrate the potential of this technology in various functions such as talent management, workforce analytics, and employee engagement. By means of advanced predictive models and adaptive algorithms, such systems not only optimize existing processes, but also enable strategic decisions that are more aligned with organizational goals.

One other important dimension of the impact of AI in HRM is the digitalization of learning and development (L&D) processes. These AI-enabled training systems make learning processes more effective and efficient by providing customized training content according to the individual needs of employees (Gligorea et al., 2023). While these digital platforms enable employees to develop their competencies without spatial constraints and provide global accessibility (Chen et al., 2020: 75264-75278; Pavitra & Agnihotri, 2023: 688-693), they also face criticism regarding their ability to fully capture nuanced aspects of human learning and creativity. In particular, the use of adaptive learning algorithms identifies the knowledge gaps of employees and prioritizes the training content suitable for their needs, thus contributing to the achievement of organizational goals while increasing individual performance.

Therefore, the integration of the Artificial Intelligence (AI) into HRM processes not only increases operational efficiency, but also radically redefines traditional methods. More and more, traditional HR methods, often limited to subjective decisions and time-consuming procedures, are being replaced by AI-based data-driven solutions that

provide accuracy, scalability and objectivity (Saad et al., 2021: 1-5). Vishwakarma and Singh (2023: 81-109) emphasize that AI adoption enables significant advancements in HRM operational frameworks and enhances the competitiveness of organizations by supporting dynamic decision-making processes.

The particular applications of AI in HRM delve deeper into the transformational potential of the technology. By modernizing job application and selection processes, Rodney, Valaskova, and Durana (2019: 42-47) argue that AI aligns recruitment practices with today's technological expectations. Through an analysis of European labor force data, Pouliakas (2021) examines the transformations created by AI-based automation in the labor market and details the effects of these technologies on labor force dynamics. On the other hand, Allal-Chérif, Aránega, and Sánchez (2021) discuss the role of AI in enhancing global talent acquisition and employee engagement, and show how AI can optimize recruitment processes to increase diversity and inclusion. Moreover, Guo, Alamudun, and Hammond (2016: 169-182) demonstrate the applicability of algorithmic personalization in recruitment processes by introducing 'RésuMatcher', a personalized resume-job matching system.

Despite current advances, there are still significant opportunities for innovation and progress. While current applications of AI in HRM have delivered key benefits, there are significant gaps in areas such as cultural fit assessment, real-time performance tracking and long-term career trajectory modeling. While current AI systems often focus on optimizing short-term recruitment and learning needs, there remains a need for deeper integration into more holistic talent management strategies. Addressing algorithmic limitations, improving the explainability of algorithms, and integrating ethical considerations into AI development processes are critical for more robust and inclusive HRM solutions.

AI in the Context of Public Administration and Personnel Regime

The public administration is characterised by transparency, fairness, accountability and merit-based selection. These attributes make the use of artificial intelligence (AI) in human resources (HR) processes both opportunities and challenges (Abdeldayem and Aldulaimi, 2020; Johnson et al., 2022). The capability of AI to provide efficiency and objectivity through automation, data analytics and learning mechanics, especially in areas such as recruitment, talent management and performance appraisal, can support innovative approaches in the public sector (Temelkovska, 2024; Wicaksono et al., 2025).

Nevertheless, issues such as ethical concerns, privacy, algorithmic biases and corporate responsibility are critical for public administration (Bignami, 2022; Keppeler, 2024). It is fundamental to the credibility and social legitimacy of public organisations

that the rights of both candidates and existing staff are protected and decision-making mechanisms are explainable (Plantinga, 2024). Llorens (2021) suggests that rapid technological transformation makes reskilling processes inevitable in public employment systems and that it is of great importance for staff to adapt to AI-based solutions. Similarly, the workshop organised by TUBITAK (2023) in Turkey emphasised the cultural transformation and training steps required for the diffusion of human-centred AI practices in the public sector. Excessive regulatory interventions or rigid institutional structures might hinder innovation, requiring tailored change management and comprehensive training programs to ensure successful integration of AI technologies.

In this scope, our study aims to adapt the AI-based HR platform designed for the private sector in line with the needs of the public sector in the following areas:

- Merit Based Evaluation: In order for the platform to evaluate scoring, exam score, experience and other objective criteria required by the public personnel regime, the proposed microservice architecture (e.g., Profile Analysis and Recommendation services) can be updated and algorithms suitable for public employment legislation can be integrated.

- Transparent and Explainable Decisions: By adding 'explainable AI' elements to the matching and rating algorithms we have developed, an auditable structure can be offered to public institutions (Bignami, 2022). Thus, candidates and managers can follow how the system acts with a scoring logic.

- Ethical and Legal Compliance: The principles of data security, personal data protection and public accountability should be placed at the centre of the platform. For example, when conducting model training on aggregated data, anonymisation and encryption steps can be strengthened by taking into account the regulatory frameworks in the public sector (Plantinga, 2024).

- Cultural Transformation and Education: The proposed learning and personal development module can be used to encourage innovative learning methods not only for candidates but also for existing public employees (Llorens, 2021; TUBITAK, 2023).

Thus, the speed of adaptation of personnel to AI technologies increases. Multidimensional Performance and Feedback Mechanism: The efficiency and speed target emphasised in the private sector can be combined with accountability and attitude analyses in the public sector. The platform's utilisation of different data sources (e.g., citizen feedback, internal reports) can create a more comprehensive HR strategy (Keppeler, 2024). In conclusion, the implementation of AI-supported HR practices in public administration and personnel regime requires the development of merit-based, ethical, transparent and adaptive systems. In this regard, the microservice architecture,

NLP and machine learning-based algorithms of the platform we have developed are easily scalable and transformable to meet the unique needs of the public sector. Therefore, a holistic approach that meets both efficiency and public interest expectations can be realised.

Building on the existing literature, this research examines the integration of advanced AI methodologies into HRM processes. It discusses how adaptability, transparency and scalability can be improved through the integration of cutting-edge solutions such as federative learning, explainable artificial intelligence (XAI) and generative models into HRM processes. At the same time, the establishment of ethical frameworks and governance mechanisms to manage risks related to data privacy, algorithmic biases and workforce transitions are prioritized. This research aims to develop sustainable and inclusive HR practices that contribute to the achievement of organizations' strategic goals.

Consequently, the integration of AI into HRM should be seen not only as a technological development but also as a strategic imperative to enhance organizations' competitiveness in a rapidly changing global business environment. Through synthesizing insights from existing literature and proposing innovative frameworks, this research aims to set new standards in terms of effectiveness, inclusiveness and innovation in HRM practices. The adoption of this perspective is essential to fully realize the transformational potential of AI in HRM and in the process offers unique opportunities in terms of operational accuracy, employee satisfaction and organizational resilience.

SYSTEM DESIGN

This project's AI-enabled job application platform features a highly sophisticated system architecture that is designed to enhance interactions between job seekers and employers, facilitate recruitment processes, and ease career advancement. It includes core modules such as the Learning and Development Module, which tailors learning experiences using AI based on individual career histories, and the Job Application Module, which uses natural language processing (NLP) and machine learning to automate candidate-job matching and initial screenings. Advanced AI algorithms such as deep learning for dynamic candidate profiling, predictive analytics to forecast job market trends, and behavioral analytics for user engagement analysis are integral to these modules. This architecture ensures scalability and interoperability and prioritizes data security, improving efficiency and delivering a personalized job search experience, making the platform a essential enabler in modern HRM strategies.

### Architectural Structure of AI-Supported HR Platform

The architecture of the AI-powered human resources platform is designed to efficiently

meet the diverse range of requirements of its user base and provide a seamless and heuristic experience. Detailed in Figure 1, the architecture is divided into distinct components tailored to meet the specific needs of three primary user groups: job seekers, employers, and system administrators. Job seekers are provided with tools for application management and career development, enabling them to effectively navigate their career paths using advanced AI algorithms for job matching and skill assessment. Employers benefit from streamlined recruitment processes enhanced by automation and data analytics, facilitating efficient candidate sorting and predictive suitability assessments. System administrators ensure system integrity through robust backend functionalities including user access management, system health monitoring, and seamless deployment of updates. The modular, microservices-based design significantly increases flexibility and scalability; however, it is important to note that the system's reliance on continuous data updates poses challenges in real-time performance monitoring and security management.

The platform's architecture also supports robust backend functionalities for system administrators, who ensure system integrity and performance. This includes user access management, system health monitoring, and seamless deployment of updates. Designed for scalability, the architecture adapts to technological advancements and evolving user demands, integrating machine learning and natural language processing to maintain high standards of user satisfaction and operational excellence. This strategic design of layered architecture ensures that each component not only meets but exceeds user expectations, contributing to the platform's overall goal of optimizing HR processes through innovative technology.
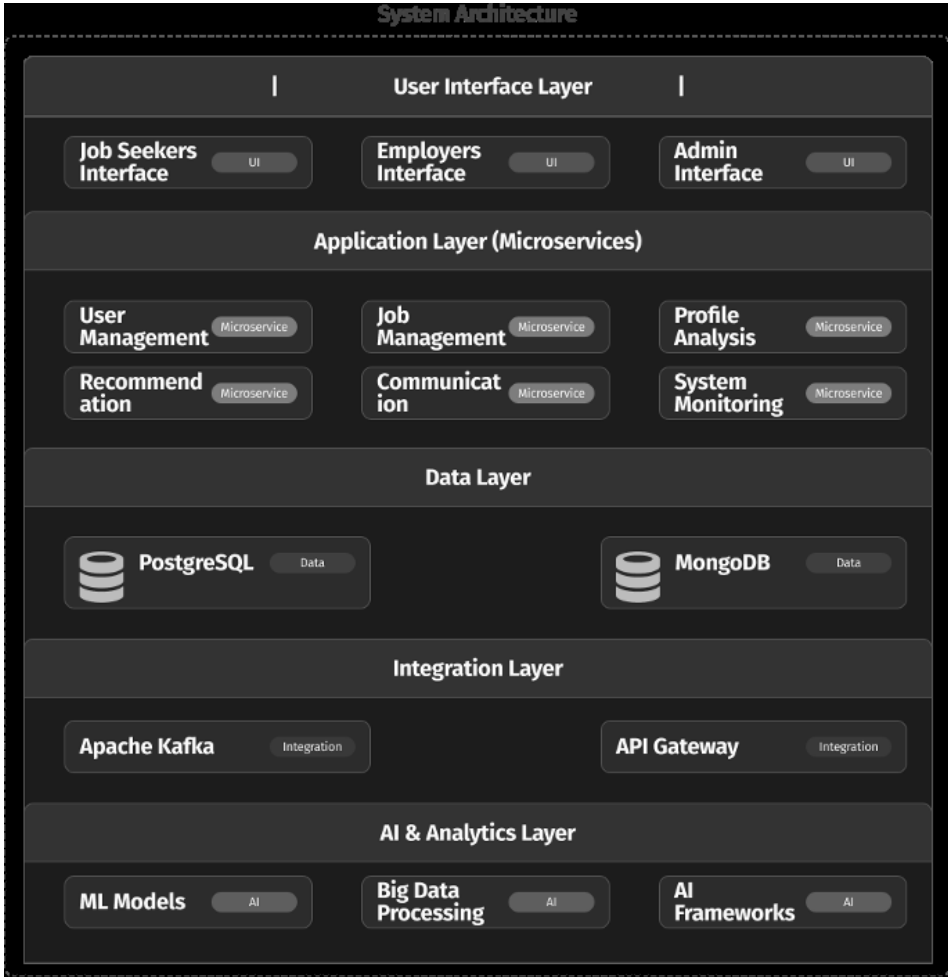
Figure 1. System Architecture

The platform offers various functionalities for job seekers: user registration, profile creation, searching and applying for job vacancies, and access to learning and development opportunities. Registration requires users to enter their personal information, educational background, work experience, and competencies into the system. In the profiling phase, users' competencies and skills are analyzed in detail and structured to be presented to potential employers.

The process of searching and applying for job postings allows users to filter according to their preferred job fields. Additionally, the platform allows companies to create job postings, evaluate candidate applications, view potential candidate recommendations, and communicate with candidates. The job posting creation procedure involves employers submitting the requirements of the position, competencies needed, and other vital information to the system. The platform provides AI-based analytics and rankings to help evaluate candidate applications. The system automatically presents suitable

candidate ideas based on parameters set by employers. System administrators are responsible for the overall management of the platform, user management, and monitoring of system performance. User management includes managing the information of registered users and monitoring their activities in the system. Monitoring system performance requires monitoring various metrics to ensure the proper functioning of the platform and to detect potential technical problems. The architecture of the platform is based on a microservice architecture. This architectural approach makes it possible to develop, deploy, and scale each component independently. Microservices are designed as independent services that perform different functions and interact with each other over lightweight and fast communication protocols (Cerny et al., 2022: 39-48). This approach increases the flexibility and scalability of the system.

The user interfaces designed on the front end of the project were developed using React.js. React.js is a JavaScript library that enables component-based development of user interfaces and can respond quickly to user interactions (Gackenheimer, 2015). It is one of the most common among many JavaScript libraries. Backend services are based on Node.js and Python. Node.js is a JavaScript runtime environment for developing high-performance and scalable backend applications (Syed, 2014). It allows JavaScript to be used in a backend environment with npm-type packages (Wexler, 2019). Python is a widely used programming language, especially in machine learning and data analytics processes (Nagpal & Gabrani, 2019: 140-145).

PostgreSQL and MongoDB technologies are planned to be used in the database structure of the designed system. PostgreSQL can be considered as a relational database focused on performance and adaptability. MongoDB, on the other hand, is a NoSQL database that is widely used in the sector and its effectiveness is increasing day by day (Fotache & Kogean, 2013). There are many NoSQL databases such as Cassandra, BigTable, and DynamoDB in the market today. In MongoDB, each record is expressed as a document. The output of these structures is stored in JSON format by default (Makris et al., 2019). The project uses advanced technologies such as Apache Spark and TensorFlow for big data analysis and machine learning. Apache Spark should be considered as a distributed data processing tool and framework for processing and analyzing large datasets. TensorFlow is an open-source library for developing and learning machine learning and deep learning models (Silaparasetty, 2020).

The architecture of the AI-driven Human Resources platform is designed with a User Interface Layer that provides custom interfaces for job seekers, employers and system administrators. The Application Layer consists of microservices such as User Management, Job Management, Profile Analysis, Recommendation, Communication and System Monitoring, providing flexibility and scalability in handling HR processes. The Data Layer uses PostgreSQL and MongoDB databases for efficient management

of structured and unstructured data. The Integration Layer includes Apache Kafka for data flow and an API Gateway for managing service requests, ensuring seamless communication across the platform. The Artificial Intelligence and Analytics Layer uses Machine Learning Models and Big Data Processing tools within AI frameworks to provide intelligent candidate recommendations and personalized learning development, making the platform robust, scalable and adaptable to future HR needs.

Artificial Intelligence Algorithms and Analysis Process

The platform's artificial intelligence algorithms are designed to analyze the skills of job seekers, identify the most suitable candidates for employers' needs, and assess the match between candidates and job postings. In the first step, profiles of job seekers are collected and analyzed using machine learning models that evaluate educational background, work experience, competencies, and other characteristics, integrating both structured and unstructured data. Natural Language Processing (NLP) techniques such as phrase extraction, sentiment analysis, Named Entity Recognition (NER), and word vector generation (Word2Vec, GloVe) are employed for a detailed text analysis of CVs and job applications.

It is essential to acknowledge that the performance of these models is heavily dependent on the quality of the input data, which may inherently contain biases that require regular audits and corrective measures. In addition to technical optimizations, continuous monitoring of model performance and bias metrics is critical to ensure equitable candidate evaluation. In the second step, matching between job postings and candidates' profiles is computed using various algorithms, including Naive Bayes classifiers, decision trees, k-nearest neighbor (k-NN), support vector machines (SVM), and deep learning models. By employing ensemble methods, such as combining random forest with gradient boosting, overall accuracy is further enhanced.
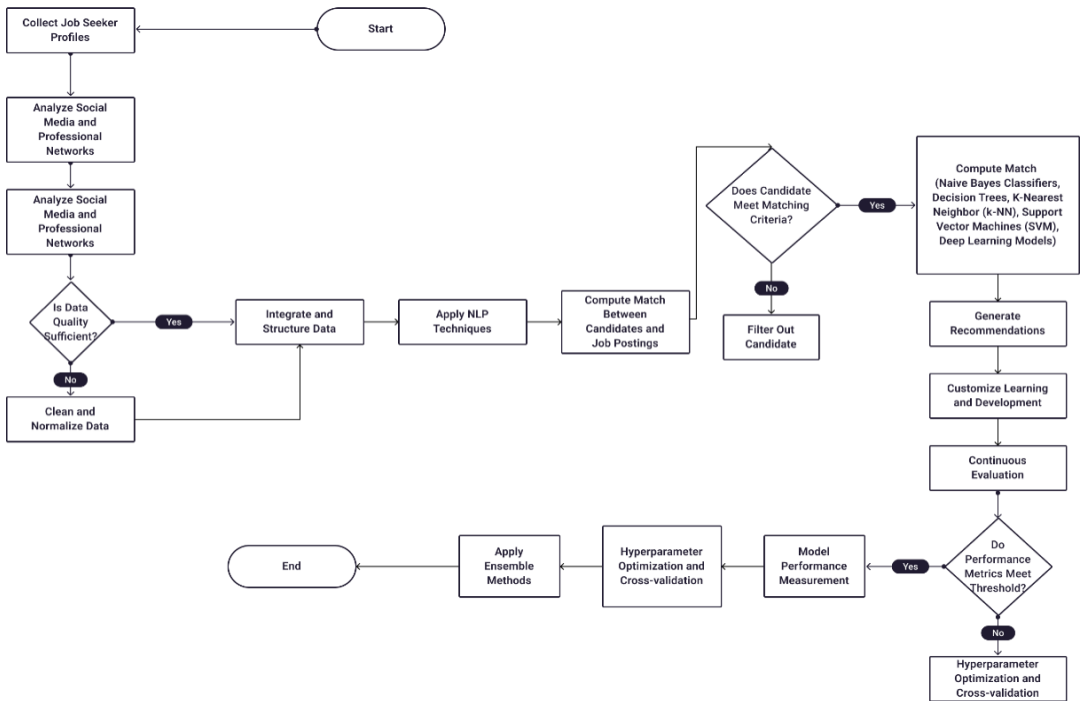
Figure 2. Flowchart of Analysis Process

The data collection process starts with the information candidates provide when they register on the platform and create their profiles. This information includes their educational background, work experience, skills, and career goals. In addition, candidates' social media profiles and data from professional networks (e.g. LinkedIn) can also be analyzed. The collected data is cleaned and normalized in the pre-processing phase. Cleaning involves filling in missing data, correcting erroneous data, and removing unnecessary data. The normalization process ensures that the data are organized in a specific format, which increases the accuracy of the analysis process (Kang & Tian, 2018: 111-130). Furthermore, NLP and data mining techniques are used to make unstructured data structured.

In the second step, the match between the employers' job postings and the candidates' profiles is computed through various algorithms. These algorithms could include Naive Bayes classifiers, decision trees, k-nearest neighbor (k-NN) algorithms, support vector machines (SVM), and deep learning models (e.g. neural networks and deep neural networks). Naive Bayes classifiers use probabilistic patterns to determine the suitability of the candidates for job vacancies. These models analyze the candidate's historical data and the requirements of the job advertisement to calculate the probability that the candidate is suitable for a particular job (Atiku & Obagbuwa, 2016). The decision trees perform classification and prediction based on the characteristics of candidates and job postings. They are divided into various branches according to the candidate's

characteristics and each branch determines whether the candidate is suitable for a particular job advertisement. Accordingly, the K-NN algorithm determines the best matches by measuring the similarity of candidates and job postings (Jadhay & Channe, 2016: 1842-1845.). It calculates the distance between the candidate and the job advertisement, finds the nearest neighbors, and evaluates the suitability of the candidate based on these neighbors. The support vector machines (SVM) use hyperplanes to determine the relationship between the candidate and the job advertisement. They are highly accurate, especially for large datasets, and determine the optimal separation between a candidate and a job advertisement.

The deep learning models can make highly accurate predictions on complex datasets. By learning from large datasets, these models deeply analyze the relationships between candidates and job postings. For example, deep learning methods such as Multilayer Perceptrons (MLP) and Recurrent Neural Networks (RNN) are used to analyze candidate profiles and job postings. With the data generated after the program's analysis, the platform selects and recommends the most suitable job seekers to employers and uses these recommendation features to customize the learning and development platform for candidates and talent. This learning recommendation system is customized in the training and development module by assessing the current competency sets of candidates and taking into account the career goals of talents. For example, if the system identifies that a candidate is deficient in a particular skill, it recommends training programs that the candidate can attend to address this deficiency. This recommendation system creates personalized training plans by analyzing candidates' past data and current competencies. Training materials are tailored to the candidate's learning style and needs, making the learning process more effective.

The analysis process is a continuous evaluation of candidates and job advertisements. The important thing here is the continuous evaluation of job postings and candidates. Thus, the system aims to get the best results synchronously by processing continuous and up-to-date information. This improves the performance of the constantly updated system. This approach has the potential to bring forward better matching opportunities for both job seekers and employers. Model performance is measured by metrics such as accuracy, precision, recall, and F1 score. Hyperparameter optimization and cross-validation methods are used to improve the performance of the models. Moreover, ensemble methods can also be applied to improve the overall performance (Handelman et al., 2019: 38-43). Therefore, using multiple models together, such as random forest and gradient boosting, improves accuracy performance.

As a conclusion to the project, an artificial intelligence-supported platform, which is the basis of this project, can analyze the skills of job seekers and match employers with the most suitable candidates for the position they enter, but it can also be said that it can

offer impressive matches with analysis results suitable for career development for candidates. Here, the potential to enrich and transform the job and talent matching problem with optimized solutions using continuously updated data and improved algorithms has come to the fore.

Learning and Personal Development Module

The Learning and Personal Development Module of this AI-based HR platform provides a comprehensive array of digital learning content and resources to support job seekers in their career development. Candidates can access personalized learning materials, track their educational progress, and evaluate their achievements through this module. The system leverages sophisticated AI algorithms to generate customized learning programs tailored to each candidate's competency needs, adapting to their learning pace and preferred methodologies.

Although the adaptive learning module personalizes skill development effectively, it may not fully capture intangible human attributes such as creativity and emotional intelligence, which remain critical for holistic professional growth. Therefore, integrating alternative assessment methods–such as face-to-face training, mentorship programs, and structured interviews–can complement the digital approach and provide a more rounded evaluation of a candidate's true potential. Additionally, the module continuously tracks performance metrics (e.g., success rates, module completion, and feedback) to refine personalized development plans.

Utilizing sophisticated AI algorithms, the module is designed to generate customized learning programs that are tailored to the individual's specific areas of competency need. These programs adapt to each candidate's learning pace and preferred methodologies, significantly enriching the learning experience. For example, the AI systems assess candidates' knowledge gaps in targeted areas and recommend specific learning materials to effectively bridge these gaps (Dogan et al., 2023).

An integral component of this module is its ability to conduct detailed analyses of candidates' learning performance. This process involves tracking candidates' interactions within the module, their success rates, and the feedback they receive, allowing for continuous improvement and personalization of the learning paths. Machine learning algorithms are employed to monitor candidates' performance data continuously, identifying adaptive learning paths and dynamically adjusting the learning materials as needed. Furthermore, the module enables the tracking and evaluation of candidates' progress using various performance metrics. These metrics, such as success rates, completion of learning modules, and feedback received, are utilized to determine candidates' competency levels, providing a basis for personalized development plans aimed at advancing their careers (Yalcin et al., 2023: 1412-1432).

The platform's global reach eliminates geographical limitations, offering universal access to digitized learning opportunities. According to Pavitra and Agnihotri (2023: 688-693), such systems significantly facilitate businesses in engaging their employees in ongoing development processes, thus enhancing the overall learning culture within organizations.

Overall, this AI-powered platform not only optimizes the interaction between job seekers and employers but also significantly enhances recruitment procedures and supports comprehensive career development for applicants. The architecture of the platform, including its AI algorithms and the Learning and Personal Development Module, is designed to meet the demands of contemporary HR practices, thereby increasing user satisfaction and improving company performance. Integrating these technological tools into human resources operations provides companies with a competitive advantage, offering more effective and efficient processes for both job seekers and employers. This unique structure and technological capability are crucial in driving the digital transformation in human resources management and contribute significantly to advancing industry practices.

DISCUSSION and CONCLUSION

The artificial intelligence-enabled Human Resources (HR) platform envisaged in this study has the potential to transform recruitment processes and the management of human capital. With the integration of advanced technologies such as machine learning algorithms, big data analytics and natural language processing (NLP), it aims to alleviate the problems often encountered in traditional HR practices, such as subjectivity, lengthy candidate evaluation processes and lack of individualised career development opportunities. In this respect, a more consistent and fair recruitment process is envisaged by analysing multidimensional data such as candidates' educational background, work experience and career goals. Furthermore, the digital learning module offered by the platform enables employees to regularly update their competencies, creating a comprehensive and holistic e-system linking corporate goals and personal development.

However, the designed platform has technical, ethical and organisational limitations that need to be taken into account as much as its practical advantages. On the one hand, strict legal regulations and organisational structures may limit the flexibility of the platform in terms of adaptation to the public sector; on the other hand, the importance of human touch in the face of biased data sets and automation is still critical in evaluation processes. It should also be recognised that the cognitive competence of AI may not have the desired impact in positions that rely on emotional intelligence or require high creativity. User training, adaptation and cultural transformation strategies are among the key requirements to fully utilise the potential of the platform. Below, the benefits and

implementation dimensions of the platform, limitations, ethical concerns and future recommendations are discussed under two main headings.

Benefits and Practical Implications

Incorporating artificial intelligence technologies into human resources processes makes it easier for businesses to quickly access larger candidate pools and for candidates to find job opportunities that match their competencies and interests. Specifically, machine learning-based modelling enables both employers and candidates to save time and resources by systematically processing CV and competency data. Such an approach contributes to organisational efficiency by significantly reducing the subjectivity and long waiting times often observed in traditional recruitment methodologies. Moreover, the platform's digital learning module enables candidates to improve their existing skills and supports organisations in building a more flexible and adaptable workforce. This increases the consistency between the corporate strategies of the companies and the long-term career goals of the employees, and increases job satisfaction and loyalty.

There is also the potential for the platform to be applied not only in the private sector but also in public administration. Because public institutions generally operate under strict regulatory frameworks (e.g. GDPR) and centralised examination systems, they have high standards on issues such as personal data protection and transparency. Utilisation of AI-based solutions in public employment can both increase the speed and efficiency of recruitment processes and support the expectation of impartiality for merit-based appointments. Excessive regulatory interventions or institutional resistance, on the other hand, risk slowing down the speed of innovation. The inability to fully reflect qualities such as emotional intelligence and leadership, where the human factor cannot be ignored, makes it imperative that artificial intelligence models are supported by complementary human judgement. The most effective use of this platform, therefore, depends on the harmonious execution of transformation strategies in line with technical competence, ethical responsibility and corporate culture.

Challenges, Ethical Considerations, and Future Directions

There are several multidimensional challenges that need to be addressed for a successful and sustainable implementation, along with the benefits offered by the platform. First of all, the risk of bias in training data may lead to the reproduction of discrimination in machine learning models. Since this situation may trigger candidates to be disadvantaged due to gender, ethnicity or similar factors, it should be closely monitored with regular model audits, bias measurement metrics and various data collection strategies. As a secondary consideration, the platform's standardised criteria may be insufficient for positions that require creativity or intensive human interaction. Under such circumstances, emotional intelligence and social skills should also be

assessed, utilising classical methods (interviews, case studies, etc.) and expert human judgement.

There is a high probability of technological adaptation and learning curve problems among users, and security vulnerabilities in data storage and processing may increase privacy concerns regarding candidates' data. In this respect, establishing mechanisms such as anonymisation of candidates' data, transparent data processing, and rights to object and deletion will strengthen the legal and ethical infrastructure of the platform.

In order to further develop the infrastructure of the AI-powered HR platform, future work should focus on a few key areas. The utilisation of large and inclusive data sets will play a critical role in reducing biases and increasing the accuracy of predictive models, paving the way for fairer outcomes. Moreover, the integration of Explainable AI methodologies will alleviate legal and ethical concerns by increasing transparency and reinforcing trust in algorithmic decision-making processes. The customisation of the platform to adapt to the specific demands of both industry and public sector contexts will likely be indispensable to ensure compliance with different organisational needs and regulatory frameworks. Furthermore, the development of in-house training programmes and the strengthening of change management strategies will continue to be decisive for the smooth adoption of the platform and the facilitation of user engagement. Last but not least, the responsible use of AI, supported by rigorous and continuous audits, will protect the rights of candidates and organisations, while at the same time reinforcing the long-term validity and reliability of the system.

As a conclusion, while AI-supported HR platforms offer significant advantages in recruitment processes and human resource management, the indispensability of the human factor requires comprehensive consideration of multidimensional issues such as biased data sets, ethical and legal regulations. More specifically, transparent and auditable mechanisms that protect data security and the rights of candidates will strengthen the legitimacy of the platform. When all these factors are considered, it is clear that a holistic strategy, including technical developments and the engagement of social stakeholders, needs to be adopted in order to sustain the platform's value proposition. This will enable the artificial intelligence-supported HR platform, which brings speed, objectivity and personalised development opportunities to recruitment processes, to be positioned as a strategic solution for both private and public institutions in the labour market of the future.

KAYNAKLAR

Abdeldayem, M. M., & Aldulaimi, S. H. (2020). Trends and opportunities of artificial intelligence in human resource management: Aspirations for public sector in Bahrain. International journal of scientific and technology research, 9(1), 3867-3871.

Allal-Chérif, O., Aránega, A. Y., & Sánchez, R. C. (2021). Intelligent recruitment: How to identify, select, and retain talents from around the world using artificial intelligence. Technological Forecasting and Social Change, 169, 120822.

Atiku, S. O., & Obagbuwa, I. C. (2021). Machine learning classification techniques for detecting the impact of human resources outcomes on commercial banks performance. Applied Computational Intelligence and Soft Computing, 2021(1), 7747907.

Bignami, F. (2022). Artificial intelligence accountability of public administration. The American Journal of Comparative Law, 70(Supplement_1), i312-i346.

Cerny, T., Abdelfattah, A. S., Bushong, V., Al Maruf, A., & Taibi, D. (2022, August).

Chen, L., Chen, P., & Lin, Z. (2020). Artificial intelligence in education: A review. Ieee Access, 8, 75264-75278.

Dogan, M. E., Goru Dogan, T., & Bozkurt, A. (2023). The use of artificial intelligence (AI) in online learning and distance education processes: A systematic review of empirical studies. Applied Sciences, 13(5), 3056.

Fotache, M., & Cogean, D. (2013). NoSQL and SQL Databases for Mobile Applications. Case Study: MongoDB versus PostgreSQL. Informatica Economica, 17(2).

Gackenheimer, C. (2015). Introduction to React. Apress.

Gligorea, I., Cioca, M., Oancea, R., Gorski, A. T., Gorski, H., & Tudorache, P. (2023). Adaptive Learning Using Artificial Intelligence in e-Learning: A Literature Review. Education Sciences, 13(12), 1216.

Guo, S., Alamudun, F., & Hammond, T. (2016). RésuMatcher: A personalized résumé-job matching system. Expert Systems with Applications, 60, 169-182.

Handelman, G. S., Kok, H. K., Chandra, R. V., Razavi, A. H., Huang, S., Brooks, M., ... & Asadi, H. (2019). Peering into the black box of artificial intelligence: evaluation metrics of machine learning methods. American Journal of Roentgenology, 212(1), 38-43.

Jadhav, S. D., & Channe, H. P. (2016). Comparative study of K-NN, naive Bayes and decision tree classification techniques. International Journal of Science and Research (IJSR), 5(1),

1842-1845.

Jain, D. S. (2018). Human resource management and artificial intelligence. International Journal of Management and Social Sciences Research, 7(3), 56-59.

Jia, Q., Guo, Y., Li, R., Li, Y., & Chen, Y. (2018). A conceptual artificial intelligence application framework in human resource management.

Johnson, B. A., Coggburn, J. D., & Llorens, J. J. (2022). Artificial intelligence and public human resource management: Questions for research and practice. Public Personnel Management, 51(4), 538-562.

Kang, M., & Tian, J. (2018). Machine Learning: Data Pre-processing. Prognostics and health management of electronics: fundamentals, machine learning, and the internet of things, 111-130.

Keppeler, F. (2024). No thanks, dear AI! Understanding the effects of disclosure and deployment of artificial intelligence in public sector recruitment. Journal of Public Administration Research and Theory, 34(1), 39-52.

Khatri, S., Pandey, D. K., Penkar, D., & Ramani, J. (2020). Impact of artificial intelligence on human resources. In Data Management, Analytics and Innovation: Proceedings of ICDMAI 2019, Volume 2 (pp. 365-376). Springer Singapore.

Llorens, J. J. (2021). Rapid advances in HRM technologies and public employment systems: A research agenda for acquiring and managing talent. Handbook of public administration, 272-281.

Makris, A., Tserpes, K., Spiliopoulos, G., & Anagnostopoulos, D. (2019, March). Performance Evaluation of MongoDB and PostgreSQL for Spatio-temporal Data. In EDBT/ICDT Workshops.

Microservice architecture reconstruction and visualization techniques: A review. In 2022 IEEE International Conference on Service-Oriented System Engineering (SOSE) (pp. 39-48). IEEE.

Nagpal, A., & Gabrani, G. (2019, February). Python for data analytics, scientific and technical applications. In 2019 Amity international conference on artificial intelligence (AICAI) (pp. 140-145). IEEE.

Pavitra, K. H., & Agnihotri, A. (2023, August). Artificial Intelligence in Corporate Learning and Development: Current Trends and Future Possibilities. In 2023 Second International Conference On Smart Technologies For Smart Nation (SmartTechCon) (pp. 688-693). IEEE.

Plantinga, P. (2024). Digital discretion and public administration in Africa: Implications for the se

of artificial intelligence. Information Development, 40(2), 332-352.

Pouliakas, K. (2021). Artificial intelligence and job automation: an EU analysis using online job vacancy data. Publications Office of the European Union.

Rodney, H., Valaskova, K., & Durana, P. (2019). The artificial intelligence recruitment process: How technological advancements have reshaped job application and selection practices. Psychosociological Issues in Human Resource Management, 7(1), 42-47.

Saad, M. F. M., Nugro, A. W. L., Thinakaran, R., & Baijed, M. (2021, December). A review of artificial intelligence based platform in human resource recruitment process. In 2021 6th IEEE International Conference on Recent Advances and Innovations in Engineering (ICRAIE) (Vol. 6, pp. 1-5). IEEE.

Silaparasetty, N. (2020). Machine learning concepts with python and the jupyter notebook environment: Using tensorflow 2.0. Berkeley, CA: Apress.

Syed, B. (2014). Beginning Node. js. Apress.

Tambe, P., Cappelli, P., & Yakubovich, V. (2019). Artificial intelligence in human resources management: Challenges and a path forward. California Management Review, 61(4), 15-42.

TTemelkovska, I. (2024). STRATEGY FOR THE USE OF ARTIFICIAL INTELLIGENCE IN HUMAN RESOURCE MANAGEMENT IN THE PUBLIC SECTOR. KNOWLEDGE-International Journal, 67(1), 99-103.

TÜBİTAK. (2023). İnsan Kaynakları İçin İnsan Merkezli Yapay Zeka Projesi Çalıştayı Gerçekleştirildi. TÜBİTAK TÜSSİDE. [Erişim Tarihi: 26.02.2025] https://tusside.tubitak.gov.tr/insan-kaynaklari-icin-insan-merkezli-yapay-zeka-projesi-calistayi-gerceklestirildi/

Vishwakarma, L. P., & Singh, R. K. (2023). An analysis of the challenges to human resource in implementing artificial intelligence. In The Adoption and Effect of Artificial Intelligence on Human Resources Management, Part B (pp. 81-109). Emerald Publishing Limited

Vrontis, D., Christofi, M., Pereira, V., Tarba, S., Makrides, A., & Trichina, E. (2022). Artificial intelligence, robotics, advanced technologies and human resource management: a systematic review. The international journal of human resource management, 33(6), 1237-1266.

Wexler, J. (2019). Get Programming with Node. js. Simon and Schuster.

Wicaksono, F., Aziz, Y. M. A., Ariesmansyah, A., & Arifin, R. K. (2025). Artificial Intelligence in Public Administration: Practice and Ethics for Talent Management in Public Sector. KnE Social Sciences, 10(4), 216-225

Yalcin, A., Kaw, A., & Clark, R. (2023). On learning platform metrics as markers for student success in a course. Computer Applications in Engineering Education, 31(5), 1412-1432.

Yawalkar, M. V. V. (2019). A study of artificial intelligence and its role in human resource management. International Journal of Research and Analytical Reviews (IJRAR), 6(1), 20-24.

Zhu, W. (2020, April). Reconstruction of human resource management under big data and artificial intelligence. In Journal of Physics: Conference Series (Vol. 1533, No. 4, p. 042016). IOP Publishing.