Literature survey

A literature review surveys books, scholarly articles, and any other sources relevant to a particular issue, area of research, or theory, and by so doing, provides a description, summary, and critical evaluation of these works in relation to the research problem being investigated.

Abstract

Every year, academic institutions invest considerable effort and substantial resources to influence, predict and understand the decision-making choices of applicants who have been offered admission. In this study, we applied several machine learning techniques.

The results from this study indicate that the logistic regression classifier performed best in modeling the student college commitment decision problem, i.e., predicting whether a student will accept an admission offer. The significance of this research is that it demonstrates that many institutions could use machine learning algorithms to improve the accuracy of their estimates of entering class sizes, thus allowing more optimal allocation of resources and better control over net tuition revenue.

Introduction

The future and sustainability of the traditional higher education business model is an important topic of discussion. These issues are of course highly dependent on the type of academic institution being considered, such as public colleges and universities, private non-profit colleges and private for-profit colleges. The economic pressures felt by incoming students surely impacts their willingness to make the large financial commitments required to enroll in many colleges and universities. To alleviate monetary stresses caused by fluctuations in student enrollment, institutions of higher education often try to operate at full capacity, which means increasing, or at the very least optimizing, their tuition income. Our research was motivated by a desire to accurately predict incoming student class size and therefore tuition-based income.

Problem Statement

Students are often worried about their chances of admission to university. The aim of this project is to help students in shortlisting universities with their profiles. The predicted output gives them a fair idea about their admission chances in a particular university. This analysis should also help students who are currently preparing or will be preparing to get a better idea.

Problem Solution

This project is web-based application in which students can register with their personal as well as marks details for prediction the admission in colleges and the administrator can allot the seats for the students. Administrator can add the college details and the batch details. Using this software, the entrance seat allotment became easier and can be implemented using system.

Algorithms

Multiple machine learning algorithms were used for this research, K- Nearest Neighbor and Multivariate Logistic Regression algorithms were used to predict the likelihood of the students getting admission into university based on their profile. Decision Tree algorithm was used to predict the rank of the college that would be suitable for the students based on their profile and suggest the list of universities accordingly.

SYSTEM ARCHITECTURE
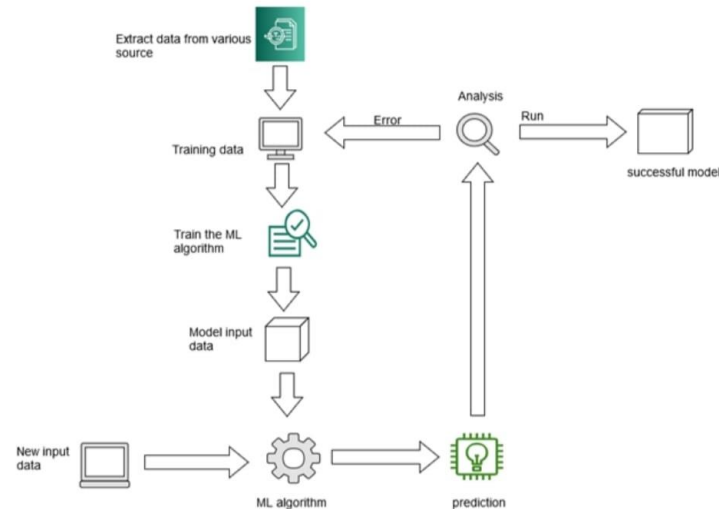
Evaluation

K-nearest neighbor and Multivariate logistic regression algorithms were used to create a model that can be used to predict the likelihood of success of a students application to the university based on his/her profile. Both algorithms were tested and their performance was evaluated based on different factors like Accuracy, Sensitivity, Specificity and Kappa value. The model created by using K-Nearest Neighbor outperformed the model created using Logistic Regression on all the performance measures. Also, by looking at the variance in the values of the data KNN seemed to be the best-fit algorithm to create the University admit eligibility predicate.

Accuracy was considered to be main metric to evaluate the performance of the models, as the data used for creating the models was balanced. Also, prediction of the true positive and true negative scenarios was equally equivalent. The KNN model performed well with an overall average accuracy. The decision tree model which was created to predict the rank of the universities suitable for the student provided the result with an accuracy.

The main objective of this research was to develop a prototype of the system that can be used by the students aspiring to pursue their education in the abroad. Multiple machine learning algorithms were developed and used for this research. KNN proved to best-fit for development of the system when compared with the Logistic regression model.

The model can be used by the students for evaluating their chances of getting shortlisted in a particular university with an average accuracy. Decision Tree algorithm was used to predict the universities which were best suitable for a student based on their profile. The decision tree algorithm proved to be accurate. A simple user interface was developed to make the application interactive and easy to use for the users from the non-technical background.

The overall objective of the research was achieved successfully as the system allow the students to save the extra amount of time and money that they would spend on education consultants and application fees for the universities where they have fewer chances of securing admission. Also, it will help the students to make better and faster decision regarding application to the universities.

References

Lapovsky, L. The Changing Business Model for Colleges and Universities. *Forbes* 2018. Available online: **https://www.forbes.com/sites/lucielapovsky/2018/02/06/the-changing-business-model-for-colleges-and-universities/#bbc03d45ed59** (Accessed on 15 December 2018).

The Higher Education Business Model, Innovation and Financial Sustainability. Available online: **https://www.tiaa.org/public/pdf/higher-education-business-model.pdf** (Accessed on 15 December 2018).

Occidental College. Available online: **https://www.oxy.edu** (Accessed on 15 December 2018).

Tuition Discounting. Available online: **https://www.agb.org/briefs/tuition-discounting** (Accessed on 15 December 2018).

Massa, R.J.; Parker, A.S. Fixing the net tuition revenue dilemma: The Dickinson College story. *New Dir. High. Educ.* **2007**, *140*, 87–98. [**Google Scholar**] [**CrossRef**]

Hossler, D.; Bean, J.P. *The Strategic Management of College Enrollments*, 1st ed.; Jossey Bass: San Francisco, CA, USA, 1990. [**Google Scholar**]

Géron, A. *Hands-On Machine Learning with Scikit-Learn & Tensor Flow*, 1st ed.; O'Reilly: Sebastopol, CA, USA, 2017. [**Google Scholar**]