

Computational Technique to Identify Specific Disciplines for Academic Programs

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Abstract

Although the scope will continue to change as new trends, technologies and requirements emerge each year, there are many possibilities and scope in almost every sector. They have no idea what branch of Bachelor of Technology (B.Tech) has a good reach over the next few years. Our frame consists of a simulated test of students that will pursue the B.Tech program. It offers numerous specialties to pursue and students choose one according to their interests and sometimes they compromise because of their grades. There are countless examples of prolific engineers from every B. Tech. Branches. Before selecting an engineering branch, the main question you need to ask yourself is whether you are enthusiastic about this particular sector. Just if you choose a course based on the possibilities of your activity, you will be stuck in a course that you despise at that point and you have to work to complete it. At this point, you will be taken into a profession for which you have neither the ability nor the enthusiasm. So it is important to look for a branch of one's passion. Here, we predict a student's class according to his or her knowledge. As our system consists of a mock test and based on the results the student will get to know which particular branch that the student can enroll in according to their ability. So that in the future, they can succeed without having the feeling of having chosen an off-base group.

Keywords: Mock test, Branches, Passion, Knowledge, Framework.

1. Introduction

B.Tech is the most in-demand program among students in the scientific field after 10+2- it is undeniable. B.Tech should be the one in which you have a large interest also you should have some skills related to this field. And also some basic knowledge in this area so only you will be able to solve tough problems [1-4]. They are several diverse areas in B.Tech(Bachelor of Technology) that offer students with professional instruction. This degree is intended to allow students in various branches of engineering with state-of-the-art expertise both conjectural and realistic [5-9]. This is because of a lack of information about the stream which they are interested in and want to get through. Ignorance is the first issue the student community faces along with the pressure of the parents that blocks them to choose the right destination. This results in them choosing some courses and instructions randomly by sacrificing their dreams [10]. Due to this nation loses many potential students in various streams. India produces 3, 60,000 designing alumni consistently, yet just 25 percent of them are employable. We have proposed an answer to this problem using a knowledge-based decision technique.

2. Literature Survey

An association mining strategy as Apriori utilizes the fractional data about the substance of a shopping basket for the expectation of items that the clients wish to purchase or are bound to purchase alongside the as of now brought items [11-15].

The proposed information-based choice strategy will direct the student for confirmation in the appropriate engineering branch. Another methodology is additionally evolved to dissect the accuracy rate for decision [16-18].

Past research has concentrated transcendently on the best way to acquire comprehensive arrangements of affiliations. Be that as it may, clients frequently favor a fast reaction to focused questions. For example, they might need to find out about the purchasing propensities for customers. But this paper proposes a methodology that changes over the market-bin database into an item set tree [19 - 21].

The use of a proposition framework relies on data mining techniques to help students and decisions subject to their scholastics plans. Significantly more unequivocally, it offers help for the students to pick which courses to enlist on, having as the reason the experience of past students with practically identical insightful accomplishments [22].

Precisely from making test papers, dominant tests, and giving results; everything must be done physically. A part of the paperwork, time, and vitality is required to get results and yet at the same time, no exact recommendation could be given to the students to pick the stream.

In an optimal case, admission is taken by an applicant based on a certain rank and family support. When the applicant is not admitted to the appropriate engineering branch, so they find it hard to determine which branch would be the best [23 - 25]. This paper will direct the applicant to a suitable branch of engineering for entry. The present work is to show excellent academic success if students study in the right branch, promotes research work, and learn practical skills that are the real need of the industry and can raise the employability rate. Performance analysis is the study of the data contained in the statistical pathway database by the learning model which is used to measure each student's success. The study classifies a student's results to average, and two grades below average and above-average [26 -30]. Based on these categories students can opt for the data based on their interest.

Branch prediction becomes more complicated as educational institutions get more diverse. Educational organizations are searching for more effective technology to strengthen management and decision-making processes, or to help them build innovative approaches [31- 34]. Two of the important solutions to addressing the quality assurance issues were to provide supplementary knowledge related to the educational processes and organizations to the management team. Until now, no framework has been created to assist the college with analyzing its affirmations not terrible, but not great either, it can develop its branches based on inclination presented by students.

3. Proposed System

The motivation for this issue - If students enroll in the right branch, they have an option of behaving in a superior way and they will achieve their goals effectively. So, we contain mock test details of the students who composed the test for choosing the branch. The test consists of subjects like Maths, Physics, Chemistry, and Aptitude. Based on the marks, we are going to predict the branch of a student, to which branch he/she can enroll in the B. Tech program.

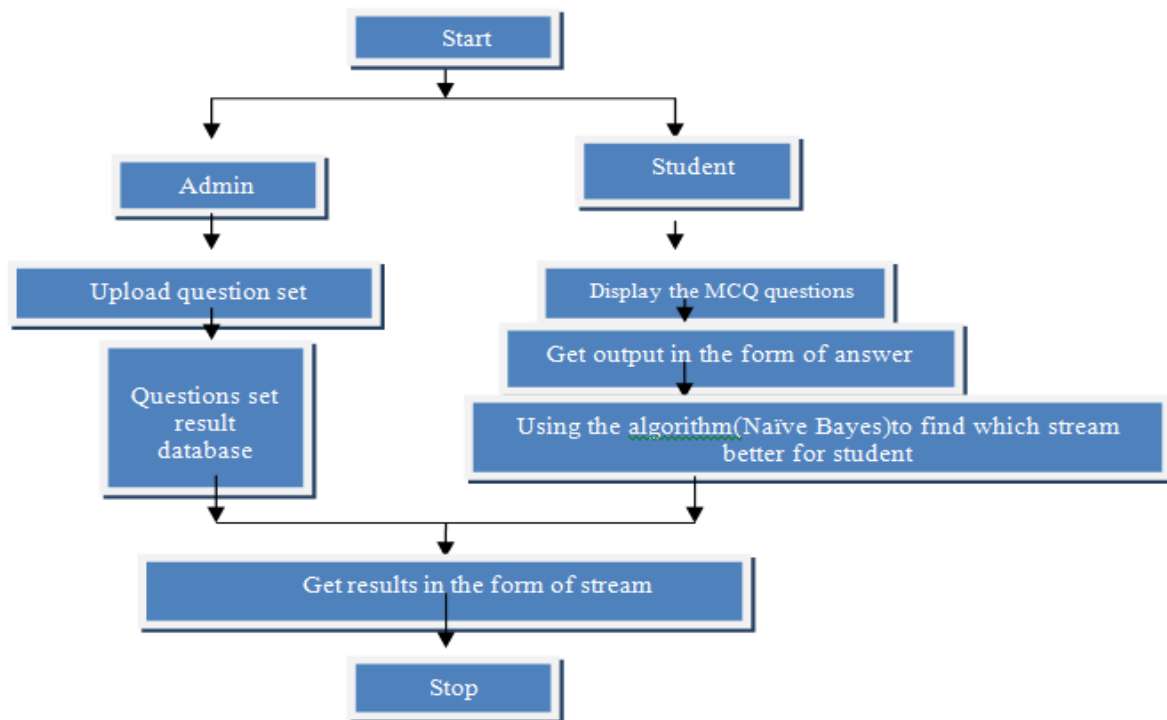


Fig. 1: A basic model to set the test paper

The above Figure 1 shows that the admin can set the question paper and the student is the one who can write the test. By using the Naïve Bayes classification, based on the result we can find the branch of the student in which they can enroll. In our proposed framework, students have to give their marks in the respective fields such as Mathematics, Chemistry, Physics, and Aptitude. With the assistance of the submitted marks and data mining strategies that we utilized, the framework recommends to the students, in regards to which branch could be taken by him.

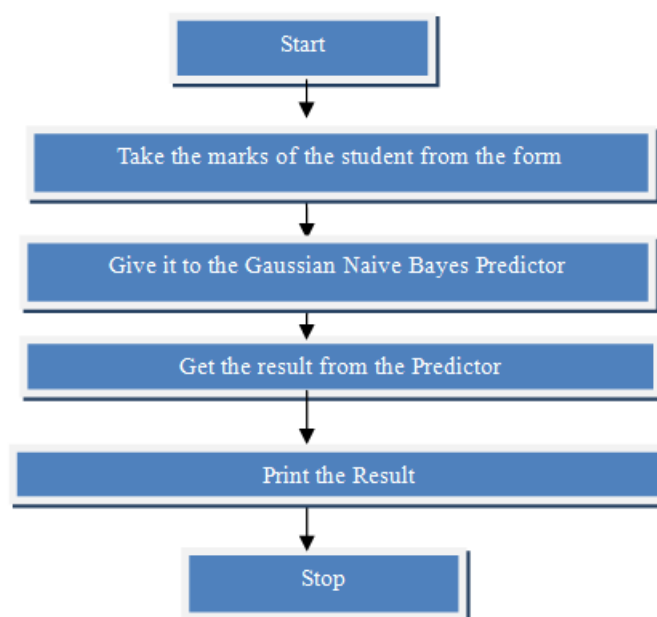


Fig. 2: Methodology applied in the proposed work

First, we'll take the marks out of the form by giving the marks to the Gaussian predictor that it gives the result that implies for which branch they belong according to their marks and we'll predict the branch for those students who attempted the mock test by using Gaussian Naive Bayes Predictor which is a classification technique. Classification means that it is a form of supervised learning that already knows the class labels. Here the class labels are branches, like CSE, ECE, EEE, MECH, food tech, and CHEMICAL as shown in Figure 2.

3.1 Creation of Database

Data can range of sources and needs to be checked before it can be put to use. You may do this by importing files that may already be available in .csv or .xlsx formats directed. Here, maths, physics, chemistry, aptitude, and the branch are the attributes we have used.

Following is Figure 3 that we have used for creating a Database.



```
In [4]: data=pd.read_csv("G:/marks9.csv")
data
```

Out[2]:

sno	maths	physics	chemistry	aptitude	branch
0	0	5	1	2	1
1	1	5	2	1	5
2	2	5	2	2	4
3	3	1	2	2	4
4	4	2	2	5	1
...
9995	9995	5	4	1	1
9996	9996	5	2	5	2
9997	9997	3	5	4	2
9998	9998	4	2	1	3
9999	9999	2	5	5	4

10000 rows x 6 columns

Fig. 3: Creating the dataset

3.2 Data preprocessing

Missing data values should be noticed in datasets in any data mining application. These can be propagated due to a lack of communication in the data collection system between the parameters. The performance of a data mining system may be influenced by these missing values and so on.

4. Methodology

To implement our proposed solution, the classification algorithm seems to be the most suitable form of the algorithm. It assigns the task to include a machine learning algorithm and the example/information algorithm focuses on one of the several separate classes. In nature, groups are clear cut, it is not workable for a case to be labeled incompletely another. A typical case of a classification task is ordering whether it is either sunny or rainy. Here in the classification, we are

using the Naive Bayes algorithm for predicting the branch for students based on the marks of the mock test.

Mathematics, physics, chemistry, and aptitude are the attributes that are needed for the extraction of data related to parameters is the first step of the system. Subsequently, such data must be organized and loaded into the database to provide a standard structure. Analysis of such data with some parameters and results can be used to measure the likelihood of the branch being predicted.

Phase I Steps:

- Phase I-Start
- The data need to be extracted from the different students that are their marks
- Collect data and convert into a standard format and load it into the database.
Analyzing the mathematics, physics, chemistry, and aptitude marks.
- For Branch prediction perform the Correlation analysis.
- Phase I stop.

Phase II Steps:

The system acquires the characteristics and outcomes from phase one and feeds them into the next classifier.

- Phase II –Start
- Get the Branch prediction of Phase1.
- Generate user reports.
- Phase II stop.

Algorithms that are used as follows:

An exclusive type of NB algorithm is the Gaussian Naive Bayes algorithm depends on conditional probability. This causes us figuring the probability that something will occur, given that something different has already happened is shown in Figure 4.

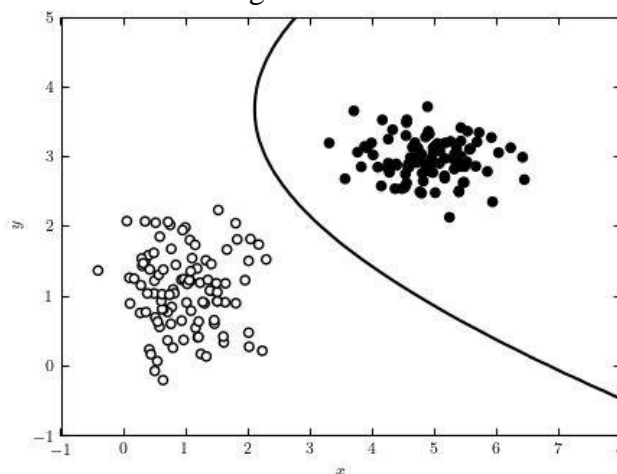


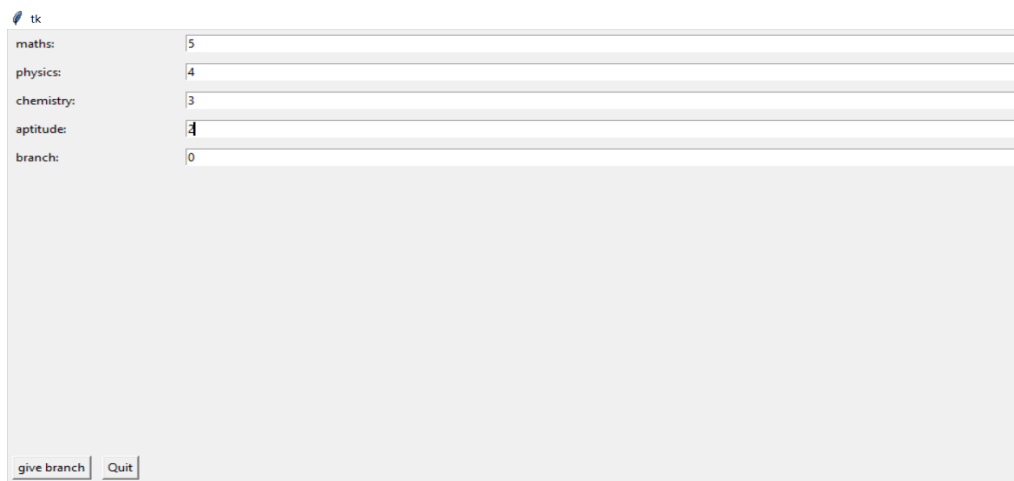
Fig. 4: Gaussian NB algorithm at predicting

Calculation of Gaussian Naive Bayes is specifically used when the functions have constant values. This is often known that all functions obey a Gaussian distribution, i.e. natural distribution.

Decision Trees are a form of supervised machine learning, according to a particular parameter, the data is continuously partitioned. This tree can be used for decision analysis to represent decisions and decision-making outwardly and clearly. Two elements, actually Decision nodes and leaves, will explain the tree. The leaves are the decisions or the actual outcomes and the node of decisions used to split the data. Decision trees acquire a sine contour with a set of if-then-else decision rules for information to inaccurate. The larger the tree, the more complex the decision principles and fitting the model.

5. Results

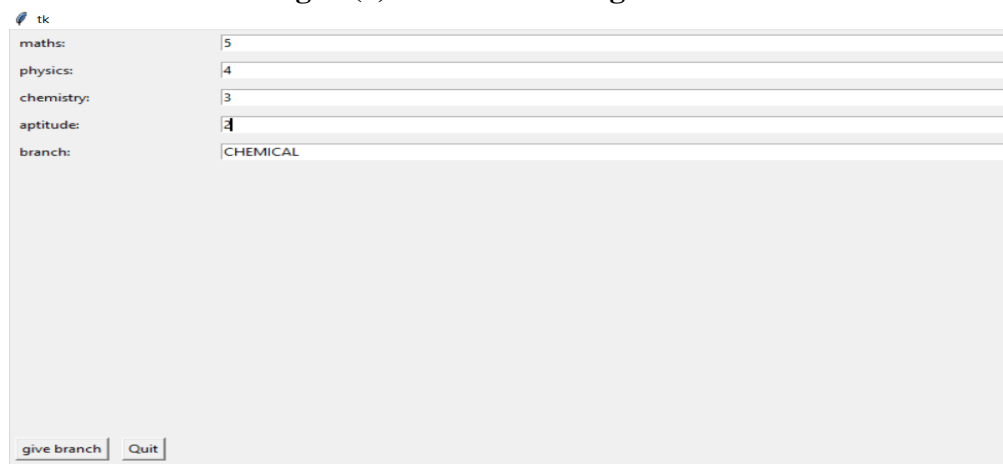
Marks Entry in the database is shown in Figures 5 (a) and (b).



The screenshot shows a Tkinter window titled 'tk'. It contains a form with five input fields labeled 'maths:', 'physics:', 'chemistry:', 'aptitude:', and 'branch:'. The values entered are 5, 4, 3, 4, and 0 respectively. At the bottom left, there are two buttons: 'give branch' and 'Quit'.

Subject	Marks
maths:	5
physics:	4
chemistry:	3
aptitude:	4
branch:	0

Fig. 5 (a): Before choosing a branch



The screenshot shows the same Tkinter window as Figure 5(a), but the 'branch:' field now contains the text 'CHEMICAL' instead of the number 0. The other fields and buttons remain the same.

Subject	Marks
maths:	5
physics:	4
chemistry:	3
aptitude:	4
branch:	CHEMICAL

Fig. 5 (b): After choosing a branch

The above tables show the user interface for the prediction of a branch. First one basic view provided to a user to enter the marks got by each student in different subjects like physics, chemistry aptitude, etc, then the data are given input to the machine learning model, then by using the historical data which we provided as input it will predict the branch according to the marks of the student.

Methods	
Name	Accuracy
Rules OneR	70
Rules ZeroR	79
Rules PART	80
Naïve Bayes	78

Fig. 6: Accuracy of each model to predict the branch

Applying various models to the test results different models produced the same accuracies, PART algorithm provided high accuracy of 80 percent compared to others. The analysis is shown below depending on the accuracy values is shown in Figures 6 and 7.

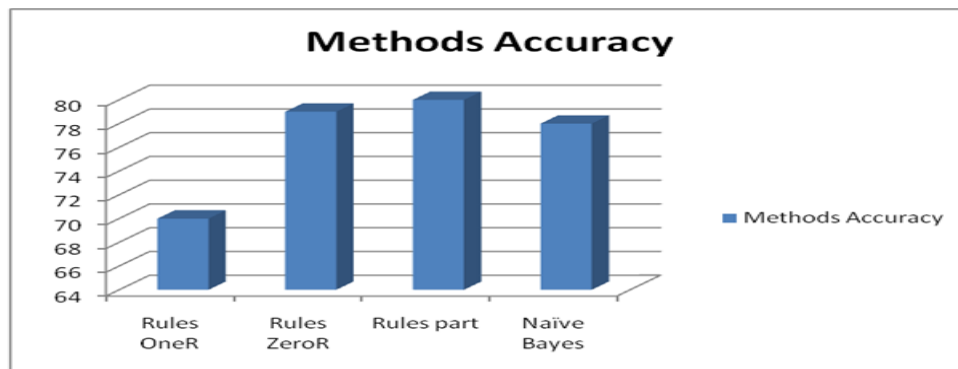


Fig. 7: Accuracy of each model to predict the branch

Here, we have used four different methods i.e., Rules OneR, Rules ZeroR, Rules part, Naïve Bayes, and also studied the accuracy in predicting branch. The results show four conclusions. The Rules part is having high accuracy when compared to other methods. In future work, we need to apply Deep learning models to increase accuracy.

6. Conclusion

The suitable branch can be predicted based on the information about the test results. So, it is very important to go to a branch that is of interest to you. There is nothing like some branch will have the best scope in the future. Every field has its importance. You should enjoy that while studying, then only you will be able to put some extra efforts to grab extra knowledge apart from your regular curriculum and that will make you different amongst the thousand of candidates. This study assists with limiting the failure ratio and making a satisfactory move for career and they can encourage the students, as it will control them to take proper choices while picking the stream as his/her profession. This framework will assist the college in analyzing the affirmations and take the fundamental activities relying on the outcomes.

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