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AI AND DATA-DRIVEN DECISION MAKING IN MODERN HR PRACTICES

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ABSTRACT

This paper explores the transformative role of Artificial Intelligence (AI) in Human Resource Management (HRM), with a particular focus on workforce planning using topic modeling techniques. It discusses how AI technologies like Natural Language Processing (NLP), machine learning, and topic modeling can analyze unstructured data—such as resumes, employee feedback, and performance reviews—to inform talent acquisition, skills gap analysis, and strategic planning. Through the integration of AI, HRM is shifting from reactive decision-making to proactive and data-driven approaches. The paper also highlights ethical considerations, implementation challenges, and the future outlook of AI-enabled HR practices. The study concludes that AI, especially topic modeling, enhances organizational agility, accuracy in workforce forecasting, and strategic talent management.

Keywords: Artificial Intelligence, Human Resource Management, Topic Modeling, Workforce Planning, NLP, Machine Learning, Talent Acquisition

INTRODUCTION

Human Resource Management has traditionally relied on manual methods and intuition-based decision-making. However, the digital era has introduced advanced AI technologies that are transforming core HR functions. Among these, topic modeling—a form of unsupervised machine learning—is gaining traction for extracting themes and insights from large volumes of unstructured textual data. This paper examines how topic modeling can support HR professionals in workforce planning and talent management.

AI TECHNOLOGIES IN HRM

AI applications in HR are vast and growing:

- **Natural Language Processing (NLP)**: Enables sentiment analysis from employee surveys and reviews.
- **Machine Learning (ML)**: Predicts attrition, evaluates candidate fit, and recommends personalized training.
- **Topic Modeling**: Identifies trends in job descriptions, skills requirements, and employee feedback for strategic decision-making.

These technologies streamline recruitment, performance evaluation, training needs analysis, and employee engagement.

TOPIC MODELING EXPLAINED

Topic modeling is a statistical technique that uncovers hidden thematic structures within a text corpus. Models such as Latent Dirichlet Allocation (LDA) group related terms into topics, which helps HR teams detect emerging skill gaps, training requirements, and employee concerns.

APPLICATIONS IN HR INCLUDE:

- **Resume Screening**: Extracts skill patterns and qualifications.
- **Internal Communication Analysis**: Identifies workforce sentiment and recurring issues.
- **Performance Reviews**: Highlights areas needing development.
- **Strategic Planning**: Aligns talent strategies with organizational goals based on emerging trends.

ADVANTAGES OF AI-DRIVEN WORKFORCE PLANNING

- **Data-Driven Decisions**: AI reduces reliance on subjective judgments.
- **Forecasting Accuracy**: Predicts future hiring needs and attrition risks.
- **Enhanced Talent Mapping**: Identifies high-potential employees and skill shortages.
- **Operational Efficiency**: Automates repetitive HR tasks.
- According to a Deloitte report (2023), organizations using AI for HR planning saw a 25% increase in recruitment efficiency and a 30% improvement in employee retention strategies.

CHALLENGES AND ETHICAL CONSIDERATIONS

Despite its benefits, AI integration poses certain risks:

- **Data Privacy**: Sensitive employee information must be protected.
- **Algorithmic Bias**: Unchecked AI models can reinforce existing inequalities.
- **Implementation Complexity**: Requires technical expertise and change management.

HR leaders must collaborate with IT and legal teams to ensure responsible AI deployment.

CONCLUSION

Artificial Intelligence—particularly topic modeling—holds transformative potential for Human Resource Management. By enabling more accurate workforce planning, AI helps organizations adapt to dynamic business environments. While implementation comes with challenges, strategic alignment, ethical safeguards, and continuous learning can ensure AI's successful integration into HR practices.

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