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Information Technology Resume Analyzer and Career Field Recommender

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ABSTRACT

Almost all recruiters in the field of Information Technology have to go through a large number of resumes every time they need to hire a person(s) for a job in the market. Going through the data present in each and every resume to shortlist candidates can be a difficult task. The project objectives are to extract details from a person's resume and analyze them. This application uses few Natural Language Processing techniques to parse through data in a resume and use this parsed data to evaluate certain features that generally exists in any resume of a person in the field of Information Technology. Skills are the most important feature of a resume when it comes to the field of Information Technology. A person's career field is recommended based on the skills extracted from the resume of the person. Further analysis of all the resumes are done by storing them along with their scores and recommended career fields to make the shortlisting process easy for the recruiter(here admin).

Keywords : Resume Analysis, Career Field Recommendation, Skills Extraction, Personal Details Extraction, Natural Language Processing.

I. INTRODUCTION

In this recommendation system the career field recommendation to the user is done by detecting the skills in the user's resume. Existing techniques are to manually look at each resume and understand the details such as skills and experience to determine the career that is best fit for that person. IT-Resume-Analyzer-And-Career-Field-Recommender which is able to recommend a career field that is well suited for a user using python, pyresparser, Natural Language Processing, with chrome as Front-end takes the resume of a user as input.

Initially, all the skills related to the Information Technology field are extracted using the various libraries based on text mining, Natural Language Processing that allows tokenization, lemmatization and classification of texts which can be manually updated to extract any set of skills the admin desires to. These all skills are sorted and belong to various fields in the Information Technology sector. As the skills extracted from a resume match the skills belonging to a list of skills of a particular field, that field is recommended as a career to the user.

II. LITERATURE SURVEY

The process of shortlisting resumes has widely been manual and a difficult process for recruiters. Digitalization of this process will be having a great impact on itself by reducing time spent on it.

Timon Zimmermann, Leo Kotschenreuther and Karsten Scmid introduces an approach that is data-driven that dictates how to process resumes automatically and provide recruiters with ample time to examine promising candidates and leverage Machine Learning and Natural Language Processing[1]. The work of P. Verma, S. Sood and S. Kalra explains how in the current scenario, to choose the right career path in their lives students remain in dilemma. Mainly without opting for proper guidance from suitable sources, students have chosen their career path. This mismatch is potentially caused among personality, interest and skill of students[2]. Information Technology Resume Analyzer and Career Field Recommender is based on the integration of works of Shivendra Saurav, S. Giri, Shivani Sharna, Shiwani and Surendra Babu Kn whose recommendation system was based on the interests of a student[3] & the ideas of Aritra Ghosh, B. Woolf, S. Zilberstein and Andrew S. Lan to base career paths on the skills of the students[4].

Developing a resume analyzer requires a number of precise and accurate techniques for tokenization, lemmatization and classification of details in the resume. Pooja Shivratri, P. Kshirsagar, Rashmi Mishra, Ronit J. Damania and N. Prabhu has developed a parsing application for the resumes that are received in multiple formats like docx, pdf, doc, txt, which transforms the original resumes into a standard format which contains only desired details of the candidate[5]. To develop a resume analyzer one must have sufficient knowledge of integrating resume data with the tools of text mining and Natural Language Processing which was summarized in the application developed by B. Kelkar, R. Shedbale, D. Khade, P. Pol and A. Damame which ranks the resumes of all the applicants to an organization to help recruiters in finding the best candidate for given employment title by the use of text mining and machine learning tools[6]. Information Technology Resume Analyzer and Career Field Recommender uses few Natural Language Processing and text mining techniques to parse through data in a resume and use this parsed data to evaluate certain features that generally exists in any resume of a person in the field of Information Technology.

III. PROPOSED SYSTEM

One of the important tools of Job Seekers is a strong resume. It is a very important document detailing the basic information such as name, email, phone number and other social information. A resume also contains skills of the job seeker which tells the recruiter about the ability of the job seeker to perform the required job. The proposed system helps the job seeker to recommend the field in Information Technology he can apply to increase the chances of getting employed. The project is mainly focussed on giving tips to the user to make a career in a certain field by analyzing the skills the user possesses in one's resume. We have lists of the technical skills that are highly required or looked after in the Information Technology sector jobs. The skills of the user are mapped to the different highly sought after skills that are present in our system, and based on the results of mapping, the field that the user can easily apply and get employed is recommended. This proposed system can also be used by the recruiter as Resume analyzer to filter out the candidates for the further recruitment process. The resume is uploaded to the system in the pdf format. The resume is converted into the text and sent to the nltk and spacy library which extracts the information of the user/job seeker using NLP techniques. Our proposed system then analyzes this data and makes the recommendation.

IV. SYSTEM ARCHITECTURE

In this paper, the proposed system initiates the main python file, this process will render a dynamic HTML page using StreamLit that allows interaction for both users and admin. For users, a form is presented to upload a resume. As soon as they upload a resume, a process is triggered. This process involves extracting personal details and skills, recommended career field based on skills using various NLP libraries, scoring resume, updating the database with this resume and its details and finally, displaying these details about the

resume to the user. A MySql database is integrated with the main python file that is being hosted by an Apache server(local-host) using the Xampp application. These details of every resume uploaded can be viewed by the admin when he logs into the application.

V. METHODOLOGY

5.1.RESUME CAPTURING:

The interface in this application provides a form field to the user to upload his/her resume. This interface is a single dynamic web page provided by the StreamLit library. StreamLit library enables python to add HTML elements to a webpage. As soon as a resume is uploaded, a process is triggered to analyze the resume, save the resume, its details and computed results in a MySql database.

5.2.PDF TO TEXT CONVERSION:

After uploading the resume a process is triggered of which the first step is to convert the data in the resume to a text string. There are many ways i.e., infinite possibilities that words combine to form sentences. Deep Learning which is a subset of Machine Learning provides a powerful mechanism to address or solve natural language problems. The resume data is text data. This data can be processed using natural language processing techniques and mechanisms.

5.3.RESUME ANALYZING:

NLTK is a collection of libraries and programs for symbolic and statistical natural language processing for English. NLTK is written in Python Programming Language. NLTK can perform NLP various tasks like tokenization, lemmatization and classification. Spacy is a python library to perform various NLP tasks. Spacy works on unstructured text data. It is used in production as it can be used to build natural language processing systems.

The next step involves sorting and gaining important data from the text extracted from the pdf file. The process of resume analysis goes through 7 important steps that converts raw text to filtered information. The 7 steps are tokenization, stemming, lemmatization, stop words removal, parse tree generation, lower case conversion and POS(Part-Of-Speech) tagging.

NLP(Natural Language Processing) is a very important tool when it comes to extraction of specific types of literals from a text string. This part of the process extracts two types of data which are skills and personals.

5.4.CAREER FIELD RECOMMENDATION:

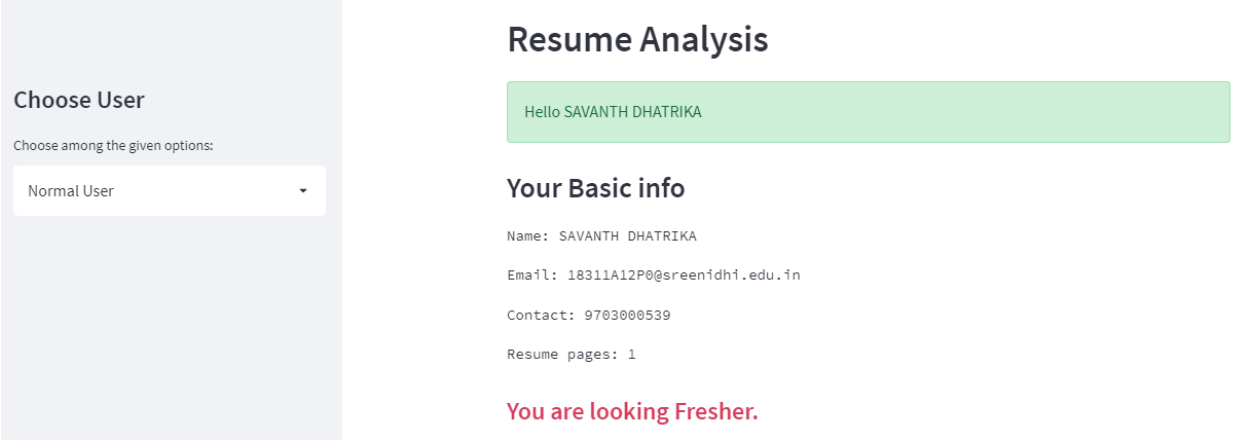
After the extraction of skills, the application's job is to recommend a career field based on the list of skills mentioned in the resume. Recommendation of a career field from a given set of fields is done using the following algorithm.

```
start
for skill in skills:
        fields=FindFieldsRelatedTo(skill)
        for field in fields:
                IncrementFieldValue(field)
return FieldWithMaxValue(fields)
end
```

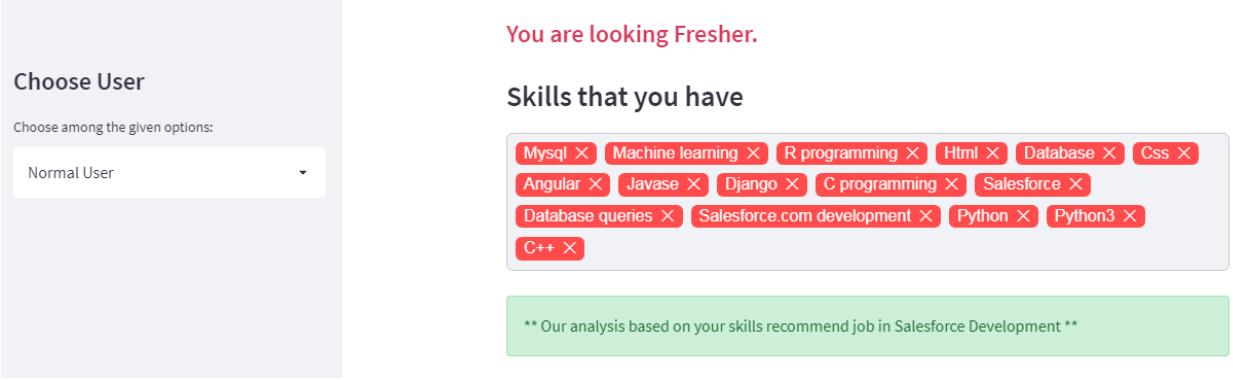
VI. EXPERIMENTAL SETUP AND RESULTS

The proposed system initiates the application with capturing of a resume(pdf file). It converts this captured file from pdf format to a text string format. This text string then goes through a series of operations that are based on

Natural Language Processing techniques and sorts the text into important information and stores them as a variable containing details related to the person, his/her skills and content of the resume. These details are used to analyze their resume and make a recommendation about their career field. Below are the sample outputs of the proposed system.



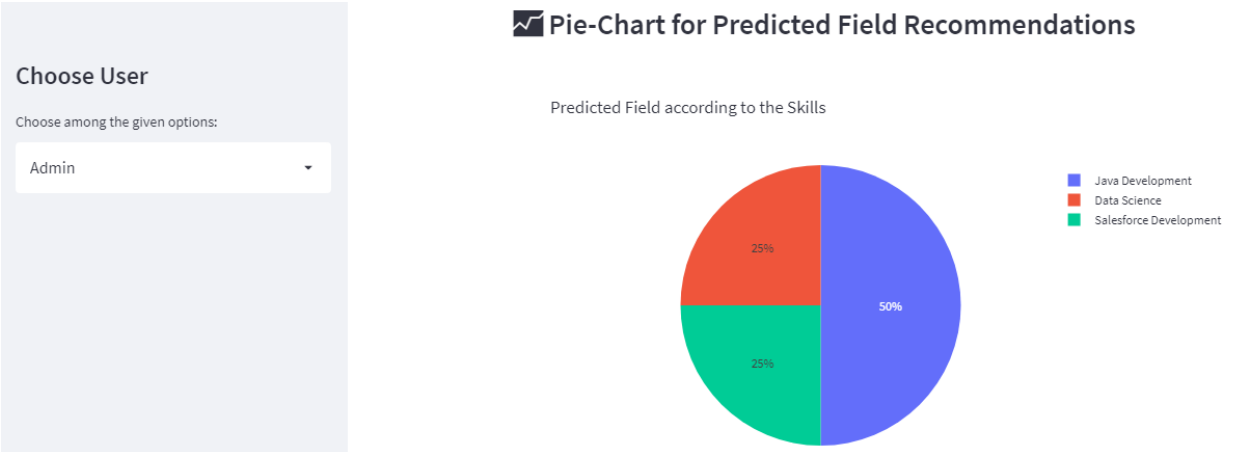
Extracted Personal Details



Extracted Skill set

	ID	Name	Email	Resume Score	Timestamp	Total Page	Predicted Field	User Level	Actual Skills
0	12	Mohd Shamsh	shamsh2909@gmail.com	80	2022-06-04_00:04:40	1	Java Development	Fresher	['Mysql', 'Spring boot
1	13	Data Scientist	info@qwikresume.com	60	2022-06-04_00:06:32	2	Data Science	Intermediate	['Aws', 'Machine learr
2	14	rishikabhat.k@gmail.com…	rishikabhat.k@gmail.com	40	2022-06-04_00:07:45	1	Java Development	Fresher	['Aws', 'Machine learr
3	15	SAVANTH DHATRIKA	18311A12P0@sreenidhi.e…	60	2022-06-04_00:22:51	1	Salesforce Development	Fresher	['Salesforce.com dev

Database Visualization



Visualization of Career Field Distribution

FUTURE SCOPE & ENHANCEMENTS

- It is not possible to develop a system that meets all the requirements of the user. User requirements keep changing as the system is being used.
- Some of the future enhancements that can be done to this system are:
  - Develop the same application for domains and careers other than Information Technology.
  - Providing visualization to the admin of the content and statistical details of the resumes.
  - Develop a filtering mechanism to filter resumes based on its content and HRs interests.
  - Integrating with recruiting applications.

VII. CONCLUSION

In this project, the recommendation system is based on the technical skills of the user mentioned in the resume of the user. This project is developed for the purpose of making a better resume shortlisting process for the recruiters in the Information Technology sector among the technical careers. Because resume shortlisting is the initial process followed by most of the recruiters, it becomes important that the recruiter gets this process done efficiently and most importantly quickly as the number of applicants is big. Thus, the present system allows admin to quickly get an understanding of the content in a user's resume.

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