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An Automated Prediction Model For College Admission System

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Abstract.

"Life is a matter of choices, and every choice you make makes you"- John C Maxwell. At present, many students make mistakes in their preference list of colleges because of various reasons like inaccurate analysis of colleges, lack of knowledge, and apprehensive prediction. Later, they end up regretting the same after allotment. Our application addresses this issue of the student admission community. The application uses data mining and data analysis techniques. Rank, category, preferred branches, preferred district, and preferred colleges are taken as input and the preference list, on thorough analysis of the last five years' cut-off data is generated. In this paper, an attempt has been made to develop an automated web application prediction model for a college admission system which can be used to make a wise choice of college before allotment.

Keywords: Allotment, Analysis, Data mining, Data Analysis, Cutoff, Preference List

INTRODUCTION

Objectives of the paper are as follows.

- To help students to fill their preferences at the time of option-entry process accurately.
- To ease of making better choices of college before allotment.
- To deploy a web application for college admission system.

After intermediate, students desiring to pursue engineering face lot of problem in choosing a good college and branch of their choice. Admission into engineering colleges across states in India happens generally through Common Entrance Tests (CET). The examination authority of every state carries out the admission, through a centralized admission process. This admission process happens through many rounds, depending on availability of seats. First, the students must get their documents verified by the authority. Later, the authority releases the cut-offs of every college, branch-wise and category- wise. Students will be allowed to give their preference list of colleges and branches, which is also known as the option-entry process. Then, based on rank, category and preference list given by the students, college and branch will be allotted to them by the authority.

In each state, there are around 1 lakh seats available in nearly 300 colleges and over 35 different branches of engineering. Depending on the category, the percentage of seats in

colleges varies. There are nearly 15 different categories and hence it becomes difficult for students to understand in which college and branch they are likely to get admitted in, even after thorough analysis of cut-off data of the last few years. This problem becomes more serious in case of students from reserved categories. Many students make mistakes in their preference list or during option- entry process due to lack of knowledge, improper and incorrect analysis of last five years' cut-off data. Hence, such students end up not getting their deserved seat and later regret for the same. Our idea will help in solving this problem of the student community. This computer-aided method will minimize the stress on students, and they will be able to get the preference list of all colleges in which they would get an admission, at the click of a button.
In this paper, we have done the necessary research using K-CET (Karnataka Common Entrance Test) data. Our system is developed taking K-CET into consideration. Similarly, this system can be used for Common Entrance Tests of other states and for other national level entrance exams by just changing database used.

RELATED WORK

In the au-courant methodology, there has been considerable use of automated approaches in education business process. These approaches can be distinguished in artificial intelligence and conventional approaches. Several approaches of multivariate study are characteristics of the conventional approaches; however, the adept schemes technique is a typical characteristic of the artificial intelligence approaches. Together were adapted in several apps in the teaching/school business like admission prediction [1] [2]. Moreover, using machine learning and predictive modelling student admission has been predicted with high degree of accuracy. Here, the method is not particular to the institution. Data provided by the applicant in the form excel file containing huge records hence process needs further exploration for predicting the student admission [3].
In [4], authors developed method that will support the organization to examine the present scenario of student admission by anticipating the registration behaviour of student. It imparts an approach like APRIORI examines the admission behaviour of the student by considering the branch of the student and the branches he chosen to seek entry. The method also presents a data-mining method naïve-bayes procedure which anticipate to which course the student can register. Since, the student's choices would be taken into rumination, the institution will be able to upsurge the admission of branch based on the anticipated outcomes. And in [5], authors have developed a web-based application system for college admission system in which students can register their marks along with their personal info. With this application the entrance seat allotment becomes easier and effective. However, the web-based system created with PHP has more difficult than python.
In addition, college admission is predicted through support vector machines and perceptrons supervised learning techniques which are based on historical applicant data [6]. This method identifies with appropriate correctness of the eligible applicants to enroll at the institution by the admission office based on historical data. However, this paper utilized admittance details from a small-scale college with about 2500 students. And four prior academic years of details to be collected to produce a sufficient sample size to create optimistic predictions.
Moreover, researchers have developed a general dataset of 41359 institution applications to predict four-year bachelor's graduation in a generalizable method [7] [8]. This method includes features such as college graduation rates, sociodemographics, test scores, work skills, academic attainment, participation in extramural events and evaluations by instructors. Still, the method has constraints. First, though the proportions of the surveyed data cluster are extensive, it only characterizes 41359 out of a possible 278201 applicants in the comprehensive illustration [8] [9]. Second, illustration only comprised students those applied to colleges that recognized the common app, recommending the possible for acceptance bias. In addition, study is essential to examine in what way the outcomes generalize to other institutions. Third, the au-courant

modelling method was chosen to improve prediction accurateness. Though, it is primarily association in nature, thus restricting explication.
Furthermore, to addressing these hindrances, there are also numerous gaps. For example, all extant approaches focused on four-year outcome in early study, that can be increased to 6-year outcome along with additional valued outcomes. And it would be advantageous to find cohesions in patterns of mis-categorize and use these insights for better accurateness of machine learning techniques.
In [10], the authors have developed a data analytics model can be used by colleges and schools to enhance student admission. In this paper, authors have developed analytical model for a local university based on historical built on neural networks, decision trees and logistic regression. However, this model cannot be self-determined and only assists to compliment university administrators' decision-making process to manage admissions and enrolment.
In [11], a hybrid recommender system has been developed for university admission system based on knowledge recover and data mining techniques for tackling college admission prediction problems. But the prediction model was developed for specific university and not appropriate for other university with huge intake student admission system. In addition, researchers have tried to develop student admission predictor system using KNN & logic regression [12] [13]. It will aid the students to find the probabilities of their application to a college being selected. Correspondingly, it will help students in categorizing the colleges which are superlative fit for their profile and offer them with the particulars of those colleges. The drawback of this research is the model considered only few universities with different rankings. There is a need for the system to add more data related to additional colleges and disciplines and the system can be advanced to a web-based application. Therefore, in our research an attempt has been made to addresses this issue of the student admission community. Also, our developed web application helps the user make wise choice of colleges for his/her option-entry.

PROPOSED METHODOLOGY

It In our proposed prediction method, we have used python machine learning libraries viz., pandas and numpy. And to develop the user interface (UI) and web application we have used streamlit package. Further to deploy the web application on the internet so that it is accessible worldwide we have used Heroku. In addition, the database consists of the average of previous five years' rank cut off data. The cut-off database will consist of the ranks with respect to branch, college, and category. A candidate will obtain a rough idea regarding the seat he or she is likely to get depending on his or her rank and category. Cut-off will be different for each college, course, and category. The row headings consist of college names along with branches. The column headings consist of the various categories. The data contained in the database is of string data type. Each cell (corresponding to a branch and college i.e., row heading and category i.e., column heading) in the database, consists of the rank that a candidate belonging to a particular category has to secure in order to get admission into that particular branch and college. Rank (mandatory), category (mandatory), preferred branches (optional), preferred colleges (optional), preferred districts/location (optional), of the user are taken as input for our method. Category is an alphanumeric value which can be selected from the drop-down list. Preferred branches, preferred colleges and preferred districts are text inputs which are multiple selection type and can be selected from drop-down list. Rank and category are required fields and it is compulsory for the user to input these fields. Preferred branches, preferred colleges and preferred districts are optional fields, and they can be used as filters for the generated preference list and the process of generating preference entry list is as sown in figure 1.
Computational process for the proposed well-defined model is as follows.

i. Use data analytic techniques to prepare a preference list based on the user's input. The preference list varies depending on user input.

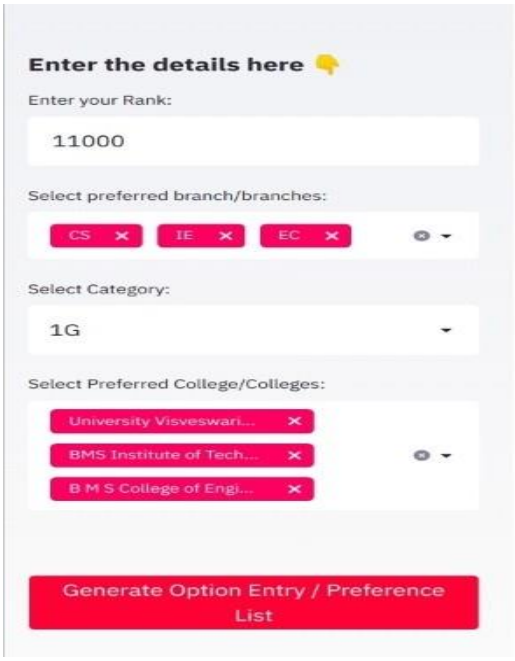

Figure 1. Generating preference list

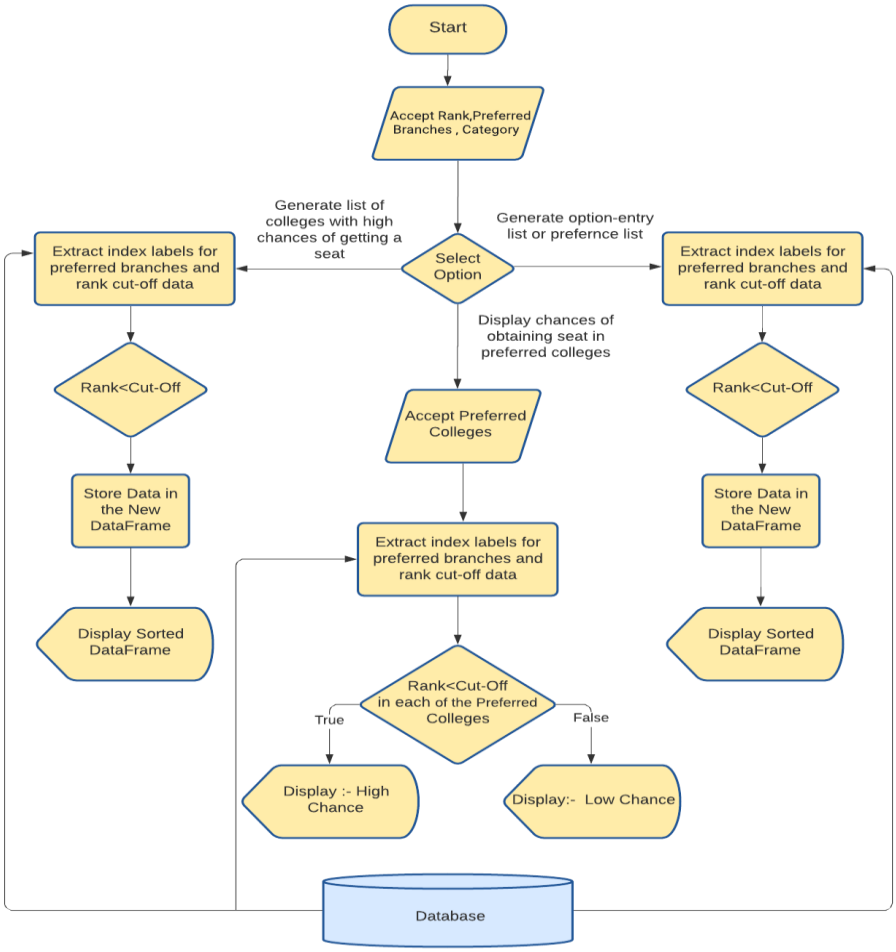

Figure 2. Flow chart for the proposed model

ii.Retrieve data, from the database using functions from panda's library. The functions used are iloc, loc, query, etc.

iii.After performing the required operations, the results are stored into a new dataframe. Later, this new data frame is sorted in ascending order of the cut-offs.

iv.Leave two blank lines after the title.

	Branch	College	Location	Cutoff
0	CS	Bangalore Institute of Technology	Vishweshwarapura, Bengaluru	11036
1	EC	University Visveswariah College of Engineering	KR Circle, Bengaluru	11404
2	CS	BMS Institute of Technology	Yelahanka, Bengaluru	11885
3	IE	University Visveswariah College of Engineering	KR Circle, Bengaluru	13038
4	EC	BMS Institute of Technology	Yelahanka, Bengaluru	14792
5	EC	Bangalore Institute of Technology	Vishweshwarapura, Bengaluru	14987
6	IE	BMS Institute of Technology	Yelahanka, Bengaluru	19568
7	CS	S K S J T Institute of Engineering	Sampangi Rama Nagar, Bengaluru	23453
8	EC	S K S J T Institute of Engineering	Sampangi Rama Nagar, Bengaluru	40088

Figure 3. Generate list of colleges with higher chances of obtaining a seat

Check your chances of getting into the preferred collges:

.....

University Visveswariah College of Engineering :

	Branch	Cutoff	Chances	Difference between your rank and Cutoff
0	CS	7032	Low	3968 ; Rank > Cutoff
1	IE	13038	High	2038 ; Rank < Cutoff
2	EC	11404	High	404 ; Rank < Cutoff

BMS Institute of Technology :

	Branch	Cutoff	Chances	Difference between your rank and Cutoff
0	CS	11885	High	885 ; Rank < Cutoff
1	IE	19568	High	8568 ; Rank < Cutoff
2	EC	14792	High	3792 ; Rank < Cutoff

B M S College of Engineering :

This college doesn't offer CS,IE branches

	Branch	Cutoff	Chances	Difference between your rank and Cutoff
0	EC	5961	Low	5039 ; Rank > Cutoff

Figure 4. Display chances of obtaining a seat in the preferred colleges

The proposed application offers three major functionalities:

i. Generate list of colleges with higher chances of obtaining a seat.
   This functionality displays a data-frame with a list consisting of branch, college name, location, and cut-off rank for the preferred branches in the colleges where the candidate has high chances of obtaining a seat, in the inputted category. If no preferred branches are selected, all the branches in the college where the candidate has high chances of obtaining a seat are displayed as shown in figure 3.
ii. Display chances of obtaining a seat in the preferred colleges.

The user may prefer to get a seat in some college. So, the user can input preferred college/colleges. Based on the input given, his/her chances (low/high) of getting a seat in the preferred colleges will be displayed branch-wise according to the preferred branches as shown in figure 4. It will also display the difference between the obtained rank and cutoff.

	Branch	College	Location	Cutoff
0	EC	B M S College of Engineering	Basavanagudi,Bangalore	5961
1	CS	University Visveswariah College of Engineering	KR Circle, Bengaluru	7032
2	IE	Bangalore Institute of Technology	Vishweshwarapura, Bengaluru	7861
3	CS	Bangalore Institute of Technology	Vishweshwarapura, Bengaluru	11036
4	EC	University Visveswariah College of Engineering	KR Circle, Bengaluru	11404
5	CS	BMS Institute of Technology	Yelahanka, Bengaluru	11885
6	IE	University Visveswariah College of Engineering	KR Circle, Bengaluru	13038
7	EC	BMS Institute of Technology	Yelahanka, Bengaluru	14792
8	EC	Bangalore Institute of Technology	Vishweshwarapura, Bengaluru	14987
9	IE	BMS Institute of Technology	Yelahanka, Bengaluru	19568
10	CS	S K S J T Institute of Engineering	Sampangi Rama Nagar, Bengaluru	23453
11	EC	S K S J T Institute of Engineering	Sampangi Rama Nagar, Bengaluru	40088

Figure 5. Final option entry or preference list

iii. Generating option-entry or preference list

This functionality displays a data-frame containing the final option entry list consisting of branch, college name, location, and cut-off rank for the branch in that college, in the inputted category. The list also contains colleges where chances of getting a seat are low. The list displayed is in sorted order of cut-offs wherein, first option is with lowest chance of obtaining a seat and last option is with highest chance of obtaining a seat as shown in figure 5 and the final of the proposed as shown in figure 6.

Advantages of proposed model

- Students from rural background find it difficult to do the necessary analysis and prepare a preference list. This idea will be beneficial for them.
- Students who belong to multiple categories face difficulty in analyzing cut-offs in each of these categories and predict the best colleges they can get an admission in.
  Example: A student belonging to SC category will either choose SC-R (Scheduled Caste- Rural) or SC-G (Scheduled Cast-General), depending on whether they are from rural background or not respectively. However, a student from SC-R has a greater chance of getting a better college compared to a SC-G student.
- Whatsoever is the student's rank, this application will aid them in finding the best branch and college for his/her rank.
- The student must input his rank, category, and preferred branches. The computer-aided system will display the list of all the colleges he/she is likely to get admitted in.
- The student can check his / her chances of getting into preferred college/colleges.
- The location of the college is displayed along with the college name, so that user can filter colleges based on the location.
- Also, the user can input the preferred district/districts to get list of colleges located in that district/districts. This acts as a filter.
- The output data frame can be sorted according to user requirements i.e., according to branch, college, or location. This acts as an additional filter.
- With this system, students can very easily obtain the detailed list of colleges, branch-wise, category-wise, and district-wise as well.
- The system greatly reduces the stress on students and helps in making right choice of colleges.

- The same system can be used for other common entrance tests by just changing the database (cut-off data). The codebase remains the same.

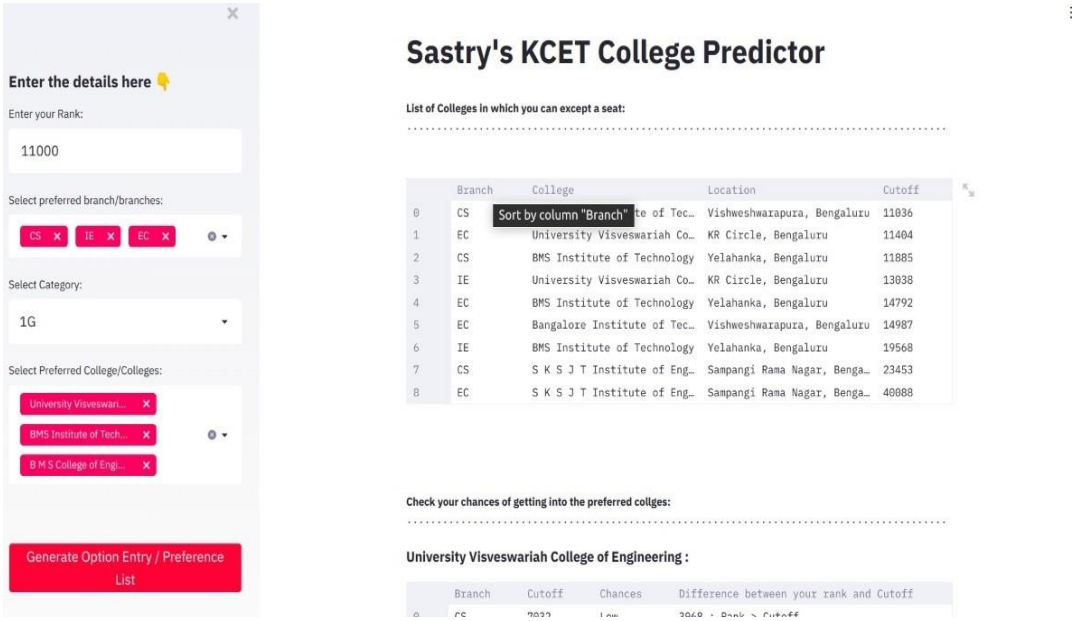

Figure 6. Output of the proposed web application

CONCLUSIONS

The web application helps the user make wise choice of colleges for his/her option-entry. Also, the user gets an outline/rough idea of the entries they can make in the option-entry process provided by examination authority. The same application can be used for Common Entrance Tests of other states and for other national level entrance exams by only changing the cut-off database of that exam. Proposed application benefits for the student admission community that accommodates the need of students to choose the best college and helps colleges too to recognize their stand in attracting students and finer prediction implies better results for the students.

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