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RESUME ANALYSIS AND SUGGESTION SYSTEM USING NLP

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ABSTRACT— Finding suitable candidates for an open role could be a daunting task, especially when there are many applicants. It can impede team progress for getting the right person on the right time. An automated way of "Resume Classification and Matching" could really ease the tedious process of fair screening and shortlisting, it would certainly expedite the candidate selection and decision- making process. This system could work with a large number of resumes for first classifying the right categories using different classifier, once classification has been done then as per the job description, top candidates could be ranked using Content-based Recommendation, using cosine similarity and by using k-NN to identify the CVs that are nearest to the provided job description.

Index terms— Resume Analysis, Machine Learning, KNN.

INTRODUCTION

The number of job seekers is increasing with the time, every job receives a number of applications and among them, many are relevant to the mentioned post. It creates a big problem for job recruiter as they have to shortlist the most eligible profile/resume from the pool of resume [2, 30, 23]. The process of matching the candidate resume with the job description is similar to a recommender system as the profile of the candidate recommended for a particular post. The recommendation system was introduced by Resnick and Varian [20]. The recommendation system is widely used in various domains now a days including product recommendation on e-commerce portal [25,27], book recommendation[16], news recommendation[6], movie recommendation [7], music recommendation [5], and many others [4,13, 18, 29, 22]. Lu et al., [13] proposed a detailed survey which included the different protocols that were used by the researcher in the past few years for the recommendation system.

They were discussed how the recommendation system widely used in real-time applications. A recommendation service is of mainly four types of Collaborative filtering, Content-based filtering, Knowledge based and Hybrid approach [28]. Wei et al., [28] discussed all different types of recommendation techniques with their working principle in detail. Al-Otaibi et al.,[1] provided a detailed survey of job recommendation service. They discussed the steps involved in

the recruiting process used by any organization. How the recruitment portal is helping to the organization, what factor of the candidate may lead to getting selected and many her relevant recruitment processes are explained. An Expectation Maximization (EM) algorithm was used by Malinowski et al., [15] for the job recommendation which considers both the applicant resume and the organizations job description. Whereas a fuzzy-based model used by Golec & Kahya [9] to evaluate the candidate relevancy with respect to the posted job description. Another model proposed by Paparrizosetal, [18] using a hybrid classifier. They used information retrieval, manual attributes and other for job recommending process Our work is different than that of earlier proposed systems, as in most of the existing system a job is recommended to the candidates based on their resume content, it leads a low classification accuracy. In order to improve it, we proposed a system which works in two phases: i) classifying the resume in their classes, and ii) ranking the candidate resume based on the job description and their resume content.

LITERATURE SURVEY

The number of job seekers is increasing with the time, every job receives a number of applications, and among them, many are relevant to the mentioned post. It creates a big problem for job recruiter as they have to shortlist the most eligible profile/resume from the pool of resume [2, 30, 23]. The process of matching the candidate resume with the job description is similar to a recommender system as the profile of the candidate recommended for a particular post. The recommendation system was introduced by Resnick and Varian [20]. The recommendation system is widely used in various domains now a days including product recommendation on e-commerce portal [25, 27], book recommendation [16], news recommendation [6], movie recommendation [7], music recommendation [5], and many others [4,13, 18, 29, 22]. Lu et al., [13] proposed a detailed survey which included the different protocols that were used by the researcher in the past few years for the recommendation system.

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PROPOSED SYSTEM

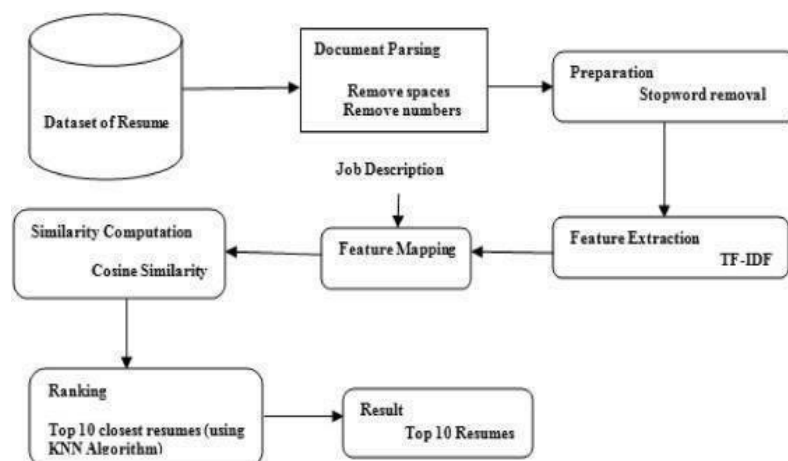The overview of our proposed system is shown in the below figure.

Fig. 1: System Overview

Implementation Modules

- Load Dataset
- In this phase, load the dataset into program and extract the data from the .csv file.

- This data can be analyzed and extract the best features to preprocess the data.

- Preprocess

- For the given data set, there are quite a few 'NA' values which are filtered in python. Furthermore, as the data set consists of numeric data, we used robust scaling, which is quite similar to normalization, but it instead uses the interquartile range whereas normalization is something which normalization shrinks the data in terms of 0 to 1.

- Train and Test Model.

- In this module, the service provider split the Used dataset into train and test data of ratio 70 % and 30 % respectively. The 70% of the data is consider as train data which is used to train the

model and 30% of the data isconsider as test which is used to test the model.

• Resume Analyze

• In this module NLP model is used then it will analyze resume and then suggest the best resume.

• Graph analyze

• In this module the graphanalyzer analyze the resume and show the better resume

Implementation AlgorithmsKNN

• K-Nearest Neighbor is one of the simplest Machine algorithms based on Supervised Learning technique.

• K-NN algorithm assumes the similarity between the new case/data and available cases and put the new case into the category that is mostsimilar to the available categories.

• K-NN algorithm stores all the available data and classifies a new data point based on the similarity. This means when new data appears then it can be easily classified into a well suite category by using K- NN algorithm.

• K-NN   algorithm   can   be used   for Regression as well as for Classification but mostly it is used forthe Classification problems.

• K-NN is a non-parametric algorithm, which means it does not make any assumption on underlying data.

•   It is also called a lazy learner algorithm because it does not learn from the training set immediately instead it stores the dataset and at the time of classification, it performs an action on the dataset.

•   KNN algorithm at the training phase just stores the dataset and when it getsnew data, then it classifies that data into a category that is much similar tothe new data.

RESULTS

This section shows   the experimentaldetails using below figures.
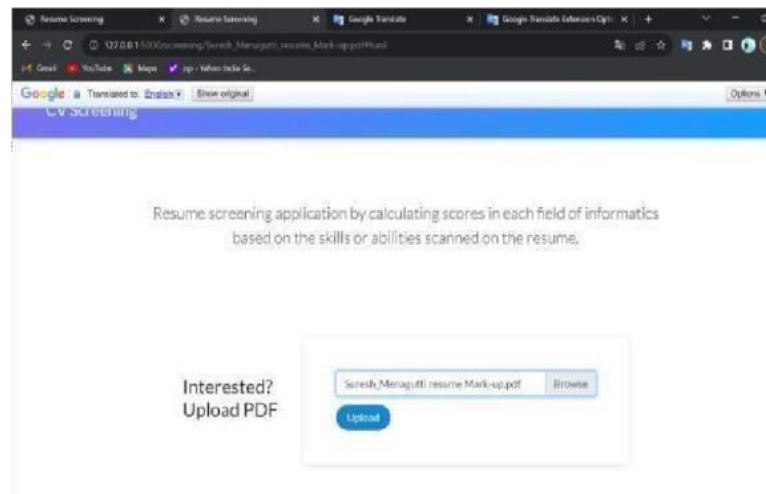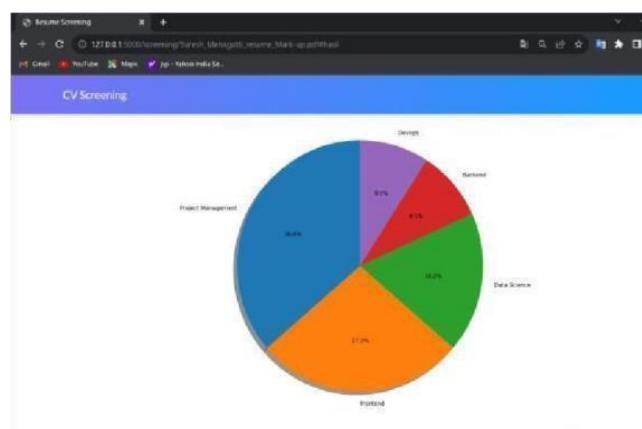
Fig. 2: Upload Resume

Fig. 3: Resume Analysis and SuggestResults

CONCLUSION

Huge number of applications received by the organization for every job post. Finding the relevant candidate's application from the pool of resumes is a tedious task for any organization now a days. The process of classifying the candidate's resume is manual, time consuming, and waste of resources. To overcome this issue, we have proposed an automated machine learning based model which recommends suitable candidate's resume to the HR based on given job description. The proposed model worked in two phases: first, classify the resume into different categories. Second, recommends resume based on the similarity index with the given job description. The proposed approach effectively captures the resume insights, their semantics and yielded an accuracy of 78.53% with Linear SVM classifier. The performance of the model may enhance by utilizing the deep learning models like:

Convolutional Neural Network, Recurrent Neural Network, or Long-Short Term Memory and others. If an Industry provides a large number of resume, then Industry specific model can be developed by utilizing the proposed approach. By involving the domain experts like HR

professional would help to build a more accurate model, feedback of the HRprofessional helps to improve the model iteratively.

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