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Student Career Recommendation Using Machine Learning

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Abstract: As scholars are going through their academics and chasing their interested courses, it is important for them to impose their credentials and identify their interests so that they will get to know in which career field their interests and credentials are going to put them. This will help them in enhancing their performance and motivating their interests so that they will be directed towards their targeted career and get settled in that. Also, recruiters while retaining campaigners after assessing them in all different aspects, these kinds of career recommender systems help them in deciding which job part the seeker should be kept grounded on his/ her performance and other evaluations. This paper deals with the students' career prediction by using various machine learning concepts like Decision Tree (DT), Support Vector Machine (SVM) and XGBoost. SVM outperform others in terms of accuracy. Also, this paper substantially concentrates on the career area prediction for computer science field student.

Keywords: Student career recommendation, XGBoost, Decision Tree, Machine Learning, SVM, OneHot Encoding.

I. INTRODUCTION

Competition today is heavily multiplying day by day. Especially since it is too heavy in present day's technical world. To compete and reach the goal students need to be planned and organized from the initial stages of their education. So, it is very important to constantly evaluate their performance, identify their interests and evaluate how close they are to their goal, and assess whether they are in the right path directed toward their target. This helps them improving themselves, motivating themselves to a better career path if their capabilities are not over to the mark to reach their thing a pre-evaluate themselves before going to the career peep point. Not only that recruiters while retaining people into their companies estimate campaigners on different parameters and draw a conclusion to elect a hand or not and if named, finds a best- suited part and career area for him. All these roles require some prerequisite knowledge in them to be placed in them. So, recruiters analyze these skills, talents and interests and place the candidate in the right job role suited for them. These kind of prediction systems make their recruitment tasks very easy because as the inputs are given, recommendation is done based on inputs.

II. LITERATURE REVIEW

According to Funda Dag et. al. [1] approaches, some researchers have investigated that presentation of learning content and learning tools are designated based on learning styles in online learning environments is a factor that impacts the academic achievements of the learner. As a result, it was seen that improving academic achievements in online learning not only learning styles by itself have utilized on online learning and the motivation of the learner, demographic factors, teaching strategies, and teaching methods should be considered.

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According to Cathy Li et. al. [2], The impact of Covid-19 has dug up the roots of our education system. It has gone completely online, boosting the business of educational apps with higher chances of earning huge profits in the long run.

According to S. Ray et. al. [3], In this paper they proposed a recommender system approach that made use of collaborative filtering approach for generation of elective course recommendations. They made use of both user-based and item-based filtering, which is applied on real-time data for prediction of elective courses. Results are based on mean absolute error, calculated for each elective course.

Jinjin Liang et. al. [4], proposed a hybrid teaching mode utilizing machine learning algorithms, which uses clustering analysis to analyze the learner's characteristics and introduces a support vector machine to predict future learning performance. The hybrid mode matches the predicted results to carry out the offline teaching process.

H. Bydžovská [5], in this paper he proposed a prediction model using classification, regression and collaborative filtering approaches for predicting final grades of students based on previous achievements of similar students

D. Upendranet. al. [6], they proposed a course recommendation system that undertook students as basis of their past performance and learning ability. They constructed model by using previous student data as input. The basic subsequent belief for the technique used is that if a student with certain skill can complete the course successfully then a new student with similar skills will be able to complete the course.

III. PROPOSED SYSTEM

Recruiting people into their companies evaluate candidates on different parameters and draw a conclusion to select an employee or not and if selected, finds a best suited role and career area for him. There are many types of roles like Database administrator, Business Process Analyst, Developer, Testing Manager, Networks Manager, Database Manager, Web Developer and so on. All these roles require some prerequisite knowledge in them to be placed in them. So, recruiters analyze these skills, talents and interests and place the candidate in the right job role suited for them.

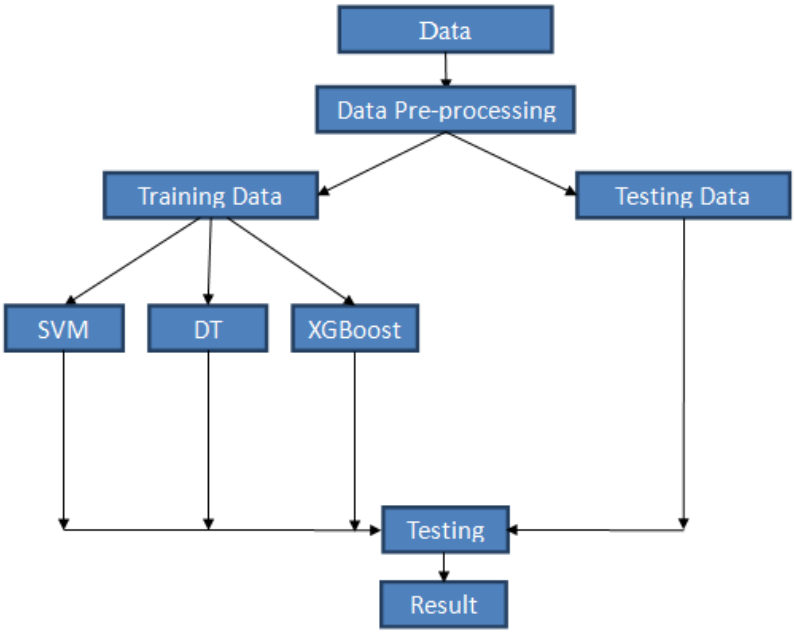

Figure 1: Flowchart of an Existing System

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These kind of prediction systems make their recruitment tasks very easy because as the inputs are given, recommendation is done based on inputs. The inputs given to the system in the form of answers is shown in figure 3 known as question answer format, and according to the inputs the system predicts the job role for candidate as shown in figure4 known as job recommendation web page.

To develop student career recommendation system dataset is collected from GitHub. Here we use three different algorithms i.e., Decision Tree (DT), Support Vector Machine (SVM) and XGBoost for training and testing. OneHot Encoding is a technique is used to convert categorical data into numerical data. SVM outperform other two algorithms and shows higher accuracy. Developed SVM model deployed on web app developed in flask framework using Python programming language. Based on input values system generates career recommendation. The proposed system flowchart is shown in Figure 1.

IV. RESULT AND DISCUSSION

The data is divided in training and testing part. Models are developed using three algorithms and SVM outperforms others. SVM shows greater accuracy. Accuracy comparison is shown in figure 2.

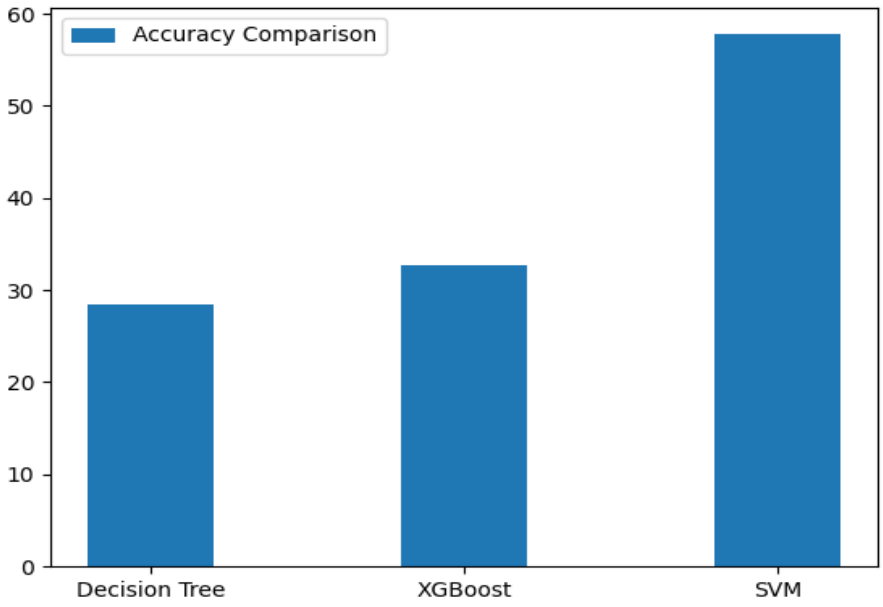

Figure 2: Accuracy Comparison

A web application is developed to input values of the student and the career recommendation is displayed. The results of the predictions that were obtained with the help of different models, were stored in the form of excel sheet which was further processed as per the proposed algorithm. Predictions that were generated via models are expected to have good generalization capability and can efficiently produce a correct class label or categorization for the previously unknown data. Classification model's performance is evaluated based on how many correct and incorrect predictions are made by the model on the testing dataset.

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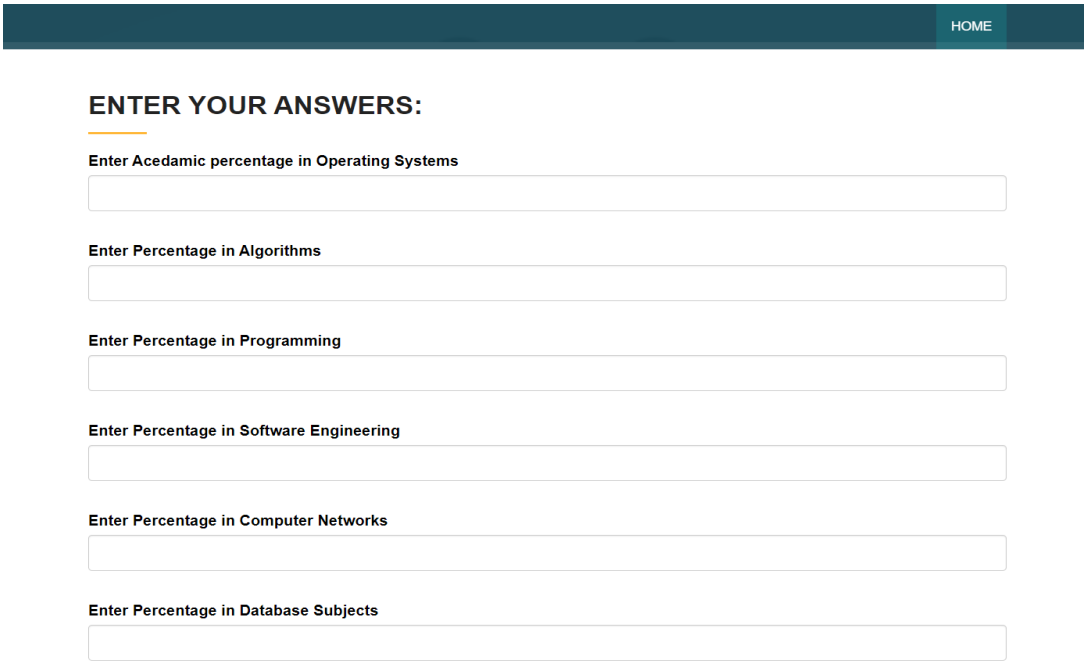

Figure 3: Student Input Form Sample

Figure 4: Student Career Recommendation Page

V. CONCLUSION

The data is trained and tested with all three algorithms and out of all SVM gave more accuracy. As SVM gave the highest accuracy, all further data predictions are chosen to be followed with SVM. So, finally a web application is made to give the input parameters of the student and the final prediction is generated and displayed. In future A more powerful web application can be developed where inputs are not given directly instead student parameters are taken by evaluating students through various evaluations and examining.

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