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Career Guidance System using Machine Learning For Engineering Students (CS/IT)

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Abstract - *In today's world choosing the right career is the toughest decision. Today many students are confused about their future. They do possess some skills but they are not able to identify their abilities and a proper domain. Different people suggest different career options but at last, the student has to select their career. In this project, we have focused on this problem of the student using machine learning. With the help of machine learning, we will help the student to decide which is the best career option and domain for them using different machine learning techniques. The career is decided based on some personal and academic information filled by the student. This project will help the student to get directed towards a specific domain as per their skills.*

Key Words*:* Machine Learning, Naive Bayes, Django, Web Development.

1. INTRODUCTION

Career Guidance System using Machine Learning is developed for Engineering Graduates who have completed their final year (Computer Science), who are confused regarding which field/path to choose for their career. As there are already many options available to choose Careers, still taking the correct decision is a challenge. So we have considered all the aspects which are important to choose a Career, aspects considered in our project are marks scored in individual subjects, personality-based questions which judge a student not only based on their Academic scores but also based on personality, which is very important for making any decision on Career.

We have developed a user-friendly website for our users. The user has to give a test on our website. The answers given by the user on Front-End will be stored in the backend. The Backend will be used to store a classifier model for prediction. Already developed code for classifier prediction is appended with the input given by the user.

Classifier (Naïve Bayes) gives us three recommendations based on the top three probabilities. The output is stored in Backend and again displayed to the user in Front-End. The user can check the recommended Career and can choose the best among three choices. The Career with the highest probability is displayed first then second and at last third. Accuracy metrics are used to calculate the accuracy of our Prediction System.

A feedback system is also included in our system for making our system more accurate and to get the response from the user about our system. They can rate us on our portal and can also write to us. They can also contact us on our systems email id.

2. SYSTEM ANALYSIS

A. Existing System

In the current scenario, the career prediction system work for getting job recommendations. Several platforms such as AMCAT, CoCubes, etc. they provide job recommendations. There is no such system exist which takes input and gives recommendations of the suitable job profile.

B. Proposed System

We describe career guidance system for the students of CS/IT branch who are confused for their career path. The contribution of this system is to help such students to be guided but a standard system and get to their hidden key skills. We want the student not to get confused between so many fields. We want to make it easy for the student by recommending them three fields which are most suitable for them based on their input. Our proposed system takes inputs from GUI can process it and gives three job fields. It also takes feedback from students about their satisfaction by the output so that we will get to know where to improve our system. We are also sending them the mail report of their career choice and will mail them after their graduation to get to know are they satisfy with their career path. This feedback system will help us to make our system more and more rigid.

3. COMPARISON TABLE

	Existing system	Proposed System
Main Function	Job Recommendation	Career Path Recommendation
Test	Based on Aptitude and Logical Reasoning	Based on Performance in academics and personal traits
Feedback System	Consist of job Recommendation interest feedback	Consist of Career path recommendation feedback

4. DIAGRAMS

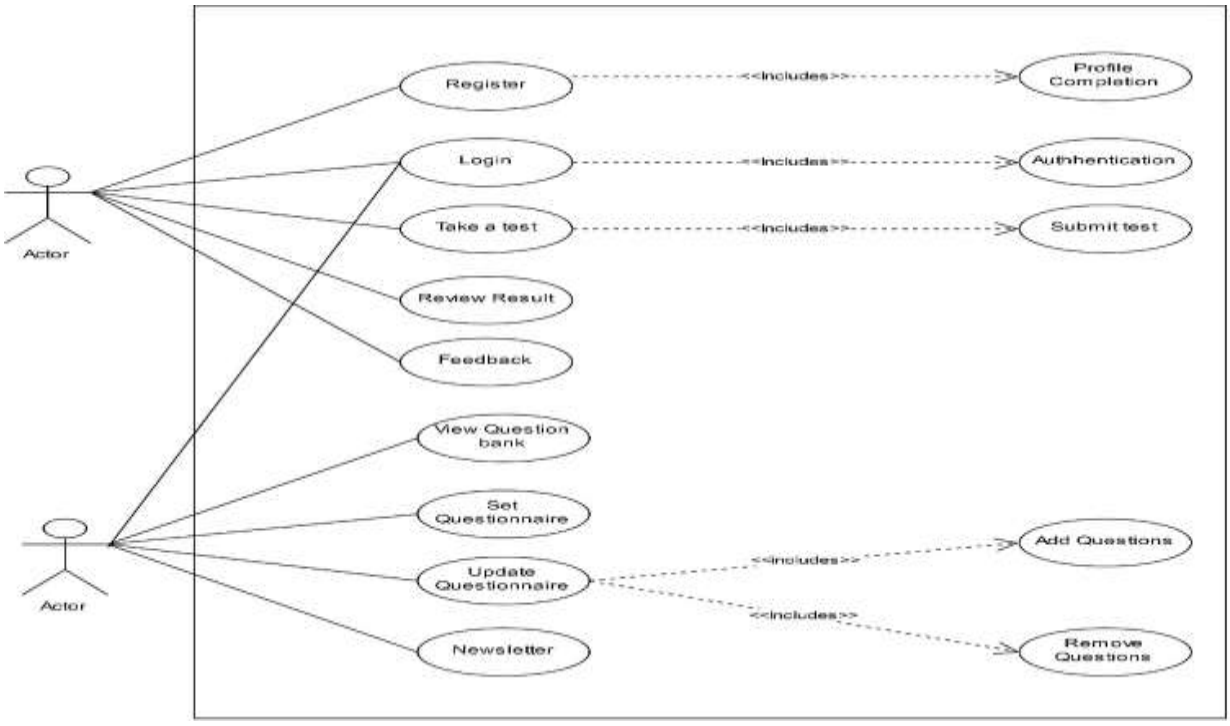


Fig-1: Use case Diagram

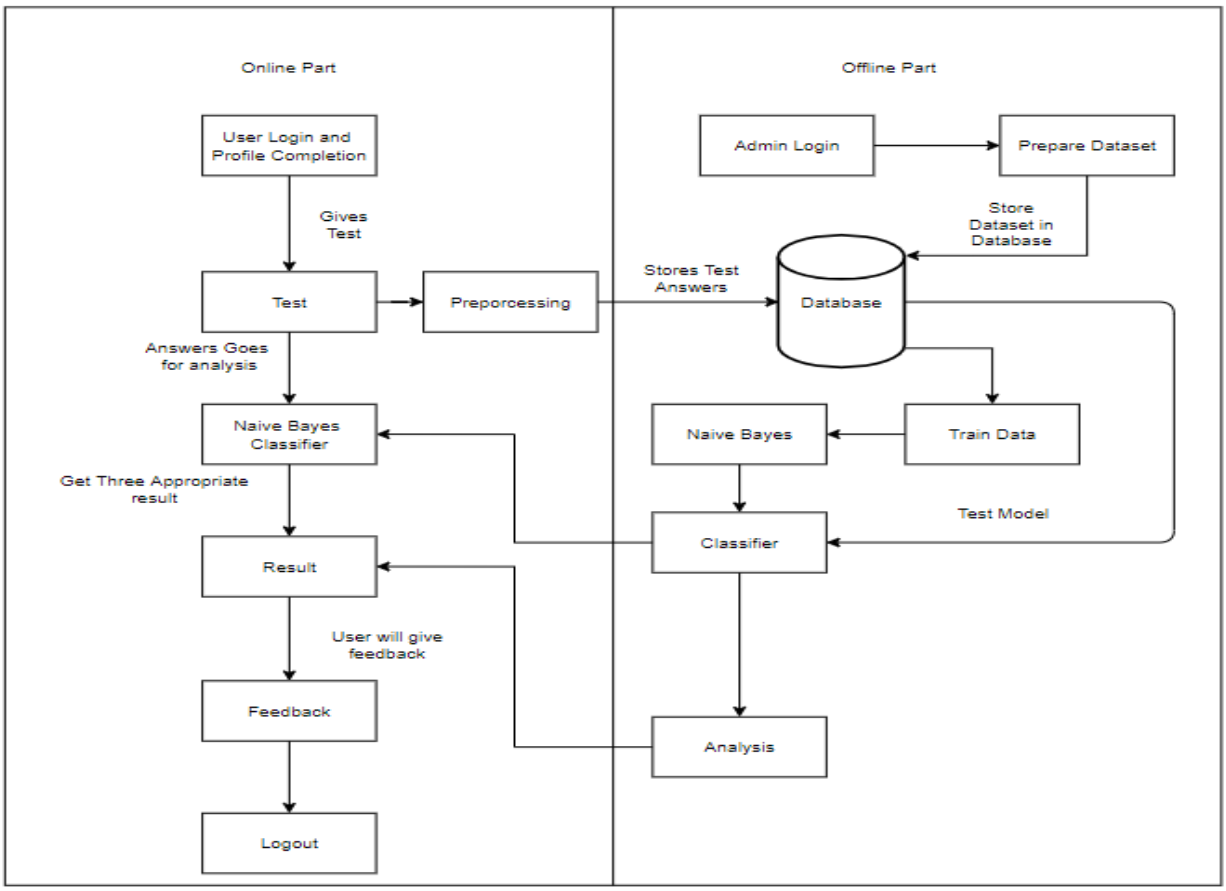


Fig -2: System architecture

5. SYSTEM IMPLEMENTATION

A. Collection of Data:

The collection of data is one of the major and most important tasks of any machine learning project for feeding the algorithm with correct data. So, the efficiency and accuracy of the algorithm depend upon the correctness and quality of data collected. For student career prediction many parameters are required like student's academic scores in various subjects, personality traits like interests, hackathon's , hobbies, workshops and many more. As all these factors play a vital role in deciding student's progress towards a career area, all these are taken into consideration. Data is collected in many ways. Totally 20 thousand records with 21 columns of data are collected.

B. Feature Scaling:

Initially, we had 38 features in our dataset but to reduce feature we have used 'Selectkbest' and 'chi2(chisquare)' method for feature scaling. We have decreased our features from 38 features to 20 features. This helped us to increase accuracy.

C. Label-encoding:

Data collection is an important part yet another important part is data pre-processing. We can't feed our algorithm with raw data. Before sending this data to the algorithm we need to pre-process this data. Label encoding is one of the parts of pre-processing. As our dataset consists of both categorical as well as numerical data we need to convert the categorical data into numerical form. Also, we need to track the conversion as we will need to inverse the transformation of the categorical data. Using LabelEncoder library of sklearn we can convert the categorical data into numerical form and vice versa.

D. Training and Testing:

For training and testing the model is split into k-folds (2-folds) and a huge part of data is used for training the model. Later the testing part is used for calculating the accuracy of the model. More the Accuracy more is the efficiency of the model.

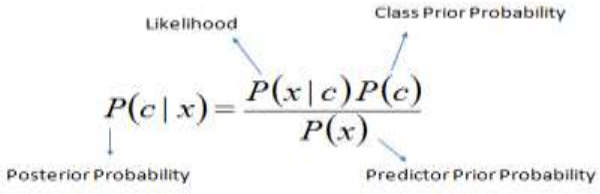
E. Algorithm Implementation:

We have used the Naïve Bayes Algorithm for our project implementation. We are using this algorithm as this algorithm will calculate the class probability for each class at the last step and will show us the class with maximum probablity. We have modified this algorithm in such a way that we will get three output at last for any of our input.

F. Machine learning Algorithm

The Algorithm which we are using is the Naïve Bayes algorithm. It is a classification algorithm that is used to predict the probability of every class label. It is based on Bayes' Theorem with the assumption of Naïve (strong) independence between the features. It is a highly scalable model that requires the parameters in a vector format.

Naïve Bayes is a simple technique of constructing the classifier and models that assign class labels that are represented as vectors of features values. These classes are drawn from a finite set of class labels. For training such classifiers there is not a single algorithm but a group of algorithms that are based on a common principle.



$$P(c \mid X) = P(x_1 \mid c) \times P(x_2 \mid c) \times \cdots \times P(x_n \mid c) \times P(c)$$

G. Accuracy:

This is where the performance of the algorithm, quality of data, and the required output all appear out. We have calculated the Accuracy of the model on the basis of the number of predicted output and the actual output to be predicted.

H. Result:

The data given by the user is evaluated in backend using Naïve Bayes Algorithm and it is giving an accuracy of 93%, so we have developed a website that takes input from the user, calculates the output using Naïve Bayes Algorithm and again displays the results back to the user. Further in the future, more E-Learning blogs related to the Latest technologies going around the market can be added and linked to websites teaching those Technologies to make it the best platform for E-commerce and Career Prediction.

6. CONCLUSION

The paper proposes a Career Guidance System which uses Machine Learning for Prediction. It is most effective and efficient System, which will be used by any Engineering Student of CS/IT(currently in final year or completed graduation) to evaluate their talent, skills and which particular Career path to choose from numerous Career paths available. This System is developed as per user requirement and provides an excellent user interface experience.

7. FUTURE SCOPE

The Education Field is evolving day-by-day with the introduction of internet and availability of study materials, videos and numerous tutorials. This website will also be used to provide these study material, tutorials on our website. If user wants to continue further Studies on the Guidance provided by our site then he/she and do it with the study material available on our site. With the revolutionary changes occurring in Engineering Fields, numerous Engineering Fields are available, we will expand our Scope by providing Guidance to other Fields such as Mechanical, Electrical, Civil etc. including CS/IT. Chatbot will be used for interaction with human beings.

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