International Journal of Research in Engineering, Science and Management
Volume-2, Issue-11, November-2019
www.ijresm.com | ISSN (Online): 2581-5792

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A Survey on Student Placement Prediction using Supervised Learning Algorithms

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Abstract: Placement of students is one of the very important activities in educational institutions. Admission and reputation of institutions mainly depends on placements. Hence all institutions strive to strengthen placement department. All students dream to obtain a job offer in their hands before they leave their college. A placement prediction is a system that predict the possibility of students to have chances to be placed. Thus a prediction system could help in the academic planning of an institution for future years. Several factors contribute to the campus placements for a student both academic and non-academic. Of these, academic achievements, both present and past, soft skills, domain knowledge, area of specialization, socio economic attributes are considered here. The proposed work attempts to build a system which can predict the probability that a student who joins in a college with certain features is going to be placed or not. The system is based on SVM, Decision tree and Random Forest algorithms.

Keywords: Supervised Learning, SVM, Prediction, Machine Learning.

1. Introduction

The higher educational institutions have capacity of knowledge such as academic performance of students, statistical details of students and various types of information in the hidden form. Now a day's data Mining techniques have a great importance in educational data set as it is rising daily. It is one of the computational processes that extract useful patterns or relationships from raw data. In educational field it is to increase learning process such as identifying, evaluating variables, extracting data set from the learning process. The campus placement of the students plays an important role in an educational institution. Prediction system could help in the academic planning of an institution. A placement prediction system helps students to have an idea about where they stand and what to be done to obtain a good placement. A placement predictor is a system that could predict the chances or the type of company a pre-final year student has chances to be placed. This system is necessary for predicting student's placement using Data Mining Techniques by considering the student dataset which is uploaded by TPO. This system is built by utilizing the Support Vector Machine (SVM) algorithm. In machine learning, Support Vector Machines are supervised learning models with associated learning algorithms that analyze and survey data used for classification and regression. It is simply a co-ordinate of individual observation. It's very crucial for cases where very high predictive power is required. Such algorithms are smaller harder to visualize because of the more complexity in formulation.

2. Related Work

Karan Pruthi, et al. depict overall goal of data mining is to extract information from a dataset and transform it into useful structure for further use. This can help in building new systems and help in decision making in educational system. Data Mining has evolved in the field of education too and its successful techniques have helped to a great extent. In this system, student data was collected with information regarding their academic performances and their final placement and this dataset was used to analyze to predict the final placement by applying decision tree algorithms and clustering techniques using Data Mining tools (WEKA). Here, it is shown the academic performance of students to predict the company type whether it is Core IT or Consultancy with accuracy 95 the company name whether it is Microsoft, Samsung, Deloitte etc. with accuracy 62. Oktariani Nurul Pratiwi, et al. depict students in first grade of senior high school in Indonesia have to pass the step called placement class. It divides into Science, Social or Literature class. In traditional method, the placement class process conducted by teachers. But, it needed much time to decide the right class for students. The proposed is using the Knowledge Discovery and Data Mining (KDD). Which is the placement class process using the classification method. In the first experiment classified instances 84.2 attributes, give the best percentage of accuracy as 92.1, best result are using Naive Bayes and SMO. Hope in the future, it can be the solution to help teacher decide the placement class.

P. K. Imbrie, et al. shows that modeling offers advisors a more effective method to integrate multiple factors in order to make the most appropriate recommendation for first year math courses to entering students and help ensure student success. Results to be reported in this study are effectiveness of predicting engineering students' success in Calculus I courses using regression models, significant predictors to Calculus I grades, the actual recommendations that students received from advisors for appropriate calculus placement, whether students

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took the advisors recommendations in choosing a calculus placement, and the relationship between the model and what advisors are actually advising. The results of this study will provide information that helps to find the most effective means of advising to help ensure student success.

Sunisa Rimcharoen, et al. depict the FP-Growth algorithm to find association rules of the questions in the placement test that associated with grades in a programming fundamental course. We collect and analyze data from 174 students who enroll in computer science program. We also analyze what are the common basic knowledge or skills of students who get good grades. The insight from the discovered association rules suggests us to prepare essential skills to computer science students. We found that the students who get excellent grades have common knowledge or skills of rational, data representation, number series, calculation and spatial reasoning.

Praveen Rani, et al. depict comprehensive statistical experiment to identify the number of students those are ready for placements and students those are not fulfilling the basic criteria for placement from a large database of all computer engineering students of a college containing their academic record. The design of experiments software named Weka Tool is used for making three clusters of whole database which will categorize the students according to their qualifications. A variety of important parameters for measuring student's performance including academic performance, technical skills, soft skills, training and projects are considered to capture the desirability and ability of a student for placement. With the simulation and analysis results, it concludes that how many students in the college are ready and fulfil all basic requirements for sitting in a placement drive, how many students need to improve their performance and how many students will face difficulty in completing his/her degree. After getting the results in form of three clusters, then a system is trained that predicts the category of the student from a new database for next session. This system will validate the results and classify that which student should come under which cluster.

Liya Claire Joy, et al. depict a system to predict the possibilities of student placement selection using various decision tree algorithms. The most common decision tree algorithms such as ID3, CHAID, C4.5 and CART algorithms were applied on the dataset using the Rapid Miner Tool. The analysis is to figure out the most suitable algorithm for the given dataset. From the result analysis and measurements, they found ID3 algorithm as the one with highest accuracy. This prediction can enlighten students to identify their capabilities and improve accordingly. This system also helps in the academic planning of an institution to prepare proper strategies and improve the placement statistics for the future years.

3. Problem Statement

Campus placement chances are important criteria while selecting an educational institution by the student. Several factors contribute to the campus placements for a student both academic and non-academic. Of these, academic achievements, both present and past, soft skills, domain knowledge, area of specialization, socio economic attributes are considered here. The proposed work attempts to build a system which can predict the probability that a student who joins in a college with certain features is going to be placed or not. The system is based on SVM, decision tree and random forest algorithm.

4. Conclusion

Predicting student placement class manually by TPO is a difficult task. To resolve this problem, we can use data mining to help predict the student placement. Our propose system implements a student placement prediction system which predicts particular student place or not with the help of these three algorithms – SVM, Random Forest and Decision Tree.

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