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AI-POWERED CAREER MASTERY: YOUR SUCCESS JOURNEY UNVEILED

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ABSTRACT

The dynamic character of modern professions is posing new problems for the established paradigms of career counseling in the rapidly changing field of career development. This study conducts a thorough investigation into the revolutionary possibilities of incorporating machine learning (ML) algorithms into the domain of career counseling websites. Our study recognizes the critical need for creative solutions to solve the drawbacks of traditional counseling techniques and places itself at the nexus of technology and professional development. By utilizing data analytics, the integration of ML algorithms seeks to transform the way that career counseling is provided. Simultaneously, focus is made on making sure that the interface is easy to use so that technology may be seamlessly integrated into the individual's study of career paths. We examine numerical data, subjective comments, and user success narratives to determine the effect of our deployed solution. To sum up, this study presents a roadmap for future improvements in addition to providing empirical insights into the integration of ML and career counseling. This will give a glimpse into the transformative possibilities that lie at the intersection of machine learning and personalized guidance.

Keywords: Case Based Learning, k-means algorithm, Naïve Bayes, Logistic Regression, Machine Learning, Career Recommendation

1. INTRODUCTION

In the modern career development landscape, people must navigate a dynamic job market that requires adaptability and well-informed decision-making, which presents a multitude of choices and challenges [1]. Even though they are useful, traditional career counseling techniques frequently fail to offer individualized advice that

is specific to each person's abilities and goals [2]. Seeing this gap, we investigate how to incorporate machine learning (ML) algorithms into career

counseling websites with the goal of transforming the guidance process [3]. Technology's widespread use has changed how people make career decisions, leading to a move away from

traditional counseling models and toward creative, data-driven approaches [4].

This study is based on the idea that using ML algorithms can provide a more detailed understanding of a person's preferences, skills, and market trends, leading to more accurate and pertinent career recommendations. As we embark on this exploration, it is crucial to understand the significance of personalized career guidance in fostering successful and fulfilling professional journeys [5].

Our investigation not only scrutinizes the potential advantages of ML applications but also critically examines the existing limitations and ethical considerations associated with such technological interventions. By amalgamating advancements in machine learning with the nuances of career counseling, our research seeks to contribute to the ongoing discourse on the future of career development in an increasingly complex and interconnected world [6].

Students will first select their areas of interest when they enter our site, and then they will respond to surveys that appear on their screen. For testing reasons, these answers will be kept in the database of our system. To gather information, we included a Personality Test on our Google Form [7]. Machine learning requires both training and testing data for the Big 5 Personality Test. The answers chosen by students will serve as the machine learning training set. This data will then be used to train the model, and user input will be used as test data. The result will be a recommended career path [8].

Depending on the methodology used, these suggestions' accuracy varies.

2. LITERATURE REVIEW

It is frequently noted that when we look at alternative career counseling platforms, they typically ask users to self-identify their attributes rather than independently evaluating them. This is a serious problem because many users could not fully comprehend their own characteristics [9]. To distinguish and identify these features, however, our platform uses behavioral science questions that are supported by a sizable dataset made up of over 10,000 data points [10]. Halee and Tair discussed the importance of data mining to fill up the missing values, the raw data was being preprocessed so that it can be converted into relevant value as attribute/variable [11].

Machine learning algorithms like k-means clustering and decision tree are highlighted by Shovon and Haque for improvement in student's performance in educational environments [12]. This could be a factor for monitoring the progression of their performance. Personal, social, psychological environments are the factors of students' performance in any field, which is needed to be predicted for better analysis, so Bhardwaj and Pal have discussed about the techniques used to discover hidden patterns for better decision-making [13]. Understanding the depth of human values and sociological perspective is very important to analyze the behavioral pattern of an individual which is significantly highlighted by Meglino and Ravlin. This highlights the qualities and skills of an individual shaping their future [14]. Gati and others have highlighted the importance of machine learning models for better understanding of human behavior so that their personalities can be analyzed with better accuracy. It tells about the difficult points and the most suitable options accordingly [15].

3. SYSTEM ARCHITECTURE

A complete platform called "The Prashasth" uses machine learning algorithms to offer personalized job advice based on user interests, talents, and assessments. The architecture is made to provide users with precise and pertinent advice that will help them make better career decisions.

This portal has been designed for taking inputs from the applicant, testing his/her aptitude as well as his/her interests and personality. These inputs are used as the test data for the Machine Learning model which then gives the recommended career as the output. It is also observed that the accuracy predicted of various methods differ from each other. It is predicted that the Random Forest Classifier will be providing highest accuracy and the Naive Bayes Algorithm will be providing least accuracy.

3.1 Case Based Reasoning

The first thing a Case-based Reasoner (CBR) will do is see if there is already a training case much like it. The case's corresponding solution is returned if one is located. When a case that is exactly like the new one cannot be located, the CBR will look for training instances with components that are comparable. These practice examples could be thought of as the

new case's conceptual neighbors. Finding subgraphs within the new case that are similar to existing subgraphs is necessary if cases are represented as graphs. To help with the new instance, the CBR attempts to integrate the solutions from the nearby training examples. Going back to look for alternative solutions can be required if compatibilities with the individual solutions occur.

It outlines the basic steps involved in Case-Based Reasoning system:

- a. Retrieve Similar Cases: Given a query, find cases in the case base that are similar to the query.
- b. Revise Cases: If necessary, adjust the retrieved cases based on the query to better fit the current problem.
- c. Reuse Cases: Utilize the revised cases to make a decision. This could involve selecting the most relevant case or aggregating decisions from similar cases.
- d. Retain Case: Store the newly solved case in the case base for future reference.

3.2 Naïve Bayes

Naïve Bayes method include classification issues. In the categorization of texts, it is often employed. Data in text classification tasks has a high dimension as each word in the data represents a feature. It is applied to rating categorization, sentiment analysis, spam filtering, and other tasks. The quickness of naïve Bayes is an advantage. With a large number of data dimensions, it is quick and simple to make predictions.

This model forecasts the likelihood that an instance with a particular collection of feature values belongs to a class. A probabilistic classifier is what it is. The reason for this is that it makes the assumption that each feature in the model exists independently of every other feature. Stated differently, every characteristic makes a contribution to the predictions without any correlation with one another.

It describes the fundamental procedures for using a Naive Bayes classifier for training and prediction:

- a. Naïve BayesTrain: Determine the class and conditional probabilities for each feature in order to train the Naive Bayes classifier.
- b. Calculate Class Probabilities: Determine the likelihood of every class in the training set.
- c. ComputeConditionalProbabilities: Determineeach feature's conditional probability for each class.
- d. Naïve BayesPredict: Calculate the posterior

probability for each class and choose the class with the highest probability to apply the trained classifier to fresh data.

3.3 Logistic Regression

The statistical method of regression analysis examines the connection between one or more independent variables (predictor variables) and a dependent variable (target variable). Finding the best function that best describes the relationship between these variables is the goal.

Logistic regression is a supervised machine learning algorithm used for classification tasks where the goal is to predict the probability that an instance belongs to a given class or not. Logistic regression is statistical algorithm which analyze the relationship between two data factors. The article explores the fundamentals of logistic regression, it's types and implementations.

It describes the fundamental procedures in logistic regression:

- a. Set Parameters: Set the weights (parameters) to zero or a random number at the beginning.
- b. Gradient Descent: To minimize the cost function, update parameters iteratively using gradient descent.
- c. Calculate Hypothesis: Utilizing the logistic function, calculate the hypothesis (predicted values).
- d. Calculate Cost: Utilizing the logistic regression cost function, compute the cost function.
- e. Compute Gradients: Determine the cost function's gradients in relation to the parameters.
- f. Update Parameters: Apply gradient descent to update the parameters.
- g. Sigmoid Function: Explain the logistic regression sigmoid activation function.

4. Machine Learning (ML) Components

4.1 User Interface (UI) Components:

- a. **DashboardUI:**The dashboarduserinterfaceoffersasimplewaytonavigate and access different functionalities.
- b. **UserRegistration/AuthenticationUI:**Enable suserstoregister,signin,andmanagetheir profiles.
- c. **Profile Management UI:** Users of the

profile management UI can change their personal data, educational background, skills, interests, and professional aspirations.

- d. **Assessment Interfaces:** Enables users to complete personality, interests, and skill assessments.
- e. **Recommendation Displays:** Personalized career recommendations based on assessment findings are displayed in recommendation displays
- f. **ML Model Repository:** Pre-trained models for skill mapping, personality assessment, and recommendation creation are kept in the ML Model Repository.
- g. **Model Training and Deployment:** This process deals with building and deploying machine learning models, possibly with the help of frameworks like TensorFlow or PyTorch.
- h. **Recommendation Algorithm:** Creates career recommendations via collaborative filtering, content-based filtering, or a combination of both.
- i. **Assessment Algorithms:** Classification or regression models are used in assessment algorithms to evaluate test results and link them to appropriate career paths.

Components:

- a. **User Profile Service:** Manages user profiles, which may include personal data, test scores, and job interests.
- b. **Data Storage (Database):** User profiles, test results, and archived data are stored in a database for later study.
- c. **Management of Educational Resources:** This involves overseeing a collection of educational resources, including workshops, courses, and certificates.
- d. **Job Market Data Processing:** Processing of job market data involves using data analytics to show information on current and future labor market trends, including the demand for particular skills and professions.

4.2 Data Management and Processing

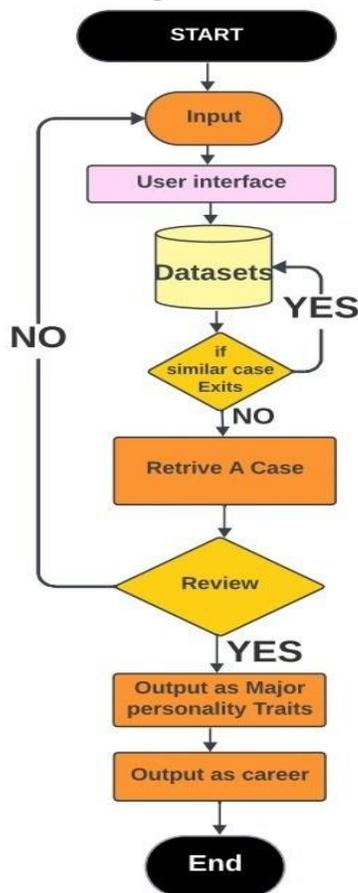


Fig.1 Project Flow

In Fig 1, the flow in which the data is going to be processed is discussed. This shows the start of the

project by logging the user on the portal and then the test is being conducted, followed by the results that the test gives.

5. EXPERIMENTAL RESULTS

5.1 The Home Page

Here, the Home page is basically the landing page of the website, which is built using frontend technologies like HTML, CSS and React with JS. It brings us to the website which proceeds to the Test Page that consists of the actual personality trait assessment. It logs in the user to the website as shown in Fig.2.

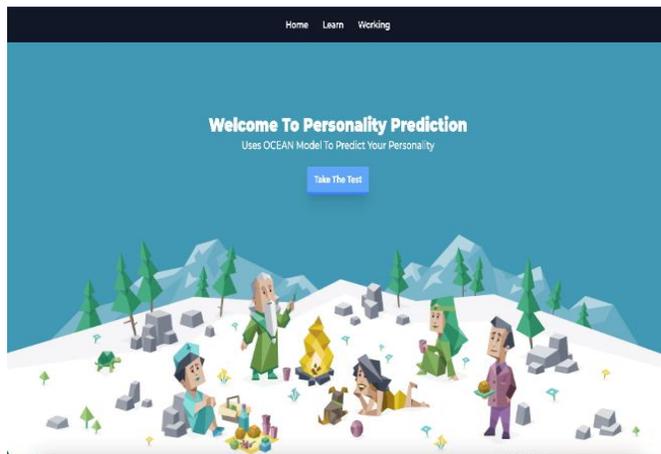


Fig.2 Home Page

Enter Your Details

8 is Highest, 5 is Medium and 1 is Lowest for the fields

FIRST NAME	LAST NAME
<input type="text" value="Atishay"/>	<input type="text" value="Agarwal"/>
GENDER	
<input style="width: 100%;" type="text" value="Male"/>	
OPENNESS OPEN TO TRYING NEW THINGS	NEUROTICISM EMOTIONAL INSTABILITY
<input type="text" value="1-8"/>	<input type="text" value="1-8"/>
CONSCIENTIOUSNESS SELF-DISCIPLINE	AGREEABLENESS CARING ABOUT OTHERS
<input type="text" value="1-8"/>	<input type="text" value="1-8"/>
EXTRAVERSION HOW MUCH SOCIAL YOU ARE	AGE 17 TO 28
<input type="text" value="1-8"/>	<input type="text" value=""/>

5.2 The Test Page

The Test Page consists of the Personality Trait Assessment which is taken to understand about the user's aptitude, behavior, interests, disinterests. It is curated using frontend technologies and Node.js for backend. It consists of some general questions to understand the personality type of the user as shown in Fig.3.

Fig.3 User Details

5.3 Result Page

The Result Page appears after the Personality test has been submitted. It shows the most

appropriate personality type of the user. It is done using Machine Learning algorithms like Naïve Bayes, k-means, and case based reasoning. It analyses the data set provided to train the model to understand the pattern of behavior of the user as shown in Fig.4.

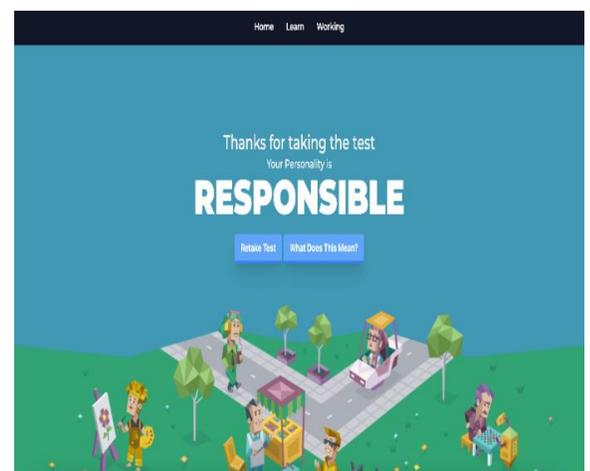


Fig.4 Test Results

5.4 Brief about the result

This page is designed to make the user understand more about the personality type, there test has brought them to. Here, the user can know about the career options, most suited for them. This page, again, is a result of our machine learning model, which works on the data values stored to train it, so that it can analyze and give the most appropriate results as shown in Fig.5.

Reading the Results

If your result is **Extraverted**, it means that you are outgoing and energetic. You enjoy being around people and tend to be the life of the party. You may also be assertive and confident in social situations.

If your result is **Serious**, it means that you take your commitments seriously and are likely to be a hard worker. You are realistically aware of your own capabilities, but are also aware of your own limitations, you are not tempted by vanity or self-importance.

If your result is **Responsible**, it means that you can be counted on to follow through on your commitments and take care of responsibilities. You may also be organized and efficient in your work. Being responsible means being dependable, keeping promises and honoring the commitments. You accept the consequences for what you say and do.

If your result is **Likely**, it means that you are energetic and enthusiastic. You enjoy being active and may be full of ideas and energy. You may also be spontaneous and enjoy trying new things.

If your result is **Dependable**, it means that you are reliable and trustworthy. You can also be counted on to follow through on your commitments and take care of responsibilities. You may also be organized and efficient in your work. A dependable person is someone who gives reliable service and is loyal and stable. The dependable person is someone you can count on in the workplace, at home, or even in the greater management field of governance and politics.

No matter what your result on the Big 5 Personality Prediction Test is, remember that personality is not fixed and can change over time. It's important to embrace your unique traits and use them to your advantage in life and work.

[Take The Test](#)

Fig.5 Result Discussion

5.5 User Related Factors

An overview of students' behavioral characteristics within the framework of their academic environment is provided by the table I. It defines several aspects of student behavior, such as classroom behavior, emotional control, and moral behavior. The table is organized into various categories under the heading "Behavioral Attributes of Students," each of which highlights unique aspects of student conduct that are essential for both academic achievement and personal growth. Openness, neuroticism, conscientiousness, agreeableness, and extraversion are all included in these categories. User needs to rate himself on the scale of 1-8. The behavioral indicators that each subcategory outlines—such as emotional stability, self-control, self-discipline, compassion, and communality—offer insights into the degrees of student engagement, interpersonal skills, self-regulation, and ethical standards. The table provides educators, researchers, and other stakeholders with a thorough framework for comprehending the intricate interactions between behavioral dynamics in educational contexts.

Table 1. User Related Factors

Fields	Values
Name	A-Z
Age	17 – 28
Gender	Male , Female
Openness	1-8
Neuroticism	1-8
Conscientiousness	1-8
Extraversion	1-8

6. CONCLUSION

PrashasthisanonlinePersonalityTraitsAssessmentandCareerRecommendationPortal which will not only help students to identify themselves through the vision of innovation, but will also recommend them the career options which can prove to be the most appropriate and productive ones for them and will fit along with their Aptitude, Emotional Quotient and Personality and Traits alongside their interests.

Prashasth starts with easily accessible and user-friendly interface built using technologies like React.js which has sign-in page where we kindly ask for essential credentials of the user for authentication and data for tailoring correct resources which seems to be realistic to the user. After our Firebase stores the information with utmost security, the user is authenticated and he lands on the main attraction: The Personality Trait Assessment. These questions make a person to deep dive in world of self-analysis and based on this performance, our Machine Learning model gets activated to determine the individual personalities and traits in order to classify the user into various categories based upon factors including personality type and some special trait attributes. The model further recommends to the user, the most suitable career options. This is done in order to assist the user to find the options in which he can excel in terms of productivity and satisfaction.

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