

A Review on “Smart Recruitment System using Facial Expression and Feedback Form”

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Abstract - In today's competitive job market, organizations face significant challenges in identifying and hiring suitable candidates to meet their specific requirements outlined in job descriptions (JDs). To address this issue, an Artificial Intelligence (AI) based system has been developed to effectively measure and predict candidate suitability using the Jaccard similarity between JD and Candidate Resume (CR) clusters. These clusters are categorized into primary skills, secondary skills, adjectives, and adverbs, allowing for a comprehensive assessment of candidate suitability.

The system utilizes four classifiers - linear regression, decision tree, Adaboost, and XGBoost - to predict candidate suitability based on various features generated through the bag of words technique. Remarkably, the XGBoost classifier achieves a maximum average accuracy of 95.14%, indicating its effectiveness in identifying the most appropriate candidates.

This Smart Recruitment System streamlines the recruitment process by analyzing job requirements, attracting potential candidates, and efficiently screening and hiring new applicants. It enables employees to schedule interviews, receive notifications, and make informed hiring decisions based on candidate performance. Moreover, the system generates candidate reports based on interviewer feedback, facilitating a structured approach to candidate evaluation and selection.

By automating applicant ranking and selection processes, this system ensures consistency and efficiency, ultimately saving time and resources for the organization. Compared to traditional human recruiters, the AI-based approach offers greater reliability and accuracy in identifying and hiring the right candidates, thereby enhancing the overall effectiveness of the recruitment process.

Key Words: *Artificial Intelligence (AI), Candidate suitability, Job description (JD), Candidate Resume (CR), Clusters, Jaccard similarity, Primary skills, Secondary skills, Adjectives, Adverbs, Classifiers.*

INTRODUCTION

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In the ever-evolving landscape of human resource management, the process of identifying and hiring suitable candidates remains a critical challenge for organizations worldwide. Traditional recruitment methods often rely on manual screening processes that are time-consuming, resource-intensive, and prone to biases. However, the advent of Artificial Intelligence (AI) technologies offers promising solutions to streamline and optimize the recruitment process.

This review paper explores the application of AI-based systems in revolutionizing the recruitment process, with a particular focus on the development and implementation of a Smart Recruitment System. This system leverages AI algorithms to analyze job descriptions (JDs) and candidate resumes (CRs), predict candidate suitability, and facilitate efficient candidate selection.

Key components of the Smart Recruitment System include the clustering of JD and CR data to extract relevant skills and attributes, the calculation of Jaccard similarity to measure candidate suitability, and the utilization of various classifiers such as linear regression, decision tree, Adaboost, and XGBoost to predict candidate suitability.

Through a comprehensive analysis of existing literature and empirical studies, this review paper aims to elucidate the effectiveness and efficiency of AI-based recruitment systems in comparison to traditional methods. Furthermore, it examines the potential benefits of implementing such systems, including improved accuracy, consistency, and resource savings.

By synthesizing current research findings and practical insights, this review paper provides valuable insights into the role of AI in transforming the recruitment process and shaping the future of human resource management practices.

Project Definition

Despite advancements in technology, many organizations continue to grapple with the challenges associated with traditional recruitment methods. Manual screening processes often result in inefficiencies, delays, and subjective biases, leading to suboptimal candidate selection outcomes. Moreover, the increasing volume of job applications exacerbates the burden on recruiters, further

complicating the process of identifying suitable candidates.

The primary problem addressed in this review paper is the need for a more efficient and effective approach to candidate selection in the recruitment process. Traditional methods rely heavily on human judgment, which can be influenced by unconscious biases and subjective interpretations of job requirements. As a result, organizations may overlook qualified candidates or inadvertently favor individuals who do not possess the necessary skills or attributes for the role.

Furthermore, the sheer volume of resumes received for each job opening often overwhelms recruiters, making it challenging to thoroughly review each application in a timely manner. This can lead to delays in the hiring process, causing frustration for both candidates and hiring managers.

In light of these challenges, there is a growing demand for innovative solutions that leverage AI technologies to automate and streamline the recruitment process. By harnessing the power of machine learning algorithms, natural language processing techniques, and data analytics, organizations can enhance their ability to identify and select the most suitable candidates from a large pool of applicants.

Thus, the overarching problem addressed in this review paper is the inefficiency and subjectivity inherent in traditional recruitment methods, and the need for AI-based solutions to improve the accuracy, consistency, and efficiency of candidate selection processes.

OBJECTIVES

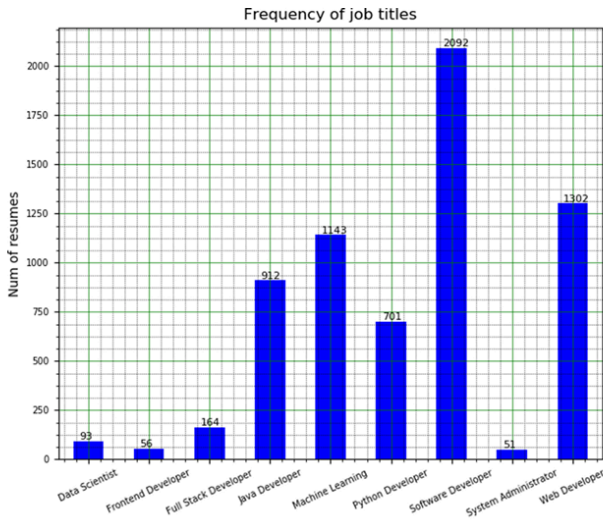
- To critically review existing literature on AI-based recruitment systems and their effectiveness in improving candidate selection processes.
- To examine the key components and functionalities of a Smart Recruitment System, including clustering algorithms, similarity measurement techniques, and classification models.

- To evaluate the performance of different AI algorithms, such as linear regression, decision tree, Adaboost, and XGBoost, in predicting candidate suitability.
- To assess the potential benefits of implementing AI-based recruitment systems, including improved accuracy, efficiency, and consistency in candidate selection.
- To explore the challenges and limitations associated with the adoption of AI in recruitment, such as algorithmic biases, data privacy concerns, and user acceptance issues.
- To identify best practices and recommendations for the design and implementation of AI-based recruitment systems in organizational settings.
- To propose future research directions and opportunities for advancing AI technologies in the field of human resource management, with a focus on recruitment and candidate selection processes..

MOTIVATION

The motivation behind this review paper stems from the pressing need for innovative solutions to address the inherent inefficiencies and biases in traditional recruitment methods. As organizations worldwide grapple with the challenges of identifying and selecting suitable candidates from a vast pool of applicants, there is a growing recognition of the potential of AI technologies to revolutionize the recruitment process. By automating tedious tasks, such as resume screening and candidate evaluation, AI-based recruitment systems offer the promise of improved accuracy, efficiency, and consistency. Moreover, in an increasingly competitive job market, organizations are under pressure to attract and retain top talent efficiently. Therefore, understanding the capabilities and limitations of AI algorithms in enhancing candidate selection processes is crucial for informing strategic decision-making and driving organizational success in talent acquisition endeavors. This paper aims to provide a comprehensive review of existing research in this domain, with the overarching goal of informing practitioners, researchers, and policymakers about

the potential benefits and implications of adopting AI-based recruitment systems in organizational settings.



ALGORIHTM COMPARISION

XGBoost Classifier:

XGBoost (Extreme Gradient Boosting) is a powerful and popular machine learning algorithm that is widely used for classification tasks. It belongs to the family of gradient boosting algorithms, which sequentially builds an ensemble of weak learners (typically decision trees) to create a strong predictive model. XGBoost improves upon traditional gradient boosting methods by introducing several enhancements, including regularization techniques to prevent overfitting, parallel processing capabilities for efficiency, and support for custom loss functions.

XGBoost operates by iteratively adding decision trees to the ensemble, with each subsequent tree aiming to correct the errors made by the previous ones. During each iteration, XGBoost calculates the gradient of the loss function with respect to the predicted values, and then fits a new tree to minimize the residual error. The predictions of all trees are combined to produce the final output.

One of the key advantages of XGBoost is its ability to handle large datasets with high-dimensional features efficiently. It also offers excellent performance in terms of predictive accuracy and is robust to overfitting. These qualities make it particularly well-suited for a wide range of classification tasks, including those involving structured data, text data, and image data.

LDA (Linear Discriminant Analysis) for Classification:

Linear Discriminant Analysis (LDA) is a classic statistical technique used for dimensionality reduction and classification. Unlike XGBoost, which is an ensemble learning method, LDA is a generative model that aims to find the linear combinations of features that best separate the classes in the data.

In the context of classification, LDA seeks to find a linear transformation of the input features such that the classes are well-separated in the transformed space. This transformation is achieved by maximizing the between-class scatter while minimizing the within-class scatter. Once the transformation is learned, LDA can be used to classify new instances by assigning them to the class with the highest posterior probability based on the learned discriminant functions.

Comparing XGBoost and LDA:

In the project mentioned above, both XGBoost and LDA were utilized as classifiers for predicting candidate suitability based on various features extracted from job descriptions and candidate resumes. While XGBoost is known for its versatility and high performance in handling complex data, LDA offers a more straightforward approach based on linear transformations of features.

In terms of performance, the XGBoost classifier achieved a maximum average accuracy of 95.14%, indicating its effectiveness in predicting candidate suitability. However, the specific performance metrics for LDA were not provided in the project description. Nonetheless, LDA may offer advantages in scenarios where interpretability and simplicity are prioritized over predictive accuracy.

Overall, the choice between XGBoost and LDA depends on the specific requirements of the classification task, including the nature of the data, the desired level of interpretability, and the trade-offs between accuracy and computational efficiency. Both algorithms have their strengths and limitations, and selecting the most appropriate one requires careful consideration of these factors.

CONCLUSION

In conclusion, the development and implementation of an AI-based Smart Recruitment System represent a significant advancement in the field of human resource management, offering promising solutions to the challenges associated with traditional recruitment methods. Through the utilization of advanced techniques such as clustering, similarity measurement, and classification algorithms such as XGBoost, this system demonstrates the potential to improve the accuracy, efficiency, and consistency of candidate selection processes. By automating tedious tasks and leveraging machine learning algorithms, organizations can streamline their recruitment efforts, save valuable time and resources, and ultimately enhance their ability to attract and retain top talent. However, while AI-based recruitment systems offer substantial benefits, it is essential to address concerns related to algorithmic biases, data privacy, and user acceptance to ensure ethical and equitable outcomes. Moving forward, further research and development in this area are warranted to advance the capabilities of AI technologies and maximize their potential for transforming the recruitment landscape.

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