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Personality Evaluation Through 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 candidates 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" CV. The system analysis 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 candidates CV will be shortlisted and the fair decision will be made.*

I. INTRODUCTION

As far as employment is considered, selecting the right candidate for the recruitment process from a vast pool of candidates has been a fundamental issue. Conducting personality and various technical eligibility evaluation tests, interviews, and group discussions have been traditional techniques. Due to inception of social media, much more important information about employees is exposed to their online handles. Generally, such information is unnoticed by the recruiters. Aptitude test followed by the interview is traditional practices for the recruitment process. These traditional practices are very much time-consuming, and may result in unfair choices of candidate. As compared to traditional recruitment process, if an online selection process is conducted, then a fair selection of the candidate is possible.

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.

In this paper, we propose a machine learning based method to check a candidates aptitude and personality score. The personality of the candidate would be identified by using two metrics, first is aptitude /personality test and second CV analysis. The administrator is responsible to design, update or drop the questions and has the complete control to customize the aptitude/personality questions as per organization requirements. Further, three categories of questions are added in the aptitude test which includes quantitative, verbal and logical type questions. After the aptitude test, the personality test is carried out so that candidates personality would be tested. The decision can be made on the basis of the test outcome. Finally, the score of the test is displayed and the decision of the candidate is made. The result of CV analysis is used for candidate selection as per organization needs.

As a last paragraph of the introduction should provide organization of the paper/article (Rest of the paper is organized as follows. In section II, related work is presented; section III contains proposed system and section IV covers architecture of the system. In section V, we present design algorithm and result and discussion is presented in section VI. Lastly, Section VII concludes research work with future directions)

II. RELATED WORK

In this section, we present the related work and literature review of various techniques and algorithm used for online selection process.

Psychometric analysis is used for choosing the right candidate as per the outcome of psychometric test and need of an organization. For psychometric analysis protocols were proposed in using the survey data of the Alberta Context Tool.

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.

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Recommendation using machine learning techniques have been used for the analysis of the CV. In literature, various evaluation tools have been used. One of the approaches has been mentioned in which use a tool called "Career Mapper" for the recommendations of the CV. It checks for the completeness of the user profile.
The recommendation usually involves the use of various filters. Content and Collaboration are among them. One of the approaches of Content-Based Recommender is mentioned is which use Fo-DRA for the recommendation which is based on content. Collaborative Based Recommender has a key function for the similarities among users.

Based on the above survey technique we state some of the limitations.

1) The impact of manual interviews and the resumes over HR has kept on increasing in recent years. It is very important to come up with a solution that can shorten or fasten the HR department work. Therefore a system has been implemented that recommends the candidates CV.
2) Traditional forms of recruitment typically involve job seekers filling out physical resumes and giving interviews with the surge in applicants lately, the number of candidates tends to overwhelm the employers. The proposed automated candidate grading system utilizes machine learning algorithms to build the models which test them.

To overcome above limitations we propose our system as follows.

III. PROPOSED SYSTEM

In our paper, we propose personality evaluation and CV analysis using machine learning algorithm. This system provides with an expert workforce for the organization which will help the HR department to select the right candidate for the particular job profile. In our society intelligence is highly appreciated. If you have a high IQ, you have a better chance of being successful at school and professional life. Generally, for prediction of personality, psychometric questions are used. The proposed system is developed as a web application wherein the admin is first needed to login with proper credentials followed by which they can add the questions and can also modify them. For each question, four options along with the correct answer is stored in the database.
The candidate will register her/himself with all the details and will also fill their own CV details into the system. Sample aptitude test questions along with their options are shown in (Table 1). 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. (Table 2) shows the sample questions for personality test. Each question has the fix set of choices varying from strongly agree to disagree

Table 1. Sample questions for Aptitude Test

Questions	Option A	Option B	Option C	Option D	Correct Option
Synonyms of EMBEZZLE	Misappropriate	Balance	Sad	Fat	Misappropriate
Antonyms of ENORMOUS	Soft	Average	Tiny	Weak	Tiny
7,10,8,11,9,12??	10	6	32	21	10
1,4,9,16,??	36	25	99	13	25
Synonyms of CANNY	Handsome	Clever	Shout	Disciplined	Clever

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Table 2. Sample questions for Personality Test

Questions	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism
I feel little concern for others	-Select- Agree Diagaree Strongly Agree Strongly Disagree Neither agree/disagree	Agreed	Agreed	Strongly Agreed	Disagrees
I am very prepared	-do-	-do-	-do-	-do-	-do-
I get stressed out very easily	-do-	-do-	-do-	-do-	-do-
I like multitasking	-do-	-do-	-do-	-do-	-do-
I never get demotivated easily	-do-	-do-	-do-	-do-	-do-

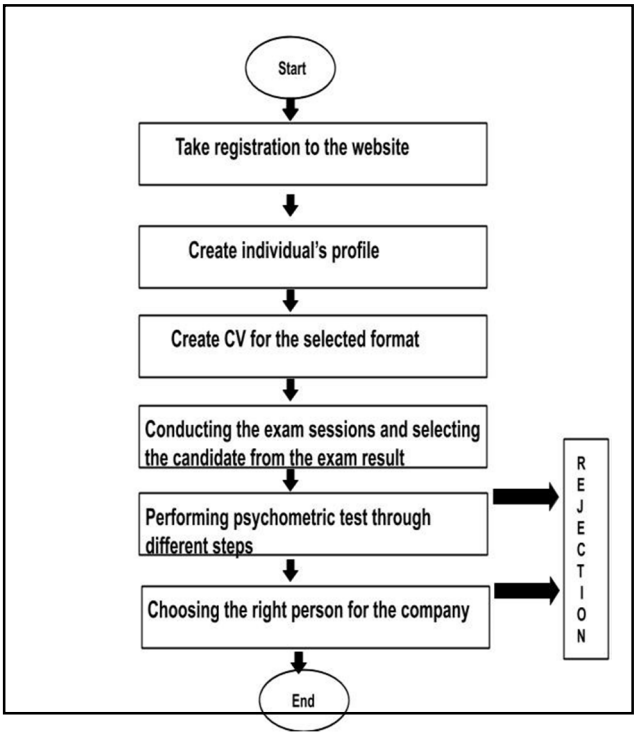


Figure 1. Implementation Steps

The proposed system is developed on the basis of the implementation steps shown in (Figure 1). The candidate has to undergo the registration and login process, then they can create their profile along with CV. Followed by this process, a candidate can give tests to get scores. The TF-IDF algorithm is used to perform the analysis as a graph in terms of the programming skills on x-axis and the respective scores on y-axis. These scores will help recruiters in selecting the right candidate.

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IV. ARCHITECTURE OF THE SYSTEM

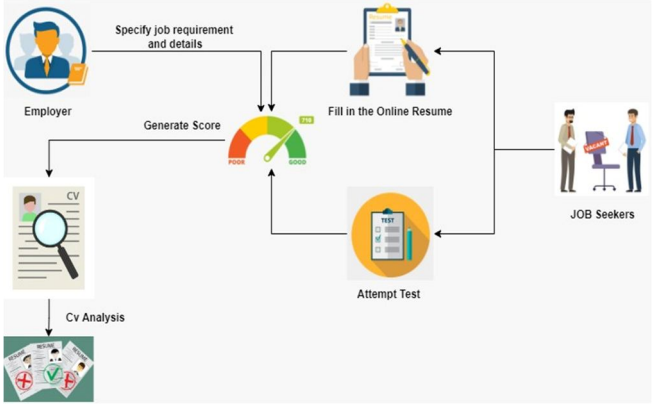


Figure 2. Architectural Workflow

The architectural workflow in a sequential process is depicted in (Figure 2). Workflow shows the interaction among the entities such as Job seekers, Admin and CV Analysis etc.
Below, we explain 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. -Analyze the CV using TF-IDF algorithm.

V. DESIGN ALGORITHM

In this section we state the machine learning algorithm (TF-IDF) for CV analysis.
The TF-IDF Algorithm is used to find out the important keywords in a document/CV. Below, we give the working of TF-IDF in detail.

1) 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.

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2) *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 document with term 'keyword')

3) *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.

Table 3. A sample CV

Skills	***Python***,Java,C,C++,HTML,SQL
Certifications	• Complete ***Python*** Bootcamp (Udemy) • Oracle Certified Associate(OCA)
Projects	• Sentiment Analysis of Social Media Data using ***Python*** • Attendance Management System using SQL
Work Experience	• Intern in Asaanjobs.com as a ***Python*** programmer • 2+ yrs experience in Atos as an Application Developer • Former Software Tester in Oracle

For example, as shown in (Table 3), Python is appeared under four sections, i.e. Skills, Certifications, Projects, Work Experience. In our system, if we want to select a candidate, with the skill-set of „Python" according to the job requirement. We can count the number of occurrence of Python" in the CV using TF-IDF Algorithm. If the count of Python word is having higher occurrence frequency then, that CV will be shortlisted for the selection. Our system is implemented using Microsoft Visual Studio and MS SQL Server Management Studio.

In this section we present the working of our online system. Now, in the next section, we analyze the obtained results.

VI. RESULTS AND DISCUSSION

A website is implemented that have three main modules namely: Admin Panel, Candidate Panel and Analysis section. In Admin Panel where administrator or recruiters can register and login to the system. After logging in to the portal, Admin will be able to Add the Category of Test to be Conducted. Then questions of each category can be added that can be Aptitude or Personality Based Questions or any technical category according to the job requirements. Admin can also View All Questions of each category

The registered Candidates are eligible to Login to the system by authentication process using Candidate ID and Password. After logging can add the CV details. where they can enter resume information. After this the candidate can attempt test. The score will be displayed at the end of the test. This test score data is given as an input to TF-IDF algorithm for further analysis.

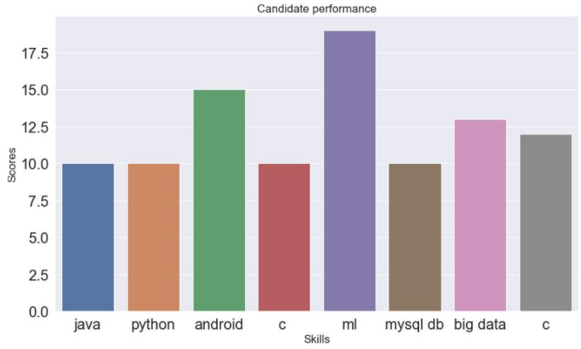


Figure.3 Analysis

Here, (Figure 3) shows analysis on the basis of the details that are filled by the candidate in their CV. The scores and Skills are taken into consideration for overall evaluation and analysis of the CV. In (Figure 3) the x-axis shows the keywords of the skills collected from the CV, and y-axis shows the score obtained. It is observed from (Figure 3), that candidate score is higher in machine learning (ml) skill-set and for others it is nearly similar. The result gives us the performance of the candidate and as per requirement of the recruiter, the candidate can be selected. The above analysis is possible by using TF-IDF algorithm.

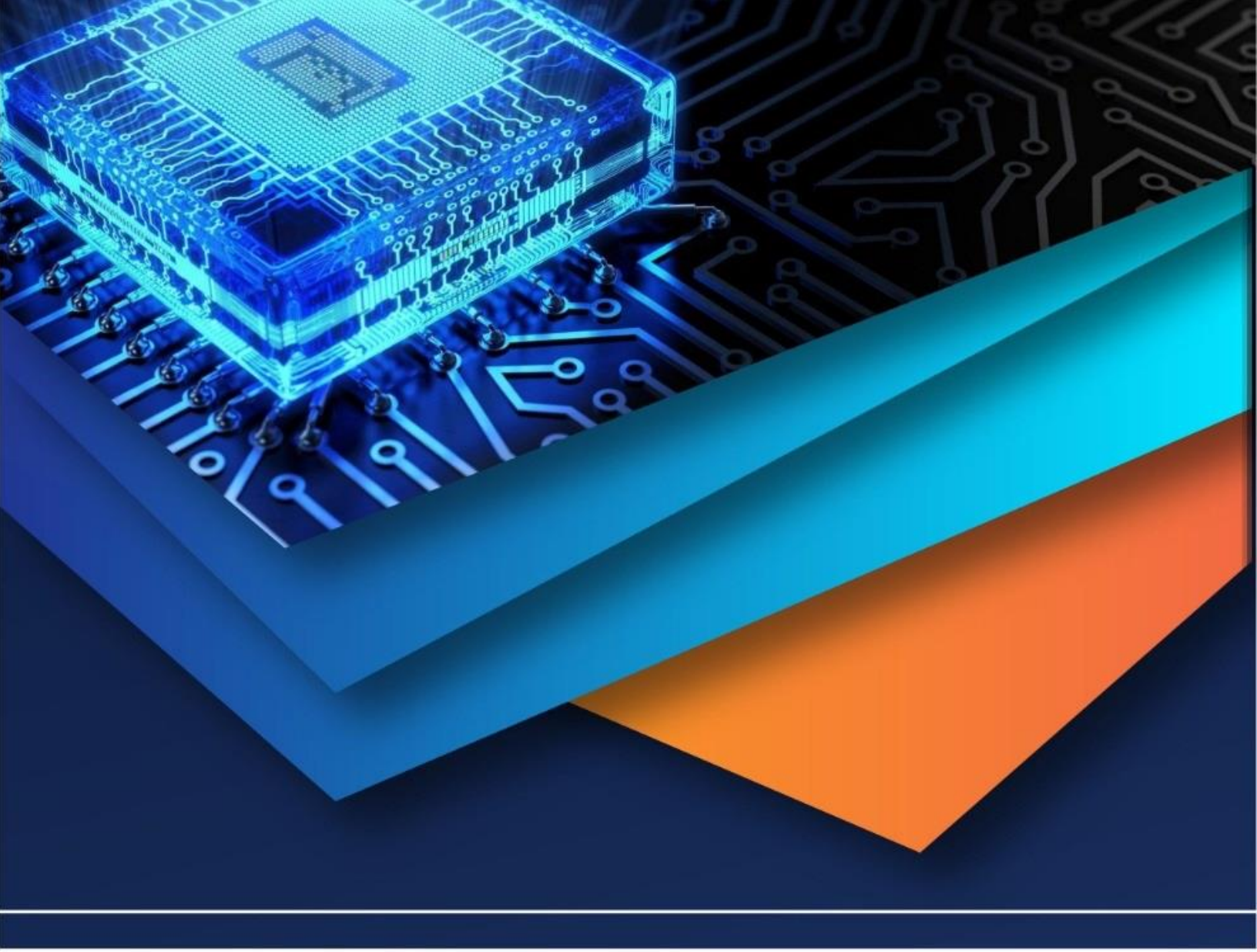
VII. CONCLUSION AND FUTURE SCOPE

We have presented in this paper, the prediction of human personality by using standard questionnaires that is provided by the HR Department according to the job selection criteria. Candidates fill an online Curriculum Vitae (CV) which can be later on viewed by the Admin. 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.

Further, we can modify the existing system to perform sentiment analysis of social media data. Many more classification algorithms of machine learning can be integrated to provide much better functionalities.

REFERENCES

[1] FoDRA – Nikolaos D. Almalis George A. Tsihrintzis , Aggeliki D. Strati , “A New Content-Based Job Recommendation Algorithm for Job Seeking and Recruiting” , 2016.
[2] Manasi Ombhase, Prajakta Gogate, Tejas Patil“Automated Personality Classification Using Data MiningTechniques”, 2017
[3] Vivian Lai, Kyong Jin Shim, Richard J. Oentaryo, Philips K. Prasetyo, Casey Vu Ee-Peng Lim, David Lo, “Career Mapper: An Automated Resume Evaluation Tool”, 2016.



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