

PERSONALITY PREDICTION SYSTEM

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Abstract

The job characteristics model based on the concept of modern job design supports Human Resource management, thereby providing more job opportunities. Firstly, a plan is developed by the system to incorporate the job characteristics model into E-HR system to develop a new model of efficient operation on Human Resource management. The current proposed paper exhibits a set of techniques which makes the whole recruitment process more effectively and systematic. Our implemented system operates in such a way that the candidates are ranked based on the weight-age policy and other important personality questions are also included. At the present, organizations are inquisitive to better understand the personality traits of the applicant and be able to ascertain the applicant's response in some crucial circumstances. Therefore, the system will conduct a personality prediction test to determine the personality traits of the applicant. Furthermore, a video resume will be required to upload by all the applicants to examine their communication skills through which relevant job skills can be analyzed. The video resume will be used in the process of background verification, where the documents can be cross-examined. Finally, the results of the applicants are presented in the ranking order to the relevant recruiter.

Key words: E-HR system, Job Characteristics Model, Personality Traits

Introduction

Personality is a combination of an individual's behavior and distinctive characteristics that how an individual reacts under certain circumstances. In the past, an individual's personality is predicted through analyzing his behavior which is rather time-consuming. The results obtained through the manual methods are less accurate despite utilizing more resources. The rapidly growing technology and improved communication skills has led to advancements in Human Resource services. Technology advancements such as mobile internet and big data, mobile terminal users can leverage the pervasive wireless devices to collect and send data from all walks of life more efficiently than the centralized organizations which benefits the management of the small cities. At the moment, the personality traits of the person can be predicted by using sophisticated techniques. It requires fewer resources, less time and the results obtained are more precise and accurate. Hence, in this case we are using personality prediction in the recruitment process. E-HR will lay emphasis on delivering the HR services by using web-based technology. This embraces the processed of e-recruitment and e-learning. Nowadays, HR professionals have mastered traditional HR skills as well as technological skills thus making the recruitment process with at most precision and effective. E-HR process further forays into e-recruitment which can manage job description, shortlisting applicants and enabling the electronic handling of organizational needs. This web application is programmed to provide flexibility to the fresher's whereby, functionalities of the job application are provided at ease. Since, applicants are shortlisted in ranking order, it saves time and effort for the recruiters. Thereby making the recruitment process a lot easier. In the end, a report containing feedback will be issued to all the applicants thus, providing scope for their improvement.

- Increases ability to compete for global talent.
- Allow HR to evolve so that it can assume a more strategic position in the organization.
- Have real-time data that help decision makers identify patterns and better organize their employees.

- Improving the procurement method in a straightforward manner.
- Providing excellent support at a rapid pace.

1.1 Objective

- The system would reduce the HR department's workload.
- The system would assist the HR department with finding the best choice for the position.

1.2 Scope

- Selecting eligible applicants from a large pool of video resumes is a difficult challenge.
- The filtering mechanism will be simplified, and the algorithm will determine a score.
- This method may be used to shortlist specialist applicants in a variety of industries.

Literature Survey

Faliagka et al. 2012. Proposed an E-Recruitment system for automatic personality mining and candidate ranking. The details of the candidate will be extracted from the LinkedIn. The candidate's personality traits will be determined based on their social presence by using linguistic analysis. Furthermore, the candidate's rank can be obtained from the individual selection criteria by using Analytical Hierarchy process whilst their weight being controlled by the admin. [1]

Liden et al. 2010 published The General Factor of Personality (GFP): The Interrelations among the Big Five Personality factors such as Openness, Agreeableness, Extraversion, Conscientiousness, and Emotional Stability serve as building blocks of the individual's personality. The big 5 personality traits were analyzed in this paper to test for the GFP. The meta-analysis exhibits evidence for a GFP at the top most hierarchical level and that the GFP had a substantive component as it is related to supervisor-rated job performance were concluded by this paper. [2]

An Automatic Personality Classification System which is proposed by Sanjay Kumar leverages the Data Mining techniques to further classify human behavior of the candidates. Additionally, algorithms such as advanced data mining, Naïve Bayes Theorem are used by the system. Personality based on the user-history and traits patterns can be identified by this model. [3]

The main objective of the current paper is to reduce the time and workload of the HR department. This can be achieved by developing the system embedded with AI algorithms like Random forest algorithm, SVM, Weighted majority voting algorithm. Finally, an online aptitude test will be conducted by the system to rank the candidate with the aid of the test results and CV. [4]

The authors of the current paper laid emphasis on Personality Computing which can be used to analyze personality from the data gathered from the social media. Individual's online presence on social media can help to predict their personality traits. [5].

Furthermore, this paper focuses on the analysis of the CV in which, they exhibit a system for structuring and analyzing CV's which are French language. Their aim is to normalize the CV content based on the structure adopted by Europass CV, which is governed by HR-XML standard. [6].

Vishnu M Menon has published Estimating Emotional Intelligence through social media thesis which posits Evaluating and Ranking candidates in a Recruitment process. Emotional aptitude can be estimated by the system by analyzing the tweets whilst professional eligibility is verified through the online resume entries. Big five personality Model (also known as five Factor model) is used to estimate the personality characteristics of the users and gauge their emotional quotient. The personality predictor is modelled by Machine learning techniques such as supervised classification. [7]

Sophisticating the methodology of the recruitment process, categorizing job posting, analyzing through E-Gen will exhibit a strategy to evaluate relevant ranking of the candidate. Additionally, E-Gen will use SVM algorithm to generate precise and accurate results. [8]

Adequate keywords are provided by the system by which, specific documents can be arranged and identified. For instance, a blogger who runs a blog feed with many contributors. The blogger hires an internee whose role is to add novel blog posts on daily basis. It has been perceived that continually, internees lack care in assessing tags due to which many blog posts are not arranged accurately. In this case, application of TF-IDF algorithm can enable the automation process to identify tags for the bloggers. Ultimately, a lot of time can be saved by the bloggers. [9]

Use of Data Mining techniques to estimate the personality of players in Educational field, published by Fazel Keshtkar provides a robust approach to data mining techniques and natural language processing for automatic estimation of student's personality and behavior in the field of education (Land Science). In which, students are supposed to act as interns in an urban planning firm, participate in group discussions thus enabling students to unleash and present their ideas. But, for this framework to be applied, the input extracts must be classified into one of the possible six personality classes. This can be achieved by applying machine learning algorithms like Decision tree and Naive Bayes Support vector Machine (SVM) into personality classification. [10].

Existing System

The existing system is a complex contrivance process which includes University career employment services, job fairs, advertising in the newspapers, employee referrals, televisions etc. The existing system is thereby tagged as 'simple' as it scans the submitted CV's and shortlisting the applicants based on the scores obtained in the aptitude test which is conducted by the online system. Additionally, in order to predict the personality of the applicant, the system conducts a personality test and shortlisting the applicants manually which requires plenty of time and resources.

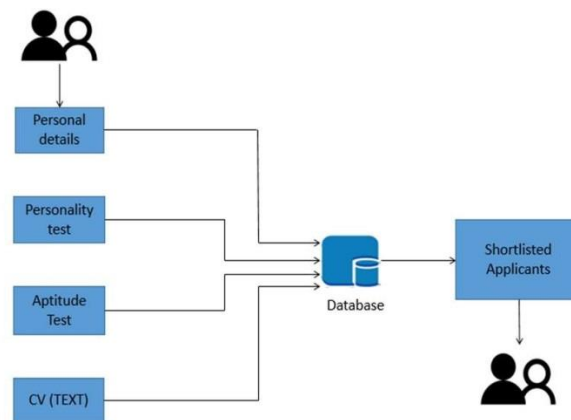


Fig 1: Existing System Block diagram

Disadvantages in Existing Solution

There are many disadvantages associated with the processing of the data. Firstly, it's lengthy and time consuming. It hinders to provide quick operation and proven to be expensive. Additionally, this system only accepts text based CV, test scores based on the aptitude test to shortlist applicants. This system also lacks algorithm in shortlisting process of the applicants. Hence, there is a need for us to find solution in order to automate the system which on the contrary is less time consuming and cost effective.

Proposed System

Given the advent of technology and internet, there is considerable growth in the e-recruitment process. This e-recruitment process revolutionized methods to hire right candidates who are in search of jobs. The proposed system will aid us in reducing the screening time and HR department's work. The proposed system not just

focuses on candidates' qualification and experience but also several important attributes required for the particular Job position.

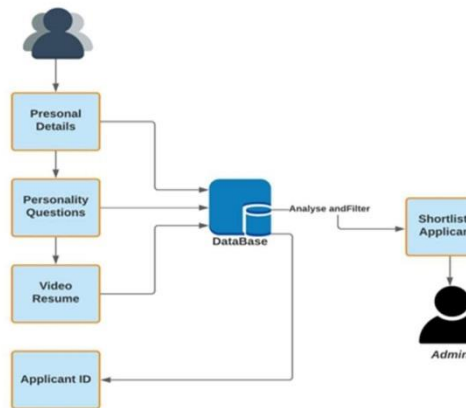


Fig 2: Proposed system block diagram

The proposed system will filter the applicants based on their responses to personality questions. This will help to predict the person's personality based on the job skill which is needed for the organization. Later, the system will display ranking positions which are highly consistent with the human experts. Hence, the recruitment process will speed up at every stage, starting from job posting, receiving applications to interviewing candidates in the end.

Support Vector Machine

SVM can be classified as a kind of supervised learning algorithm. SVM can analyze data and observe patterns for classification. SVM is drawn on linear division. The algorithm is used from low dimensional space point to high dimension space. Regression problems can be solved through this linear model. The notion of SVM is simple. Firstly, a hyperplane is created by the algorithm which can categorize data into classes. Later, the algorithm can search for closest points which are also called as support vectors. SVM is underpinned on a discriminant function (i.e., $y=w.x+b$ where w is the weights and bias parameter b are estimated from the training data)

SVM works as

- Get question and answers and also create vectors.
- Calculates weighted value of vectors.
- Get higher value vectors and find the value of the personality.
- Predicts personality factor.

Naïve Bayes Algorithm

Naive Bayes algorithm is one of distinctive probabilistic algorithm, learning classifier used to make predictions in real time. These classifiers are used primarily in multi class problems and independence rule. Naive Bayes algorithm has a higher success rate when compared to other algorithms. This algorithm model is based on the posterior probability from the class conditional densities. Hence the result is the probability of a class.

Big Five Personality Traits

The Big Five Personality traits represents the five continuums of personality which are used to estimate the personality of a person. It is one of the widely researched model to describe the personality traits of the individuals. Anecdotal evidence suggests that, these 5 core dimensions of personality are found in variety of people based on their age, gender and cultures. This model helps to predict the traits of a person more accurately to a large extent.

The Big Factors are:

Extraversion – Extraversion is characterized by the individual’s ability to socialize, assertiveness and excitability. Traits include more energetic, talkative, able to express emotions and confident. Contrary to extraversion is introverts who tend to have less energy, less sociability.

Conscientiousness – This characteristic features people who are thoughtful, more goal-oriented in their motives, ability to control impulsiveness and are ambitious in their academic efforts and at work. They are more confident, think ahead and be mindful for their presence.

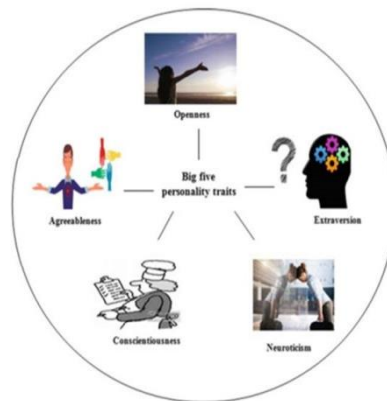


Fig 3: Big Five Personality Traits

Openness to Experience – This characteristic features individuals who are receptive to new ideas and experiences. Individuals who have this trait have ability to imagine and have variety of interest. A person with a high level of openness to experience will be open to new experiences and venturing new things.

Agreeableness – This personality dimension reflects the individual’s nature to develop attributes such as trust, kindness, affection and altruism. Individuals who are high in this trait are more empathetic, caters to other individual problems, trustworthy, and more modest.

Neuroticism - This personality dimension characterizes an individual’s sadness, emotional instability and moodiness. Individuals fall under high neuroticism are prone high stress, worries about problems and suffers from anxiety. Contrary, individuals with low neuroticism can deal with stress and are less anxious.

Working of the System

Applicants will fill out the required information, answer personality and skill-based questions, and then complete the registration by uploading a video resume (5MB).

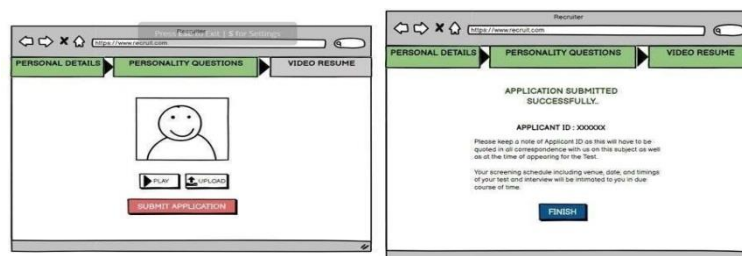


Fig 4: User Interface - 1

The Applicant will obtain an Applicant ID after completing the application process, which will be used to connect with the Applicant in the future.

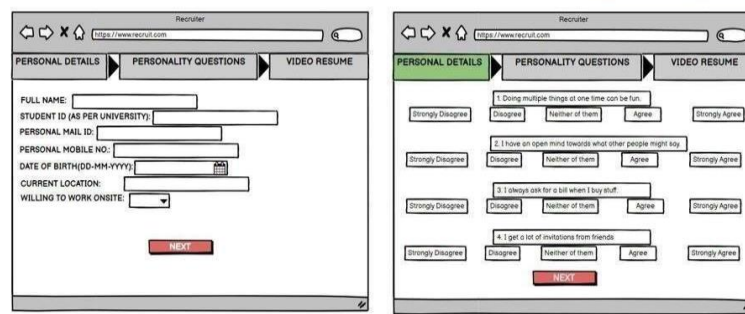


Fig 5: User Interface - 2

The system will use the specifics and answers to predict the Applicant's personality and evaluate the Applicant's abilities, which will be used by the system to further shortlist the candidate using a ranking-based decision model.

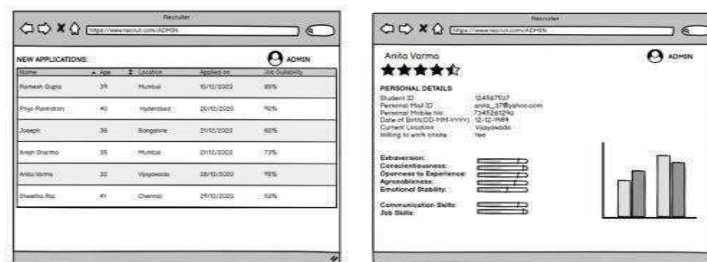


Fig 6: Admin Interface

The algorithm will rate the candidates based on the results of personality characteristics to determine who was qualifying for the next stage of the recruiting process.

Architecture of the system

In a single database, the Personality Prediction system stores all of the candidates' records. The Admin's page and the Applicant's page are the two main modules of the framework.

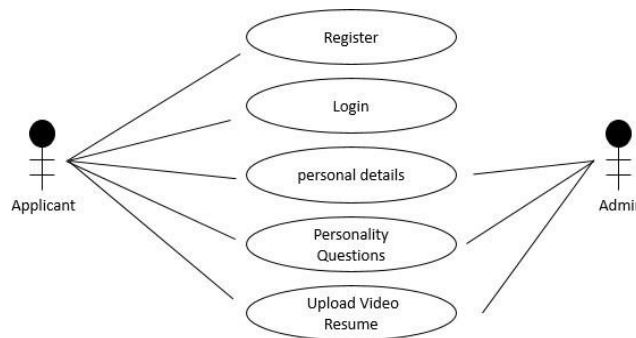


Fig 7: Use Case Diagram

Admin's Page

Login – To set different device parameters and access sub-modules, the Admin must login with their credentials.

Personality Questions – The admin will apply personality questions to this sub-module in order to predict the Applicant's personality. Extraversion, Agreeableness, conscientiousness, Openness to Experience, and Emotional Maturity are the Big Five Personality Traits that will be reflected in its production.

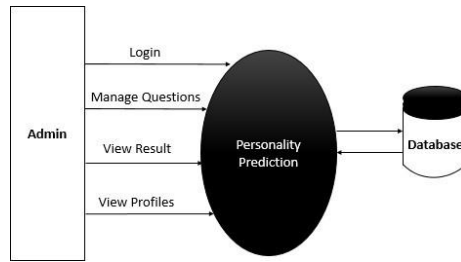


Fig 8: Applicant’s Dataflow Diagram

Skills Assessment - Admin may apply questions to the skills assessment to predict the Applicant's ability on the relevant work specification.

Shortlisted Resumes – A list of Applicants is presented in a decision-making order depending on their rating.

Applicant’s Page

Registration – For the purposes of the corporation, the applicant must fill out all of his or her personal information.

Personality Questions – The Applicant must answer all of the questions in order for the algorithm to predict the Applicant's personality.

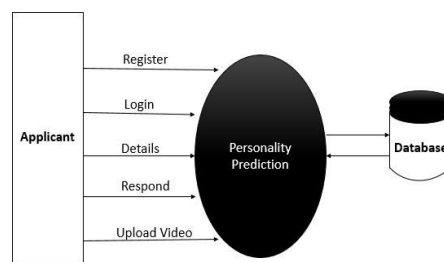


Fig 9: Admin’s Dataflow Diagram

Video Resume – To complete the registration, the applicant must submit a video resume.

Applicant ID – The applicant will be given an Applicant ID, which will be included in the next step of the recruitment process.

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