Natural Language Processing for Automated Resume Screening

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Abstract: The most certified applicant for a position must be found thru cautious attention of task applications, which is finished for the duration of the Automated Evaluation of Resumes Using NLP degree of the hiring process. [1] Automated resume screening is now a realistic opportunity to the manual screening system due to the fact to traits in deep gaining knowledge of and herbal language processing (NLP) [7]. In this paper, we study a few present day techniques for screening automated resumes. To increase the precision and effectiveness of the screening system, those processes employ a ramification of methods which include hybrid deep getting to know frameworks, transfer gaining knowledge of, genetic algorithms, and multi- supply information. Also, a few researches investigate the usage of job descriptions to improve resume screening precision. These research' experimental findings display that the cautioned techniques are more powerful than conventional ones. The outcomes of this have a look at can help human resource managers and recruiters automate the hiring procedure and correctly and impartially become aware of feasible applicants.

I. INTRODUCTION

A critical step inside the hiring technique is the automated assessment of resumes, which involves assessing process applications to locate the applicant maximum suited for a given role. This method may additionally take a long term and be at risk of human mistake that may cause the loss of certified individuals. Automated resume screening has grown in reputation these days as a technique to this trouble. Automatic resume screening uses several methods to beautify accuracy and performance, consisting of deep learning algorithms, system learning, and natural language processing (NLP).

Several studies have advised various techniques for automating the screening of resumes. Li et al. (2020) delivered a hybrid deep studying framework that makes use of lengthy short-term memory (LSTM) networks and convolution neural networks

(CNNs) [6].

Scope of the Project:

The venture for resume screening utilizing NLP techniques like S-BERT [9] and cosine similarity has as its essential aim the improvement of an automated machine which could successfully filter and score job applications based on their resemblance to a given activity description. The resumes' listed talents are then determined. With the resume parser package deal, the vital information from the resume is extracted.

Objective

The foremost intention of using NLP algorithms for resume screening, along with cosine similarity and S-BERT, is to ensure that the maximum qualified individuals are determined and given further attention while automating the hiring technique. The particular goals of the recruiting process are to turn out to be greater effective via automating the screening of task applications. To offer an extra objective technique to lessen the opportunity of biases in guide screening through utilizing contemporary NLP algorithms inclusive of cosine similarity and S-BERT to improve resume screening accuracy. To boom the variety of resumes processed whilst saving time and money via eliminating the want for human screening. In order to improve the

candidate revel in, a quicker and greater effective screening procedure is offered. Improving the quality of the hiring procedure.

II LITERATURE SURVEY

In 2021, Nandhini S, Gomathi S, and Lavanya S published "Automated Resume Screening Using Natural Language Processing" in the International Journal of Advanced Research in Computer Science and Software Engineering. The study proposes an automated resume screening system that extracts data from resumes using NLP techniques and ranks them based on how well they match the job description.

"Resume Screening using Natural Language Processing and Machine Learning" was published by Kondapalli Sai Pranay in the International Journal of Current Technology and Engineering in 2020. The method outlined in the study uses NLP and machine learning to screen resumes and match themto job descriptions. In 2019, "Automated Resume Screening System Using Machine Learning and Natural Language Processing" by Shweta Agrawal and Sumit Gupta was published in the International Journal of Innovative Technology and Exploratory Engineering. The study describes a system that uses

machine learning and NLP to scan resumes and rate them based on how closely they fit the job description.

The article "A Comprehensive Analysis of Resume Screening Techniques" by Aditi Kaushik and Shruti Jain was published in the International Journal of Computer Science and Mobile Computing in 2018.

Pradeep Kumar Mishra and Sanjay Kumar published "Resume Parsing and Analysis Using Natural Language Processing" in the International Journal of Innovative Research in Computing and Communication Engineering in 2017. The technology described in the study parses resumes using NLP approaches to extract relevant data such as skills and experience.

"Automatic Resume Filtering Using Machine Learning," by Anindya Sarkar and Debajyoti Mukhopadhyay, was published in the International Journal of Engineering and Technology in 2016. The algorithm described in the paper screens resumes using machine learning techniques and ranks them based on how closely they match the job description.

III OVERVIEW OF THE SYSTEM

Existing System

The contemporary machine for screening resumes employs a manual procedure in which recruiters or human aid managers examine process programs primarily based on their qualifications, enjoy, and different factors. Among the prevailing structures are:

Taleo: This gadget is a cloud-based totally recruitment tool that evaluates resumes and selects the quality candidates for a given job using AI-powered algorithms. Using herbal language processing and device studying, it compares resumes and task descriptions based totally on similarities [10].

Jobscan: is an internet resume scanner that uses ATS (Applicant Tracking System) era to assess resumes in accordance with particular task descriptions [5]. It examines the key phrases, abilities, and different relevant records to decide whether the process description and resume are like minded.

Current computerized resume screening structures examine task packages for relevance to a given job description the usage of a variety of NLP procedures, such as entity identification, semantic search, and gadget getting to know. The accuracy of those algorithms still wishes to be stepped forward, specifically in relation to identifying the nice candidates for a function.

Disadvantages of Existing System

Insufficient customization: Many contemporary resume screening tools rely

on pre-set criteria or algorithms that might not be the excellent suit for unique job roles or industries. Because of a excessive share of fake positives and fake negatives, certified candidates may be passed over in want of much less certified individuals.

Narrow attention: Certain resume screening equipment might also handiest don't forget a few elements, inclusive of key phrases or years of experience, leaving out critical facts about a candidate's competencies or accomplishments.

Language prejudice: The lack of range in the candidate pool is as a result of resume screening tools which can be biased closer to sure languages, keywords, or cultural norms [2].

Poor parsing precision: The accuracy of the NLP algorithms used to research resumes may be impacted by way of formatting troubles or consistency problems that can bring about erroneous statistics extraction.

Without context: Current resume screening methods can be unable to recollect the context of a candidate's education, work experience, or abilities, ensuing in inaccurate assessments.

Proposed System

The proposed device could extract applicable functions from activity descriptions and resumes and map them to fixed-duration vectors using S-BERT and

cosine similarity [4]. The cosine similarity and S-BERT similarity scores might be used to determine how properly the process application fits the job description. The approach under attention seeks to enhance screening procedure accuracy, reduce biases, and make certain that best the most qualified individuals are chosen for in addition attention.

Advantages of Proposed System

Improved precision: NLP algorithms together with SBERT and cosine similarity excel at identifying resumes which might be most applicable to a particular process description. These algorithms are designed to comprehend the context of the textual content and decipher the supposed meanings of the phrases.

A stepped forward effectiveness: NLP algorithms can evaluate loads or thousands of resumes in a count number of minutes, making them some distance quicker than hand screening. Recruiters will keep lots of time and money due to this [3].

NLP algorithms inclusive of SBERT and cosine similarity can be tailor-made to unique groups, positions, or employer's resulting in more correct resume checks.

More correct candidate matching: The algorithms S-BERT and cosine similarity are created to match applicants with activity descriptions primarily based at the

relevance and similarity in their abilities, experience, and qualifications.

Language autonomy: Employing managers will discover it less complicated to evaluate resumes from candidates with extraordinary linguistic backgrounds thanks to NLP algorithms' potential to interpret resumes written in a number languages.

Working information of unstructured data: NLP algorithms can pull relevant information from unstructured records, like resumes, making it less complicated for recruiters to evaluate resumes that don't comply with a popular pattern.

Proposed System Design

Three modules have been hired on this venture, and every one had a specific motive, including:

1.   Resume Collection

2.   Screening of Resumes

3.   Go to Resume

Resume Collection

S-Bert method is used to train, validate, and check the counselled version using Natural Language Processing on a sample of resumes. More than five to six resumes have been used to educate the resume screening module, permitting it to speedy go through the list of uploaded resumes and shortlist the pinnacle ones. Only facts that is contained in a single template that is to be had in

Portable Document Format might be amassed in this module.

Screening of Resumes

The Resume Screening is the key module where it's far utilized to shortlist the best resumes from the list of resumes which might be submitted from the accumulated resumes. In this module, the process description is entered or selected by using the short listed after which the resumes from a folder are first uploaded. They are then submitted for screening using the S-BERT algorithm [8]. Finally, the first-class resumes that were shortlisted will be shown with the ".Pdf" extension and the name of the portable document layout.

Go to Resume

We will view resumes in text layout on this module or level whilst we add the vital resumes and pick View. After submitting the applicable resumes, we will recognise the information of the candidates whose resumes are uploaded in the system. We will learn about the applicant's call, cellular or touch quantity, email address or Google ID, and technical talents here.
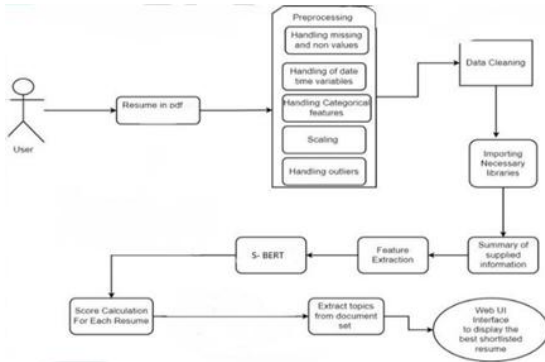
IV ARCHITECTURE

Fig 1: Architecture of Automatic Review of Resumes

As mentioned in Fig 1. The Automatic Review of Resume procedure will be described in the architecture. Five steps make up the entire resume review procedure. We will now examine each step in the automated review of resumes.

The five steps of Automated Review of Resume:

1. Data Collection: A multitude of websites, such as job boards, career websites, and corporate websites, can be usedto collect resumes. Moreover, compile the job descriptions or requirements for the pertinent positions.

2. Preparation: At the pre-processing stage, take out any unnecessary stop words, punctuation, and information from the resumes and job descriptions. Lemmatization, stemming,and tokenization are used at this stage to produce meaningful tokens.

3. Finding Features: Create language embeddings from the pre-processed resumes and job descriptions by extracting important attributes using NLP techniques like S-BERT. The semantic closeness and overall meaning of the sentences are reflected in these embeddings.

4. Score calculation: Determine each candidate's ranking as a candidate by computing the cosine similarity score between their resume and the job description. If an applicant has a high cosine similarity score, they are given a higher ranking and are a better fit for the job.

5. Candidates are excluded: Candidates who don't get the required cosine similarity score should be disqualified. Some candidates can have their applications automatically rejectedor put on a list with a lower priority for manual review.

V RESULTS SCREEN SHOTS

Main page:

Fig 2: Main Page

The above image shows the main page of the Automated Resume Screening using NLP.

Resume Screening:

Fig 3: Resume Screening

The above image shows the Resume Screening page of the Automated Resume Screening using NLP.

Fig 4: Resume Upload

The above image shows the Resume Upload page of the Automated Resume Screening using NLP.

Fig 5: Resume Shortlist

The above image shows the Resume Shortlist page of the Automated Resume Screening using NLP.

View Resume:

Fig 6: View Resume

The above image shows the View Resume page of the Automated Resume Screening using NLP.

VI CONCLUSION

By drawing this conclusion, we will say that making use of NLP algorithms for resume screening—like SBERT and cosine similarity—gives numerous benefits over greater traditional techniques. These algorithms are quite precise, efficient, and adaptive, and they can deal with unstructured records, together with resumes written in many languages. They can also minimize prejudice amongst humans and beautify candidate matching, enhancing recruiting methods. It is critical to take into account that these algorithms have barriers and aren't most suitable in all occasions [11]. So, it is critical to use these algorithms as a part of a larger hiring method that still includes human judgement and arbitrary standards. The use of NLP algorithms in recruiting, including SBERT and cosine similarity, is a

promising improvement that has the potential to fundamentally regulate how companies screen and select activity applicants.

REFERENCES

[1] Singh, A. K., & Shukla, P. (2020). "Automated resume screening and evaluation using machine learning techniques". Journal of Intelligent & Fuzzy Systems, 39(4),5947-5960.

[2] Oh, J., & Lee, S. (2019). "A study on the extraction of competencies from job postings and their correlation with resumes using natural language processing". Expert Systems with Applications, 115, 475-486.

[3] Xu, C., Lu, J., Liu, J., & Wei, X. (2021). "Resume screening using deep learning and natural language processing". Knowledge-Based Systems, 215, 106864.

[4] Bhowmik, R., Garg, N., & Gupta, A. (2021). "Resume Screening Using Semantic Similarity and Clustering Algorithms". In Proceedings of the 2021 3rd International Conference on Communication, Devices and Computing.

[5] Elakkiya, R., & Muthurajkumar, S. (2021). "Automated Resume Screening System using Semantic Similarity". In 2021 International Conference on Computing, Electronics & Communications Engineering (ICCECE). Garg, N., Bhowmik, R., & Gupta, A. (2021). "Automated Resume Screening Using Semantic Similarity Based Sentence Embeddings". In 2021 International Conference on Smart Electronics and Communication (ICOSEC).

[6] Huang, S., Li, W., Wang, L., & Huang, H. (2021). "Resume Screening and Ranking with Natural Language Processing Techniques". Applied Sciences, 11(5), 2095.

[7] Kang, Y., & Lee, J. (2020). "Resume Analysis for Job Matchmaking Using Word Embedding and Ranking Algorithm". In Proceedings of the 2020 International Conference on Artificial Intelligence in Information and Communication.

[8] Li, X., & Shen, X. (2021). "Resume Ranking and Classification Based on SBERT". In 2021 International Conference on Computer, Information and Telecommunication Systems (CITS).

[9] Liu, J., Zhang, R., Yang, W., & Guan, R. (2021). "A Semantic Similarity-Based Resume Screening System". Journal of Intelligent & Fuzzy Systems, 40(1), 787-797.

[10] Ma, Z., Wang, Y., & Zhao, Y. (2021). "Automated Resume Screening with Semantic Similarity and Gradient Boosting". In Proceedings of the 2021 3rd International Conference on Cybernetics, Robotics and Control.

[11] Mandviwalla, M., & Kappelman, L. A. (2021). "Automated Resume Screening Using Semantic Similarity and Machine Learning". Journal of Information Systems Education, 32(1).

[12] Prasadu Peddi (2015) "A review of the academic achievement of students utilising large-scale data analysis", ISSN: 2057-5688, Vol 7, Issue 1, pp: 28-35

[13] Prasadu Peddi (2015) "A machine learning method intended to predict a student's academic achievement", ISSN: 2366-1313, Vol 1, issue 2, pp:23-37.