Personality Evaluation and CV Analysis Using Machine Learning Algorithm

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Abstract: *Human personality has played a vital role in an individual's life as well as in the development of an organization. One of the ways to judge human personality is by using standard questionnaires or by analyzing the Curriculum Vitae (CV). Traditionally, recruiters manually shortlist/filters a candidate's CV as per their requirements. In this paper, we present a system that automates the eligibility check and aptitude evaluation of candidates in a recruitment process. To meet this need an online application is developed for the analysis of aptitude or personality test and candidate's CV. The system analyzes professional eligibility based on the uploaded CV. The system employs a machine learning approach using TF-IDF Algorithm. The output of our system gives a decision for candidate recommendation. Further, the resulting scores help in evaluating the qualities in the candidates by analyzing the scores obtained in different areas. The graphical analysis of the performance of any candidate makes it easier to evaluate his/her personality and helpful in analyzing the CV properly. Thus, the system provides a helping hand for the recruitment process so that the candidate's CV will be shortlisted and the fair decision will be made.*

Keywords: Psychometric Analysis, Machine-learning, TF-IDF, Curriculum Vitae Analysis, Personality Evaluation

I. INTRODUCTION

Personality is the most important factor which reflects an individual, which keeps on varying. Tackling them is a tedious task for which we have implemented an approach to identify the personality and also provide with the recommendation. The world is passing through an era of technological revolution. In every sector, the manual works are being replaced by the digital automation systems. This advancement of technology can improve the job recruiting process to some extent. The organizations always seek for a qualified and experienced person. Again, job seekers also get puzzled while searching for a perfect job. But most of the time it is seen that the right person is not placed in the right position and as a result employee is not getting job satisfaction. On the contrary, organizations sometimes discover the fact that the recruited employee does not have the qualities and qualifications that they needed. As a result, a question comes how many of the employees are satisfied with their respective job leading another question of the satisfaction of the organization. In this case, Psychometric analysis can provide a great support in choosing the right person for the right job. Psychometric analysis is a process aimed to gather a wide array of information by using assessment of a person. It is then evaluated to reach to a conclusion or make a decision. From this perspective, testing which involves the measurement of human behaviour is one of the key elements of the much broader evaluative process.

II. LITERATURE SURVEY

A. Personality Predication using AI/HR Assessment Tool using AI

This proposed system will enable a more effective way to short list submitted candidate from a large number of applicants providing a consistent and fair CV ranking policy. This can be legally justified. System will rank the experience and key skills required for a particular job position than system will rank the candidates form based on the experience and other key skills which are required for particular job profile.

This system will reduce workload of the human resource department. A set of techniques that makes the whole recruitment process more effective and efficient also was not explained further.

B. Personality Prediction System through CV Analysis

In this system, the candidates will register themselves with the required details in the CV form and upload the documents for verifying the authenticity of the information provided in the CV registration form. If the candidate satisfies the requirements/parameters, then the candidates request for that job would be accepted else the system denies the candidate's request for that job. Candidate can also give an online test, which will be conducted on personality questions as well as aptitude questions. The system would then derive and rank the candidates who were eligible for the job. The recruiter could also analyze the personality of the candidate based on the result of the personality test. So, based on CV, aptitude test and the personality test the candidate would be shortlisted.

This system will reduce workload of the human resource department. This system will help the human resource department to select right candidate for particular job profile which in turn provide expert workforce for the organization. The working of requesting or rejecting for job was not explained. May provide inaccurate results.

C. Automated CV Processing along with Psychometric Analysis in Job Recruiting Process

This proposed system states that the company and the applicants take the registration in the website by providing the necessary information to the website. Thus, an account is created. If the applicants choose the necessary option for forwarding the CV to available circulars for the vacant posts, the CVs of the applicants will be automatically forwarded to that respecting company by matching the criteria. The companies will then select their required CVs from the application for the examination. The selected and the non-selected applicants will be notified through the website along with SMS or notification. The applicants will be examined through further examinations in different sessions.

Psychometric analysis along with automating the total working process of applying for a job with the help registering to a website is easy and totally automating the CV processing system in case of applying for a job. The report was based on surveys. This system didn't provide any working algorithm and how the system will reject or accept the candidate and notify the candidate. Most of the work was done manually.

III. PROBLEMS

There is a huge workload on the human resource department to select the right candidate for a particular job profile which in turn would provide experts workforce for the organization from a large pool of candidates.

3.1 Impact of Problems
1. Failure to attract talented candidates.
2. Lack of understanding between the recruiters and hiring manager.
3. Lack of communication with candidates Retaining Millennial in the workforce for a longer period of time.
4. Inability in using data effectively.
5. Difficulty in balancing the speed of hire with quality of hire.
6. Lack of efficiency during the recruitment Process.

3.2 Solution

The proposed system will enable a more effective way to short list submitted candidate CVs from a large number of applicants providing a consistent and fair CV scores. This can be legally justified. System will identify the experience and key skills required for a particular job position. This system will help the HR department to easily shortlist the candidate based on the CV scores. This system will also help to identify the personality of the candidate.

IV. OBJECTIVES
- To develop a system to provide a more effective way of short-listing the candidates
- To determine the key skill characteristic by defining each expert's preferences and ranking decisions.
- To automate the process of requirement specifications and applicant's ranking.
- To conduct aptitude and personality test to produce ranking decisions that would have relatively higher consistency than those of human experts.
- This system can be used in many organizations in order to shortlist candidate.

- At employee position also determine work done efficiency of the employee.

V. METHODOLOGY
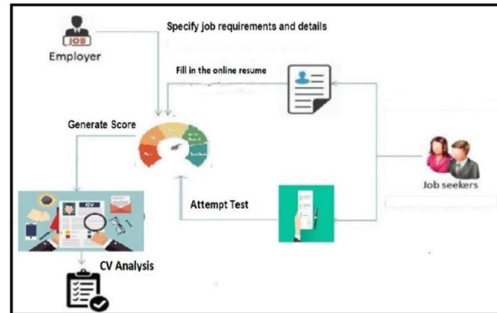
5.1 Architecture of the System

Figure 1: Architectural Workflow

Workflow shows the interaction among the entities such as Job seekers, Admin and CV Analysis etc. Below are the three entities in detail:

A. Admin Module

Following are the tasks of the admin module:

- Authority to login.
- Conduct aptitude and personality tests.
- Add questions for the test along with alternatives.
- Along with correct option store the data.
- Add, modify or delete the questions as per requirement.
- View candidate results.

B. Candidate Module

Following are the tasks of the candidate module:

- At first glance, register to the system.
- Login as and when required.
- Attend the test.
- Fill online CV.
- View the test score.

C. CV Analysis

The CV analysis module consists of:

- CV data to be stored in database.
- Analyse the CV using TF-IDF algorithm.

5.2 Algorithm

In this section we state the machine learning algorithm (*TF-IDF*) for CV analysis.

The TF-IDF [11] Algorithm is used to find out the important keywords in a document/CV. Below, we give the working of TF-IDF in detail.

Step 1: Calculate TF (Term Frequency)

Term Frequency (TF) - Number of times a keyword appeared in a document is calculated by Term Frequency.

TF ('keyword') =number of times 'keyword' appears in document /Total number of keywords in the document.

Here, the term "keyword" signifies any job specific skill which the algorithm is searching for.

Step 2: Calculate IDF (Inverse Document Frequency) value.

The problem of rare and frequent words is resolved.

This helps our system to give more priority to the required word or skills.

IDF sets the *log* value=1 for the required CV as per skill sets and *log* value=0 for the unwanted CV.

IDF ('keyword') =log (total number of CV/Number of documents with term 'keyword')

Step 3: Calculate TF-IDF Weight

Weight= TF ('keyword') *IDF ('keyword')

Higher the weight, more relevant is the CV and lower the weight, less or no relevance of the CV for the selection process. This step returns the CV with highest and lowest weight values which is further useful for classification.

The system determines the candidate on the score obtained. The high-frequency of some keywords may impact on candidate overall score. TF-IDF is widely used in text mining techniques. The algorithm takes into account the effect of high-frequency keywords and negates the low-frequency keywords.

VI. IMPLEMENTATION

The candidate will register her/himself with all the details and will also fill their own CV details into the system. Further, the candidate has to give an aptitude test. After the test given by the candidates, the scores are stored in databases. The next test is of personality test. There is a common myth which says that IQ tests measure intelligence. What an IQ test actually measures is not actual intelligence, but a person's capacity for intelligence. In this test various situations will be encountered by the candidate ranging from strongly agree to disagree, which is provided as a drop-down list. The factors range like openness to experience, conscientiousness.

Big Five Personality Model (also known as Five Factor Model) has been used to predict the personality of the candidate which includes Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism.

For classifying the person Automated Personality Classification is used, which is used to classify the person from a large number of people.

6.1 Functions

The functionality of the Personality Evaluation and CV Analysis using Machine Learning Algorithm as follows:

- Develops interdisciplinary knowledge - Practical training programs help students increase their interdisciplinary knowledge. It helps students learn the practical implementation of theoretical knowledge in any discipline, and enables a deeper learning experience.
- Experience through industrial exposure - Through practical training, students get to know how the industry operates and what standard procedures must be followed in the real working environment. Practical training addresses industrial problem statements and helps students enhance their knowledge that makes them an industry ready professional.
- It develops interpersonal skills - In addition to enhancing technical skills, practical training for engineering students is also a way of improving their communication skills and soft skills. These training programs also help students learn how to coordinate with people helping them improve their leadership skills as well.
- *Helps in exploring your area of interest* - The practical training programs expose students to a particular technology and make them aware of varied industrial applications. Once you discover your area of interest, it will help you to develop necessary skills in relevant field and become a passionate engineer.

Impact Factor: 6.252

VII. RESULT

Figure 2: Personality page

Figure 3: Result after answering the questions

Figure 4: CV Uploading page

Figure 5: Extracted CV of the candidate

VIII. CONCLUSION

This system will help the human resources department to select right candidate for particular job position, which in turn provide expert workforce for the organization. This system will help to get shortlisted CV's according to their ranking. Ranking is based on their test result and experience, qualification etc. This system will reduce work of the human resource department.

Candidates are provided with separate set keys for attempting the aptitude and personality-based tests. CV analysis is performed using the CV filled by the candidate in the website. A machine learning approach has been used in analysis of data through content and collaborative filtering. Further the test scores help in deciding the qualities in the candidates. Thus,

the CV is shortlisted for the recruitment process and a fair and appropriate decision is made by HR department. Also, data visualization model determines the overall performance of the students based on various factors. This analysis helps the Admin department to calculate the proficiency of candidates accurately.

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