

An Ideal Forecasting Technique to Scrutinize the Candidate Using Curriculum Vitae

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Abstract

Recruitment process is tedious process even today especially to recruit a skilled person. HR Management has apparently been developed and has explored many approaches that facilitates their convenience. The advancement in the Digital automations, Information systems, anytime access of the electronic technology have reduced the complexity the recruitment process and the up gradation in the virtual connectivity made the process more pertinent. The proposed system aims to devise a system that assimilates the Job Characteristics Model into an E-HR system that helps to identify the personality and skill sets of a person using their curriculum vitae. The techniques used in this process make the whole recruitment process efficient. The process implements a system that ranks the candidates based on technical skill exposure and aptitude test as well, this ranking finally leads to the psychometric test where the entire system procedure is being designed and executed. It makes the procedure is much easier to shortlist the candidates from the resume of an enormous number of applicants. Then the System will arrange and propagate the skill sets for the considered Job position. This system using Machine Learning technique forecasts the skill sets of the person using their Curriculum Vitae, that indeed helps the HR to scrutinize the candidates easily..

Keywords: CV, Machine Learning, Prediction Analysis

1. Introduction

As far as employment is considered, selecting the right candidate for the recruitment process from a huge number 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 which causes 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, 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. We

propose a Machine Learning based algorithm to check a candidate's 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 with the Prediction Analysis is carried out so that candidate's 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. Two techniques were being used generally in all of the papers namely Big Five Analysis and Psychometric Analysis. Also for classifying the person we use Automated Personality Classification from a large number of people. From the represented methods and systems we could be easily analyze and classify every student according to their results. Also we can recommend the students for other profiles based on their marks and results which could further reduce the candidate's work and time.

2. Literature Survey

In the recent years many professionals have developed the prediction techniques based on the machine learning which improves the analysis processes.

Shiqiang Guo and et-al[1]proposed the ResuMatcher, A personalized resume matching system provides a searching procedure that is truly customized to job candidate which search results are based on the candidate's qualifications, skills, and work experience. It works based on the recommender systems namely Content-Based, Collaborative Based, Knowledge Based and Hybrid Based Systems. It also uses the information extraction especially for the job recommender systems which the other traditional websites like naukri, indeed where every system and algorithms proposed based upon the generalized techniques. It's main technique is the ResuMatcher which receives a input, a résumé object from the Query Interface and compares the job database using a novel similarity method to extract the relevant job skills. It has similar features between a résumé object and a job object which is calculated as a sum of the updated features. It produces more accurate and consistent results and improvises the current search methods and also shows that Résumatcher system scales in an easier way and can be optimized for large scale procedures. It has major drawback which deals with the complex and time consuming task.

Joanna Sosnowska and et-al[2] proposed the Dynamic systems access to personality, The Personality Dynamics(PersDyn) model which particularly deals with the Personality Dynamic model and also it compares to the other relevant models for the personality abstraction. It has the major technique involved as the PersDyn model. Here the traditional method of process is on stable compatibilities, focus on the complex behavioral systems, cognitive and effective patterns results interactive ways between different methods of the system. It also covers the regulation which the focused point in the individual's thoughts, feelings, and exact converges. The dynamic approach to personality are represented in the PersDyn model which it could be applied to the points of psychological research, including clinical settings and systems (e.g., research on personality pathology, bipolar disorder), social psychology process (e.g., affect dynamics and social relationships), and work and organizational psychology method (e.g., studies on performance, burnout and engagement).It executes the straight forward approach to capture dynamic changes in personality methods using three parameters: trait baseline, variability and attractor strength. It is being limited with the condition that it can only be used for modeling one or two personality dimensions.

Jeromy Anglim et al [3] analyzed the Predicting employee's attitude to job location diversity from personality, values and cognitive ability system which it mainly focuses on the new ways about the predictive value of big and straight facets of the individual differences calculated while excluding some of the limitations of previous research process. It takes the method of BIG-FIVE and HEXACO model which synthesizes the findings about the role of individual differences across attitude, morals and cognitive strength. This updated assessment is exclusively important for new learners which they use those information for their selection, training, and professional development procedures. Negative executions of personality for the workplace diversity is being measured and was designed to calculate whether a worker had a positive or negative attitude to diversity in relation to three parts (a) co-workers who are least, (b) supervisors who are least, (c) hiring and promoting of least categories. In terms of social arrangements, items generally look upon the Races (i.e., Black, Hispanic, and White) or Gender (i.e., male, female). The residual collaboration for Social self-esteem system was statistically significant and suggests that it is incredibly predicts the least negative attitudes. The methods of power, security and tradition shows limited positive correlations, and globally shows a least negative correlation with negative attitudes. Limitations that reflecting negative attitudes were relatively low.

Xiaojun Shen et al[4]analyze the complete Personality Detection of the person based on Deep Learning concept for words of letters. This analysis will detect the user personality; we implement a model TwoCLSTM which is two directional long short term storage. Long string of words and words are keywords for the datasets which involved in evaluation for analyze the personality. We introduce Word embedding technique with pre-defined work vectors from Glove which is machine learning technique. The model contains 2LSTMS and CNNLSG in that softmax layer, word vectors will be sent. In our experiment, stream of consciousness essays are used for evaluating personality traits. YouTube personality datasets are introduced for denoting transcriptions, genders from videos. They have analyzed that YouTube dataset is superior to the stream of consciousness and it seems to detecting the personality traits.

OyaCeliktutan et al[5] examined the Completely Automated Prediction of Footprint in time and across Changing Background in Personality, Allurement, Appealing .This approach performs automatic prediction using big 5 models. In this implementation, they obtain audio, visual explication continuously for prediction which learns temporal relationship .The personality perception and recognition involves in the automotive prediction. Big five dimensions based on behavioral ranging for 10s to few minutes. The extracted audio and visual features are employed to train regression model for each dimension. In this long span of audio, visual data is modeled using bidirectional long short time memory. The analyzed output with awe to the work of explication facility The capturing of high frequency changes in this approach is a tedious task due to limited number of data clips.

Khyati Pradeep Suratwala et al[6] predicted the Employment Analysis System using Data Mining and Linear Classification which they created a new kind of prediction model which mainly focuses on the Career Prediction for the Students and Graduates. It is followed with a Career Intuitive Model uses a type of problems that candidate have to test the analytical skill personal skill .Another important model analyzed here is the Schooling Data Mining (SDM)which uses the many ML concepts, informative data retrieved by many keywords of data for the educational purposes. Intuitive Career System mainly focuses on the three types of analysis which every Dataset Description as well as Data Preprocessing plays the main part in it. Aptitude, Personality and Student Background Information are the three important topics where a graph API is being used and formed for every individual student data .Finally it classifies this

three types with the relevant algorithms-K-Nearest Neighbors and Stochastic Gradient Descent Also Logistic Regression and Random Forest methods were used for the classification in this system.

3. System Architecture

In our paper, we propose Personality Prediction analysis with the Curriculum Vitae using machine learning algorithm. This system provides with an expert workforce for the organization which helps the HR department to shortlist the exact candidate for their expected job profile. In our society, talent based on research thoughts is highly noticed and if you have a high IQ, you have a better chance of being praised at school and professional life.

Generally, for prediction of personality, psychometric questions are used. Fig 1 represents the system architecture where the 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 are stored in the database.

The candidate will register her/himself with their details and also fill their resume details into the system. Then according to the CV data and applications we analyze and extract the keywords which are being repeated for more number of times. It is being calculated using the TF-IDF algorithm. Then after analysis, Technical test questions along with their options are given with a individual question like time slot. After the test given by the candidates, the scores are stored in databases. If the candidate clears the Technical test he will be moved to the next test otherwise he is rejected.

The next test is of personality test. There is a common thought process which speaks that IQ tests intelligence but an IQ test actually not calculates the actual intelligence, but the capability of their own 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 shows the sample questions for personality test. The Psychometric Analysis which involves the BIG FIVE model where OCEAN also gets involved and solved. Each question has the fix set of choices varying from strongly agree to disagree. This test also follows the similar time pattern for the betterment and the short listing procedures. Finally if he clears the Personality test he gets selected by notifying him with the pop-up message.

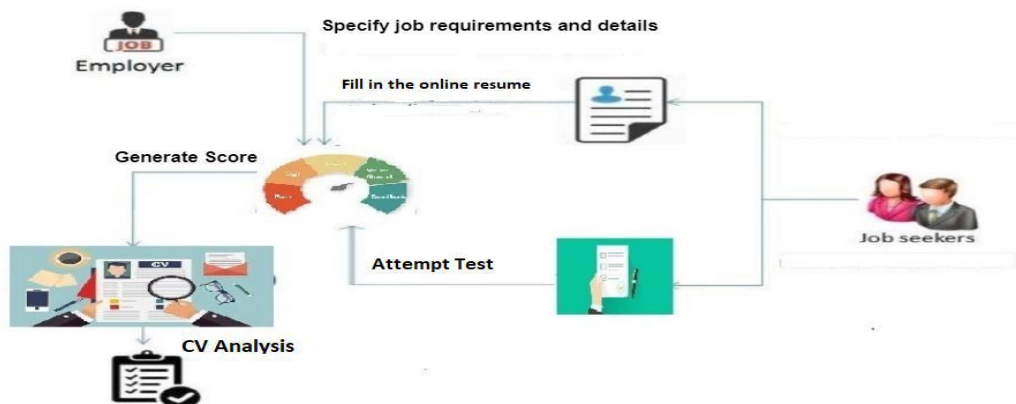


Fig.1 System Architecture

4. System Implementation

This model when implemented will be much useful for the organizations to recruit the skilled personalities. Fig 2 clearly explains the exact process of the personality prediction system in a single way representation. The major process and working strategies are allowed and analyzed in both the technical and the psychometric analysis module. Also the first two simpler modules has a basic level of workings and specifications which it collects randomly the candidate and user details according to the processes.

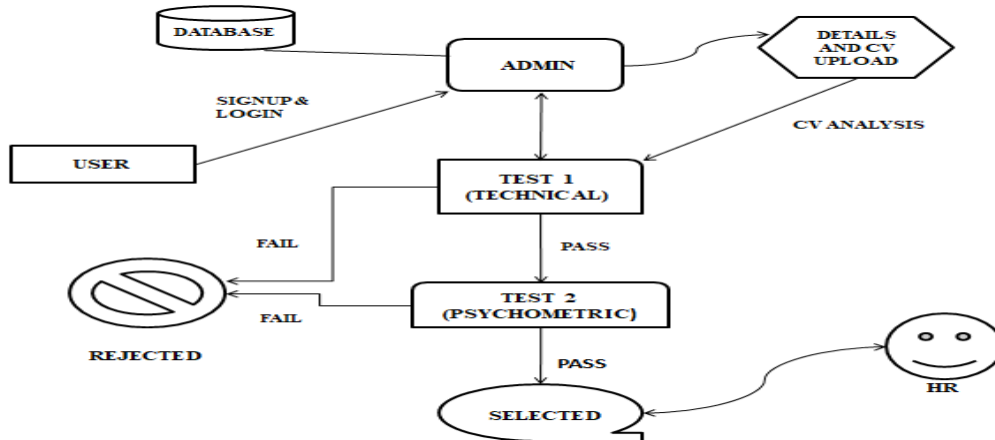


Fig. 2. Functional Architecture of the System

4.1 CV Up loader Module

The up loader involves the same procedure like the analyzer Module but the basic pattern and working procedure gets differed. Here the candidate creates the account or login into the website. Fig 3 depicts the scenario .Then the candidate enters the details and uploading the CV which it analysis the CV and gives the test according to their CV.

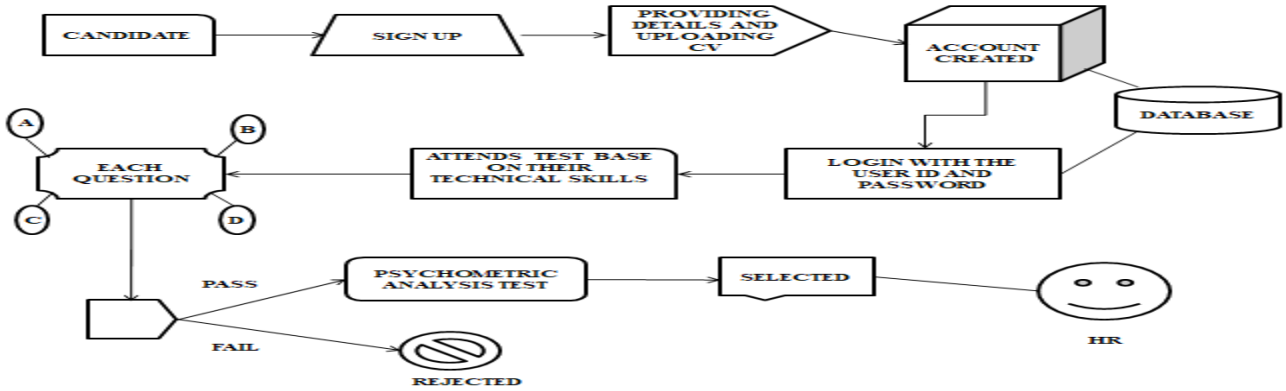


Fig 3. CV Uploader Module

When the candidate fails at the Technical test, he/she gets rejected and when he passes the technical test he moves to the Psychometric Test where the question like time duration is being managed. Finally if he passes the test he gets selected for the required position and when he fails he gets rejected.

4.2 CV Analyzer Module

Fig 4 depicts the analyzer module which deals with the sign up and login page for the candidate. If a new user enters the website, he should create the account and then login into the page. Now the candidate must enter the name, email id, phone number and he/she should upload the updated CV. Then the analysis is preceded by the Third Module (CV Analysis) and then the Admin manages the two tests (Technical and Psychometric) according to their CV. Finally the results and the individual details is stored in the database. Results will be notified by the pop-up message. When he gets failed, he/she will be rejected but they will be recommended according to their scores.

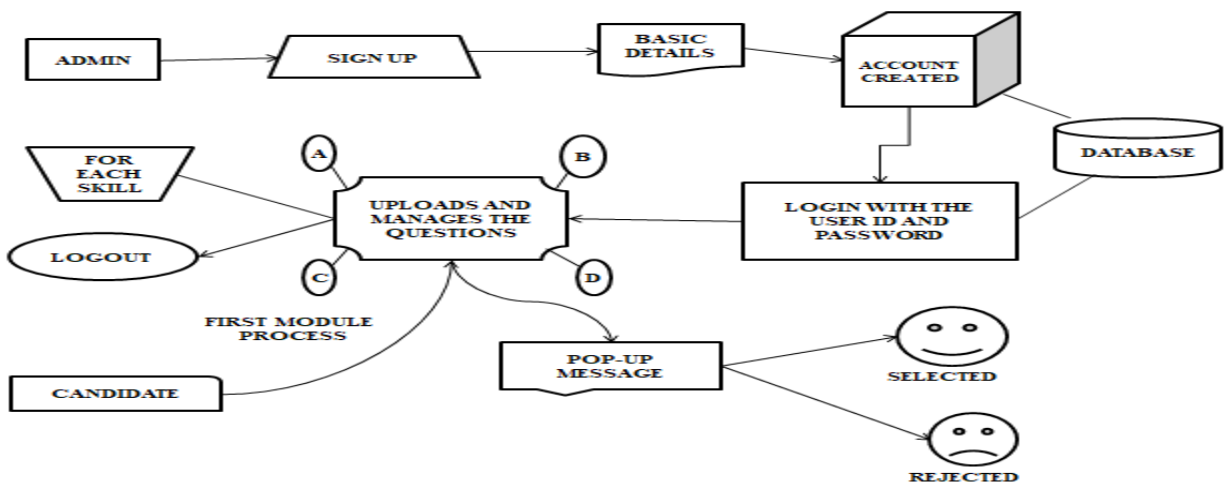


Fig 4. CV Analyzer Module

4.3 Technical Analysis Module

This is the important module which it manages and holds the Above two modules which is depicted by Fig 5 Here the CV analysis involves the Keyword Extraction and the TF-IDF algorithm explaining that when a person's CV has the majority of the main keywords and text(eg:Python), the perso will get the particular keyword related Technical at the basic to the advanced level.

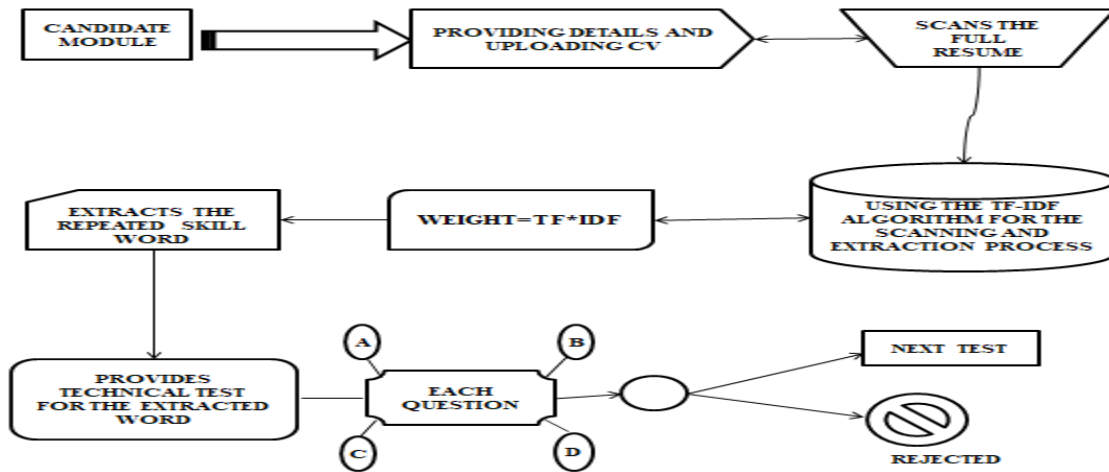


Fig 5. Technical Analysis Module

Similarly when the repetition is not involved, the general test is being generated for the candidate. If the candidate passed in the technical test he will be directed to the psychometric test otherwise he/she will be notified as rejected.

4.4 Psychometric Analysis Module

The Psychometric test is being generated when the candidate gets passed in the technical test. Here for the Psychometric analysis the BIG FIVE Model and the OCEAN analysis is being involved. For the both tests we generated a time duration according to their question for the limited duration(3sec,5sec). Finally when the candidate clears the both tests he/she gets selected and the candidate gets notified by the pop-up message as well as the email message as depicted by Fig 6.

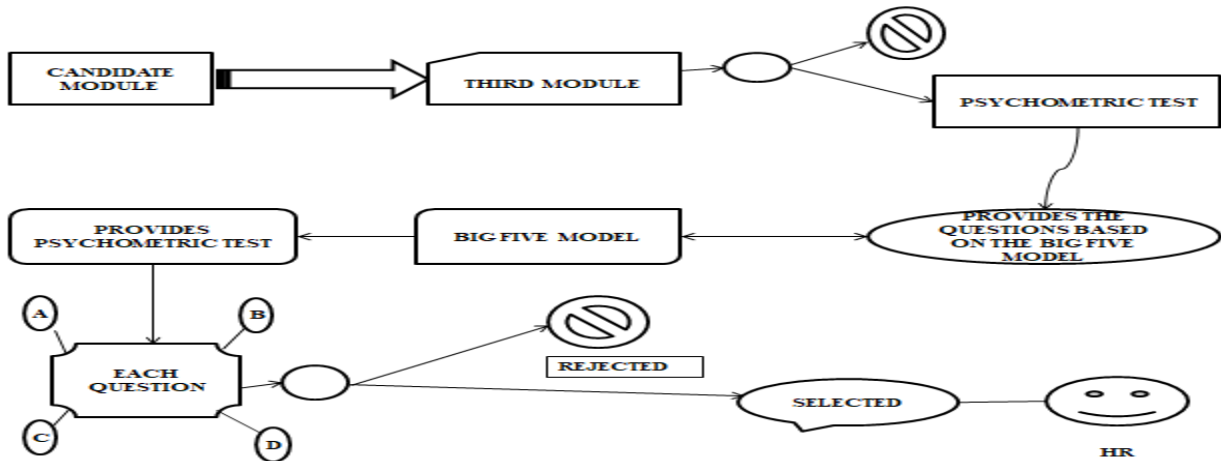


Fig 6. Psychometric Analysis Module

5. Statistical Analysis

From the above module and processes we can conclude and extract the required candidate for an organization from the above extracted data. It has been shown that each individual candidate's results are displayed for the analyzer purposes like in Fig 7 and Fig 8. Also every data which is being extracted can also be used for the other purposes like the recommending upon their final data and training wise performances. 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 as per the form where they can enter resume information. After this the candidate can attempt test provided as option in the left panel. The score will be displayed at the end of the test. They can give multiple tests so as to improve their scores. This test score data is given as an input to TF-IDF algorithm for further analysis. Each test results lead to the next step of procedure so that candidate must be prepared technically as well as mentally which their main prediction analysis is involved in the Psychometric Analysis procedure (Fig 6).

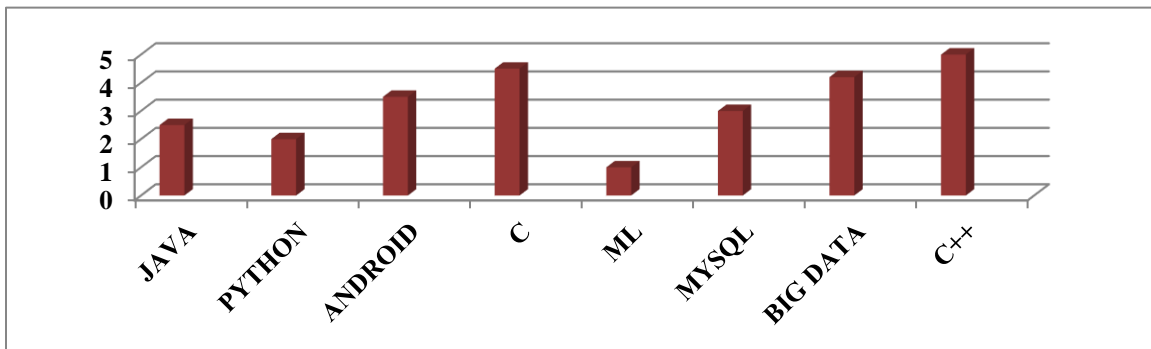


Fig 7. Output of the Technical Test

Also we had taken the sample output for the random candidates who have different kind of mental approach with the society so that each of them answers their respective options. According to their

answers we showcased the results in Fig 8 which every one of them has their own results. Finally the required candidate for an organization is being selected. Also this approach can be used with the other processes like sentiment analysis. 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. Further, the efficiency and performance of the application can be tested and analyzed.

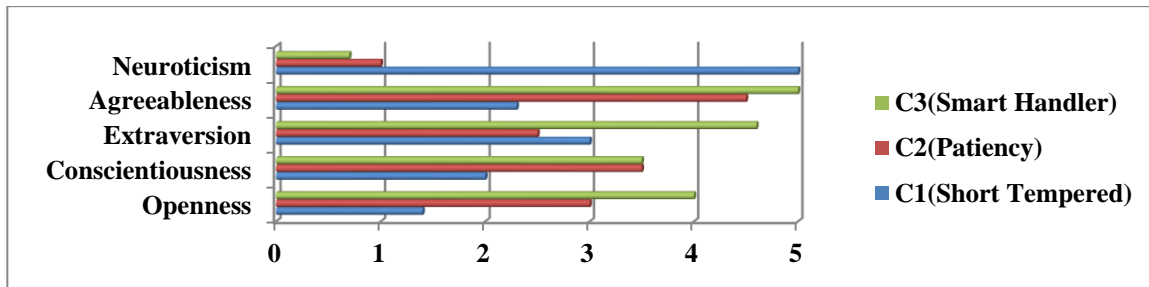


Fig 8. Output of the Psychometric Test

6. Conclusion and Future Work

Throughout this analysis on the above papers we can conclude that each of the system has its own advantages, strategies as well as algorithms that are represented with the Machine Learning and Data Mining. From the above 8 papers every system and their process are deals with the keyword extractions, Big Five Models Comparison, Resume Evaluation, Automated Personality Prediction and the Text Semantics. Also Deep Learning is being partially deals in it. Further for the Future Works we can integrate it and modify the existing system to perform sentiment analysis in the Social Media.

References

- [1] ShiqiangGuo,FolamiAlamudun,TracyHammond,2016, ResuMatcher: A personalized resume-job matching system, Expert Systems with Applications, Volume 60, 30 October 2016.
- [2] JoannaSosnowska, PeterKuppens, FilipDeFruyt, JoeriHofmans,2019, A dynamic systems approach to personality: The Personality Dynamics (PersDyn) model, Personality and Individual Differences, Volume 144, 1 July 2019.
- [3] JeromyAnglim,VictorSojo, Linda J.Ashford, AlexanderNewman, AndrewMarty, 2019, Predicting employee attitudes to workplace diversity from personality, values, and cognitive ability, Journal of Research in Personality, Volume 83, December 2019.
- [4] Xiangguo Sun,Bo Liu, Jiuxin Cao,Junzhou Luo, "Personality Detection based on Deep Learning for Texts",May 2018.
- [5] Oya Celikutan and Hatice Gunes, "Automatic Prediction of Impressions in Time and across Varying Context in Personality,Attractiveness and Likeability", March 2017.
- [6] Rucha Hemant Rangnekar,Khyati Pradeep Suartwala,Sanjana Krishna,Sudhir Dhage, " Career Prediction Model using Data Mining and Linear Classification", 2018.
- [7] Manasi Ombhase,Prajakta Gogate,Tejas Patil,Karan Nair," Automated Personality Classification using Data Mining Techniques",April 2017.
- [8] 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",2017.
- [9] Shahzad Qaiser,Ramsha Ali," Text Mining: Use of TF-IDF to Examine the Relevance of Words to Documents",July 2018.
- [10]Jian Zhan,,Zhiqiang Wei,"Statistical analysis with Visual features and Personality",2017.
- [11] Md.Abdur Rahman,Asif Al Faisal,Tayeba Khanam,Mahfida Amjad,Md Saeed Siddik,"personality Detection :Use of convolutional Neural Network",2019.

[12] A.T. Rupasinghe¹ , N.L. Gunawardena² , S. Shujan³ , D.A.S. Atukorale⁴ “Scaling Personality traits for online job recruitment process”,2016.

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