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Personality Prediction

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Abstract: ***In Personality Prediction, we look at to which degree social measures can be used to predict personality. Personality is one the factor that directs individual's inclination to trust and their associations with others. It includes all the attributes and qualities that set you apart from every other person. Here the personality of an individual is predicted by five personality key components they are Openness, Conscientiousness, Extraversion, Agreeableness, Natural Reactions. It's a test that can be used to measure individual's most significant personality attributes, and help him to comprehend which roles suit him best. In recruitment process this model help you to recognize individuals whose personalities best match the roles that you are recruiting for and who will be more likely to succeed in your organization. The main aim is to predict personality of a person by using different classification algorithms. The algorithms used for this purpose are Random Forest, Decision Tree, and K-Nearest Neighbor. Accuracy score is used to compare this classification algorithm.***
Keywords: Personality, Openness, Conscientiousness, Extraversion, Agreeableness, Natural Reactions, OCEAN.

I. INTRODUCTION

The term "personality" is derived from the word persona. Personality is something that empowers an individual to stand apart as particular from others. What does it mean when someone say you have a nice or bad personality? Personality is a reflection of what you do. Basically, your personality characterizes what your identity is. Your behavior reflects your personality and determines how different you are from others. In personality psychology, it is said that "Few things change, few things stay the same". People differ in many aspects, some are significant, some are trivial. Personality traits are more important characteristics in explaining human behavior in the world of work. Have you at any point asked why various individuals respond contrastingly to a similar circumstance? These are explained by the personality model which has had great popularity in the last decades or so known as Five Factor Model of Personality or the OCEAN Model. According to the OCEAN Model, there are only five main components of personality. They are Openness, Consciousness, Extraversion, Agreeableness and Neuroticism. Market research agencies and marketers often use the OCEAN model to understand the consumer and to segment customers into personality types. Human resources professionals often use this to recruit employees for their company. The five traits are often referred to as OCEAN. They are

A. Openness

Openness concerns with the people who are willing to do new things and they can also have the ability to think out of the box. They are well known for their "Creative mind", this estimates your degree of innovativeness , and your longing for information and new encounters.

B. Conscientiousness

This explains about the care that a person take to deal various situations in his life and in work. If a person score high in conscientiousness, they are more likely to be organized and thorough, and they know how to make plans and follow them. If he/she score low in Conscientiousness, they are more disorganized.

C. Extraversion/Introversion

This describes whether the person is outgoing or quiet. Extroverts people are bound to connect with others, while introvert people get drained from cooperating with others and they get their vitality with isolation.

D. Agreeableness

Agreeableness is explained in such a way that how a person keeps others needs ahead of their own. They used to co-operate more with others than compete.

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E. Natural Reactions

Also called as "Emotional Stability" or "Neuroticism", this measures emotional stability of a person based on the situations.

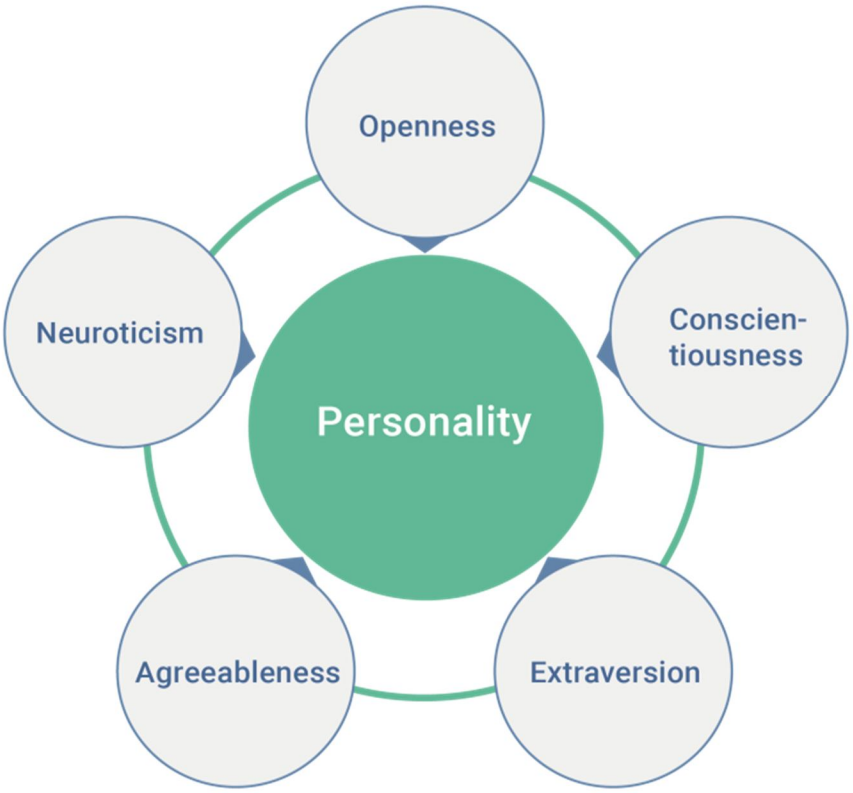


Fig. 1 Personality is related to big five traits

II. LITERATURE REVIEW

From most of the previous researches and works, there is a solid connection among personality and performance. There are various examinations which endeavor to correct the connection between personality properties and different performance parameters. The accompanying writing survey endeavors to grasp these connections between personality characteristics and performance parameters like occupation performance, profitability, work fulfillment, etc.

A. The Five Personality Traits

The Five personality attributes are autonomous personality qualities which decide five personality types including Conscientiousness, Extraversion, Neuroticism, Agreeableness and Openness to encounter. Many researches have been done in recent decade on the person personality qualities which will prompt particular sort of mentalities and business related conduct.

Openness to encounter incorporate attributes like inventive, refined, inquisitive, unique, expansive disapproved (Barrick and Mount, 1991). Openness has to do with inquisitive, innovative, imaginative, perplexing, refined, advanced (Colquitt, 2009).

Conscientiousness personality joins characteristics, for instance, devoted, wary, cautious, careful, created, forging ahead (Barrick and Mount, 1991).

Extraversion incorporates characteristics, for example, amiable, garrulous, gregarious, emphatic, dynamic, expressive. They have a powerful urge for acclaim, social acknowledgment, status and force. Extraversion is related with descriptive word attributes, for example, loquacious, amiable, energetic, strong, and prevailing (Colquitt, 2009).

Agreeableness incorporate characteristics, for example, gracious, adaptable, trusting, pleasant, helpful, excusing, kindhearted, and lenient (Barrick and Mount, 1991). Agreeableness has descriptive words for example, kind, agreeable, thoughtful, supportive, gracious, and warm (Colquitt, 2009).

Neuroticism incorporates attributes like restless, discouraged, furious, humiliated, enthusiastic, stressed, shaky (Barrick and Mount, 1991). Neuroticism is a personality type which is constrained in social aptitudes and evades circumstances that request taking control. Neuroticism has to do with anxious, irritable, passionate, uncertain, and temperamental character (Colquitt, 2009).

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B. Personality Traits and on Job Performance

Analysts have inspected the association among personality and on job performance, (Barrick and Mount (1991). This composing shows an anticipated strong productive result of conscientiousness and passionate quality on job performance, while the effects of other personality characteristics are related with explicit occupations (extraversion decidedly influences occupations including social associations) or explicit job angles (openness to experience is related to planning capability). Among the five traits, conscientiousness is identified with job performance. After the research ,the analysts excitement for utilizing personality measures to predict performance at work and have vivified inquire about that clarifies why an unequivocal individual stands apart recognize from job performance.

C. Personality Traits and Readiness to Contend

Muller and Schwieren with the assistance of trials came to know the connection between the Five personality characteristics and section into rivalry. By this they found that neuroticism identifies with low performance in rivalry and low eagerness to contend.

D. Personality Traits and Worker Turnover

Verifiably, scientists have tried to distinguish natural reasons for employee turnover. This paradigm has prompted to the contrasts similar to a significant reason for people's turnover choices.The outcome of the meta-investigation show that personality qualities do influence individuals turnover points and practices. The quality of Emotional Stability best anticipated (adversely representatives goals to stop) though the trait of Conscientiousness and Agreeableness best anticipated (contrarily) real turnover decisions.

III.AN OVERVIEW OF PROPOSED SYSTEM

Before recruiting an employee for any company there should be one test to predict the personality of a person but many organisations doesn't have that phase in their recruitment process. It is very important phase to determine the personality of a person and while recruiting for a job in any organisation if one's personality doesn't fit the role then everyone loses and then there will be low productivity, and loss of investment in training if the person chooses to leave the job. So, by using this personality prediction it helps the recruiters to find people who have the personality, as well as the skills, to fit the roles that they are hiring for their company. Here, the personality of a person is predicted in the form of test as a part of recruitment process. The data set for this personality prediction is collected from Kaggle.

It contains attributes such as Gender, Age, Openness, Neuroticism, Conscientiousness, Agreeableness, Extraversion which are Personality traits that contains some score between (1-8). By using these attributes we will predict the personality of the person whether he is extraverted, serious, dependable, lively, responsible person. The test score is used determine whether you're in correct role. If you score high in extraversion and natural reactions, then the person would feel like his in home when he is in crowd also they would more easily stressed and nervous.

If your present job includes a great deal of pressure for example, in the event that you need to meet targets or tight cutoff times or on the off chance that you are detached in a desk area for the greater part of the day, you'll likely look for some kind of employment hard.

This could be that your personality sometimes doesn't suit for the sort of employment you have. So, if it is the case you can utilize your test results to distinguish a new role or profession that would accommodate your extrovert personality. On the other hand, you could search out new an alternate job inside your organization that fit your personality better. The classification algorithms may reduce burden on recruiters in order to recruit for their company.

IV.METHODOLOGY

In this model, we use Classification Algorithms like Decision Tree, Random forest, K-Nearest Neighbor. Classification can be done on both structured and unstructured data. Classification is a process in which data is categorized based on given number of classes. In classification, it's main purpose is to identify the class to which new data comes. In classification we come across some important terminologies like Binary Classification, Multi Class Classification and Multi Label Classification.

In Binary Classification there is only two possible outcomes. For instance, Gender can be either Male or Female where as in Multi Class Classification there are more than two classes.

In Multi Class Classification each sample is given to only one target label. For instance, an animal can be cat or dog but not both at the same time. In Multi Label Classification where each sample is mapped to a set of target labels. For instance, A news story can be about games, an individual, and area simultaneously.

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These are the following steps required to build a classification model:

1) Initialize the classifier that we are using.
2) Then train the classifier.
3) Predict the target: For an unlabeled observation X, then the predict (X) which gives predicted label y.
4) Evaluate the model.

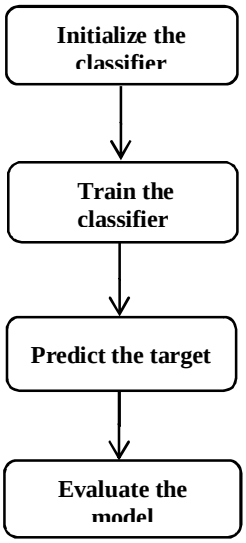


Fig. 2 Architecture of the model

Personality prediction comes under multi-classification model and the data is collected from Kaggle website. The data set has seven attributes which predict the personality of the person. The attributes description is given below. Based on data types the attributes are given. The data set is built on both numerical and nominal data types. In our project dataset contains attributes such as Gender, Age, Openness, Neuroticism, Conscientiousness, Agreeableness, Extraversion which are Personality traits. The table provide details about the attribute and attribute type. As clearly visible from the table, all the features except gender are real valued integers. The feature gender is converted to numeric value (0 and 1) in the data pre-processing step. The age of the person is between 17-28. There will be some score given to Openness, Neuroticism, Conscientiousness, Agreeableness, Extraversion between 1-8. This dataset can be used in several ways if this is used for recruitment purpose then the organisation should fix some standards of scores that they are expecting from the employees they are recruiting for various posts and if the person meets that standards based on the performance in personality test then they can recruit that particular person by using these attributes that are given below and predict the personality of the person whether he is extraverted, serious, dependable, lively, responsible person.

TABLE I Description About Dataset

S.No	Description of attributes		
	Attributes	Type	Range
1	Gender	nominal	Male/Female
2	Age	numeric	17-28
3	Openness	numeric	1-8
4	Neuroticism	numeric	1-8
5	Conscientiousness	numeric	1-8
6	Agreeableness	numeric	1-8
7	Extraversion	numeric	1-8

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A. Decision Tree

A Decision Tree is a Supervised Machine Learning where the data is continuously split according to a certain parameter. Decision trees characterize the models by arranging them down the tree from the root to some leaf node. Every node in the tree goes about as an experiment for some characteristic, and each edge plunging from the node compares to the potential responses to the experiment. This procedure is recursive in nature and is repeated for each subtree established at the new node.

1) *Working of Decision Tree:* The decision of making key parts intensely influences a tree's exactness. It uses many algorithms to choose to divide a node into at least two sub nodes. The formation of sub nodes expands the homogeneity of resultant sub-nodes. The decision tree parts the nodes on every single accessible variable and afterward chooses the split which brings about most homogeneous sub-nodes. The algorithm selection is based on the type of target variables.
2) *Advantages of Decision Tree*

a) It can deal with both downright and numerical information.
b) Impervious to exceptions, subsequently require little information preprocessing.
c) New highlights can be handily included.

B. Random Forest

Random Forest algorithm is a supervised classification algorithm. We can see it from its name, which is to make a forest by some way and make it random. There is a connection between the trees in the forest and the outcomes it can get. The bigger the quantity of trees, the more precise the outcome. In Random forest making the forest isn't equivalent to developing the choice with information gain.

1) *Working of Random Forest: Random Forest works in two-stage initially is to make the random forest by joining N decision tree, and second is to predict each tree made in the principal stage.*

The Working procedure can be clarified by the following steps:

a) Select some K data points from the training dataset.
b) Form the decision trees related with the chose data points.
c) Pick the number N for decision trees that you need to build.
d) Again repeat 1 and 2.
e) Find the predictions of each decision tree for new data points and assign them to the ones that have more votes.
2) *Advantages of Random Forest*

a) It automatically handles the missing values.
b) It doesn't require feature scaling.
c) It efficiently handles non-linear parameters

C. K-Nearest Neighbor

K-Nearest Neighbor is non-parametric which means there is no suspicion for fundamental data dispersion. In present reality datasets don't follow numerical hypothetical suppositions and this is useful in that scenario. It does not need any training data points to build model. The training data is used while testing. This makes training quicker and testing stage increasingly slow. Expensive testing stage implies time and memory. In worst case, it needs more opportunity to check all data points and filtering all data points will require more memory for keeping training data.

1) *Working of K-Nearest Neighbor*

a) Select the K as number of the neighbors
b) Then calculate the Euclidean distance for K number of neighbors.
c) Take the K nearest neighbors based on the determined Euclidean distance.
d) Check the number of the data points among all these k neighbors.
e) Assign the new data points for which the number of the neighbor is maximum.
2) *Advantages of Random Forest*

a) As it is a lazy algorithm it doesn't require any training period.
b) As training is not require, if new data is added then there will be no impact on the accuracy of the algorithm.
c) It is easy to implement.

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V. RESULTS AND DISCUSSIONS

Our main goal going into this project was to predict the personality of the person using various machine learning techniques. We predicted K-Nearest Neighbor (K-NN), Decision tree and Random Forest. Among those Random forest and Decision tree algorithms are predicted with best results. Out of 710 records in the data set, we predict 151 are extraverted, 161 are serious, 138 are dependable, 134 are lively, 126 are responsible and the rest of 250 patients are healthy. Among all the algorithms the best result we got for Decision tree. So, we choose Decision tree as the best algorithm for Personality prediction.

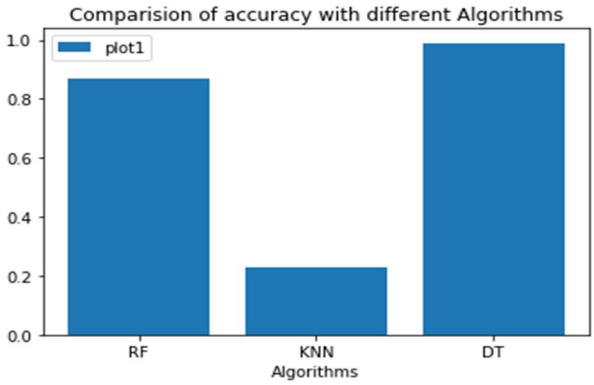


Fig. 3 Accuracy of algorithms

In this experiment, we considered different analysis to examine the three-machine learning classifier for the prediction of personality. In terms of accuracy, K-Nearest Neighbors achieved the accuracy of 22%, Random forest achieved the accuracy of 87% and Decision tree achieved 99%. According to these measurement criteria Decision tree classification techniques is more effective than the other classifiers for predicting personality.

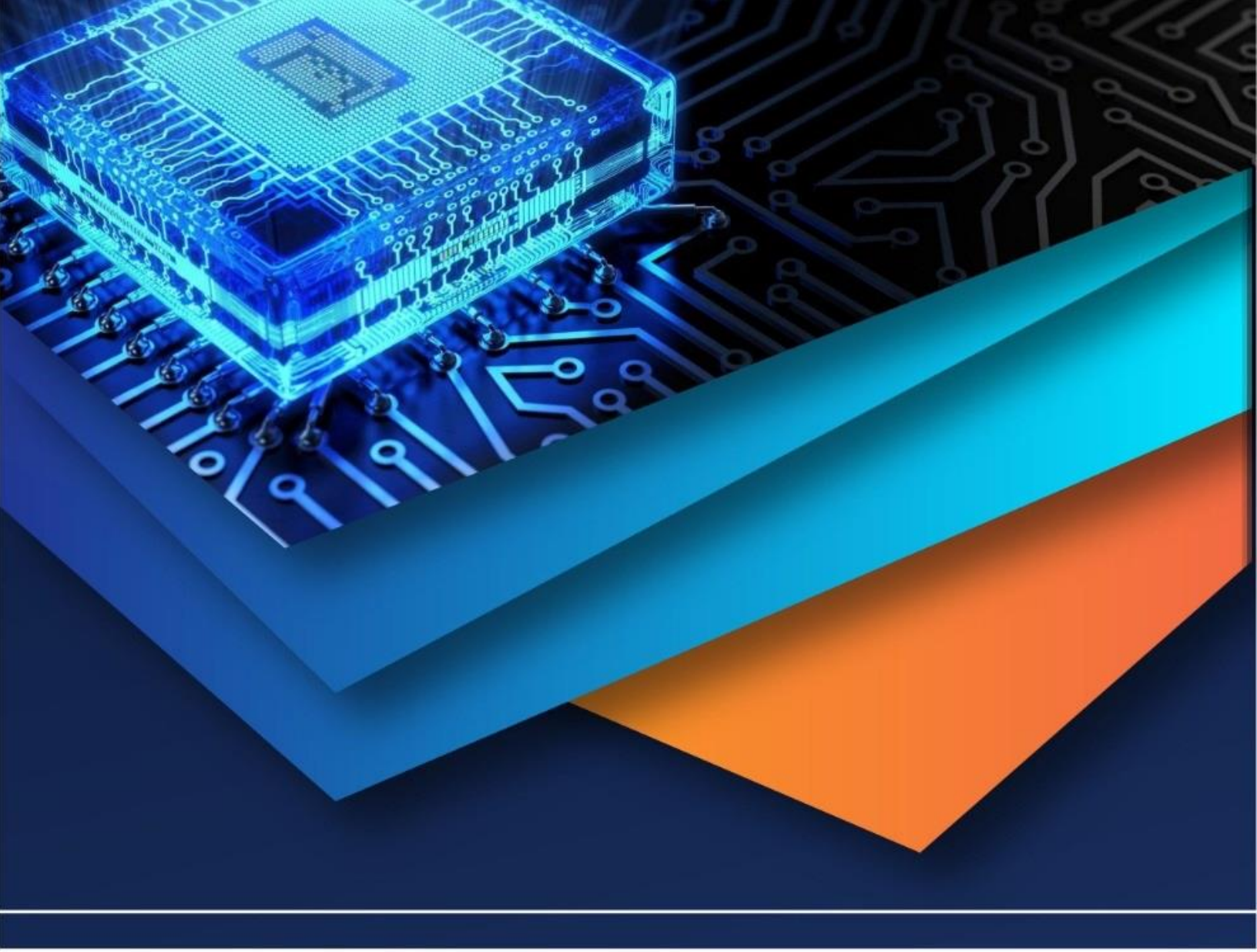
VI. CONCLUSION

The association between job performance and the five traits is increasingly an estimation of the social parts of the work environment than of capacity. The five traits are all the more unequivocally connected with associating with others and the work understanding, which are key parts of long term job achievement. The OCEAN model can be used to predict employee performance. Personality is an most important respect for recruiters who are seeking for quality employees. Personality of a person does contribute to performance but only at some level. Conscientiousness is one of the trait that predicts performance among all the job types. Various combinations of personality traits among the five traits are needed for jobs that have unique demand. Combined use personality and cognitive ability tests for employee selection gives high performance.

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