

**Factors Affecting Admission into Postgraduation Programs
Among Bangladeshi Graduates**

BY

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This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Masters of Science in Computer Science and Engineering

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APPROVAL

This Project/Thesis titled “**Factors affecting admission into postgraduation programs among Bangladeshi graduates**”, submitted by **S M Shahriar**, ID No: **221-25-142** to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of M.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 17-01-2023.

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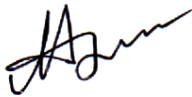
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ABSTRACT

This thesis titled “**Factors Affecting Admission into Postgraduation Programs Among Bangladeshi Graduates**” is used machine learning algorithms to determine whether students are interested or not the admit or completing the post-graduation degree, and also analysis the ratio and some factors that can think to do post-graduation after completing a bachelor's degree. For this project, the data is collected offline. There are four machine learning algorithms used for analysis. In this analysis, I got 93% accuracy from logistic regression algorithms. In this analysis there are 58.5% student from 600 total number are want to do public job, and 25.5% want to do private job after under graduation, and rest of 15.7% want to continue study in any foreign country. On the other hand, 53.2% student from 600 total number are want to do post-graduation, and 34% do not want to do graduation after under graduation, and rest of 12.8% are confused.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

A bachelor's education is followed by the completion of a postgraduate degree. All postgraduate programs share this ability to pursue further study in a specialized field, as well as the majority of them, call for just an undergrad course to also be accepted for admission. Many people pursue postgraduate degrees for multiple reasons, including to enter academics & researching or even to concentrate on a certain employment track. Many voters are determined to get a master's degree in order to completely alter their study program and job.

Most private and public institutions in Bangladesh give post-graduation graduation programs in a variety of fields, including CSE, EEE, Social Science, English, Law, BBA, and numerous others. Many post-graduate- graduate courses are also offered internet via internet sites such as coursera.org or via distance education programs at multiple global academic institutions. Any person with any educational knowledge can implement research-commissioned commissioned accountancy, based on the ICAB. Undergraduate students must maintain a GPA of 4 or 5 in their SSC and HSC, and their consolidated test scores will be considered. Students who wish to pursue CA after graduation can also apply [1].

1.2 Forms of master's degree

Among the most popular postgraduate degrees earned following an undergraduate program is a master's degree. This postgraduate certificate can be obtained in a variety of ways; however, they all generally require an undergrad degree to also be admitted. These postgraduate degree programs include

1. Engineering master's degree (MEng)

2. Science Master's (MSc)
3. Masters in the arts (MA)
4. Master of Science (MRes)

A fantastic approach to concentrating, training, or gaining abilities in their desired career, and the professional route is through a postgraduate degree. After learning the fundamental academic abilities from an undergraduate degree, postgraduate degrees are usually shorter than undergrad degrees, allowing you to effectively get additional certificates. But an average to further graduate studies toward a Doctorate is to complete a university program. Most schools often include Ph.D. applicants to hold a university program in addition to an undergrad course with a score of 2:1.

Postgraduates can educate in a variety of methods and utilize a wide range of techniques, regardless of their schedule, whether learn full-time, part-time, or even online, they all seem to be students enrolled.

Full-time students: Postgraduate students who are enrolled full-time: Students who have recently earned their university course or are aware that a postgraduate degree is necessary for particular career plans usually choose this option. As graduates who've already given up filled jobs return to university full-time, it can be a challenging transition.

Part-time students: For candidates that are a bit older or have added duties, including taking care of family, or being fully employed, pursuing a postgraduate degree part-time is a common option. Specifically for courses that culminate in professional certification, most individuals will still have lengthy professional goals in sight and may receive support or funding from their workplace for just a part-time program.

Online students: A typical virtual classroom course consists of books, reference books, or sometimes a few resident teaching sessions spread over the course of the academic year. There could never be a use for current learners to visit the institution in which the program is taught because the majority of their time is spent internet.

1.3 Objective

1. To find out why many students do not want to complete their education after graduation.
2. To Find out the ratio of male and female to do post-graduation
3. To find out what is their thought to do after they complete graduation
4. To find out the reason who needed to complete post-graduation

1.4 Motivation

In Bangladesh, most of the students completed their bachelor's degree, and then they can find jobs. Many students didn't want to do post-graduation. So, I want to do an analysis that what is the condition a student can follow to do post-graduation

1.5 Outcome

1. In my analysis, I will present the ratio and some factors which can think to do post-graduation after completing a bachelor's degree.
2. Estimate the number of students who will be interested in enrolling in post-graduate programs.
3. Find out best Model and Accuracy.

1.6 Research Questions

1. Does it predict an actual output by given sample data with the system?
2. Can it classify if they can not postgraduation by using a machine learning algorithm?
3. Does every algorithm work perfectly (yes/no)?
4. Do I know the addiction ratio of Students ages?

It can, really. All of the data were completing this activity, and the information was correctly compiled. 600 data points from university-level students were gathered by me through the use of Google. Although I obtained a great outcome, the other algorithms didn't provide us with adequate accuracy or information.

Yes, it classify if they can not do post graduation by using a machine learning algorithm. I show it with confusion matrix.

Yes every algorithm work perfectly. I apply four machine learning algorithm. This algorithms are: logistic regression, naive bayes, bagging classifier, and mlp

Yes, I know the addiction ratio of post graduation ration in my research.

1.7 Report Layout

Chapter 1 It contains details on my motivation, goals, and the typical outcomes of my work.

Chapter 2 I examined relevant research, comparable studies.

Chapter 3 I'll discuss the topic of my study, the tool I employed, the method I utilized for data collection, data analysis, and implementation.

Chapter 4 I shown table and discuss about the results.

Chapter 5 Here i discuss about conclusion of my research.

CHAPTER 2

LITERATURE REVIEW

2.1 Previous Paper Analysis

Sandri et al. emphasize the importance of gauging graduate abilities after college graduation, as well as the problems that such a job presents. The study investigates factors to consider when assessing graduate educational objectives, particularly the distinction among evaluating competencies, abilities, and capabilities and the importance of measuring the former in the setting of environmental education of future managers. Measuring graduate absorption & implementation of sustainable skills is an essential aspect of enhancing sustainable pedagogy and curriculum in order to produce survival graduates for the 21st era [2].

According to Sheridan et al., the outcomes of the independent regression models for the duration of time required to complete a doctoral or master's degree show that the duration of time required to complete a degree is influenced by slightly different factor matrices. Although the findings presented here suggest potential pathways for accelerating degree development, more research is needed for making any drastic modifications because the issue is complicated. The goal of the current study was to determine how diverse socioeconomic, intellectual, and economical factors affected how long it took to obtain master and doctoral degrees. Only 7 of the twenty potential independent factors were substantially associated with a graduate student's stay in a master's degree. This study includes students from graduate programs in the natural sciences, social sciences, and humanities [3].

According to Mouton et al., issues about the economy, instead of issues about efficacy and quality, dominate the conversation in South African higher education today. Instead of addressing the difficulties faced by post-graduate students who lack the necessary academic preparation, they place too much emphasis on management and administrative solutions. They lack comprehensive and reliable information regarding South Africa's

doctorate dropout rates. According to anecdotal evidence, between 30% and 40% percentage of all enrolled students never finish their education. In SA, the number of academic staff members has expanded over the last 10 years by less than 20 percentage points during the same time period. Here, enrollment in and graduation from master's and doctoral programs have risen by more than a third, and the amount of research done by academic staff during this time has climbed from 5000 to 6600 output nodes [4].

Angell et al. recognize and evaluate the fixed broadband employed among postgraduates for satisfaction level. It additionally presents a live demonstration of IPA's app. Utilizing Martilla and James's IPA method, every key component then was examined for overall service quality. The evaluative phase yielded twenty service attributes. Professionals may effectively detect regions for care importance inside this study [5].

The IELTS study's validity was looked into by Woodrow et al. 82 foreign enrolled students in postgraduate courses just at institution made up the student sample. This institution's average IELTS admission requirement is 6.5. For both the journal article and laptop versions of the TOEFL, the starting score is 577. Here the small size of the associations suggests that just a small fraction of the first educational excellence is accounted for by English competence. IELTS serves as a gatekeeper, therefore there isn't a whole spectrum of IELTS results accessible, which makes it difficult to evaluate the predictive validity of IELTS. Over 50 percent of a professional group felt the admission threshold was just too low, in contrast to the student organization, which thought it was roughly appropriate. However, this research showed that talking, hearing, or producing, on only one side, and GPA in trimester 1, had positive relationships rather than the pupils' literacy score being connected with productivity [6].

Blease et al. used a technique to examine the awareness or formalized engagement of postgraduate psychology graduates to things relating to machine learning and artificial intelligence throughout the education. Statistical results with 95percentage margins of error were extracted from the quantifiable questionnaire responses through analysis.

Nearly half 46% of the participants said they wanted to understand further about AI and ML. Additionally, participants answered that they learned for an average of 6.18 hours. This is a projected sum of 18.61/3,600 h, or 0.52% of their total degree, when accounting for both actual and projected time being spent on Machine learning coursework [7].

According to Fang et al., 6.5% of Chinese university post - graduate students suffer from depression. They investigate if natural assessment might function as just an useful and trustworthy technique to aid in melancholy identification by putting these variables to classifications with various machine learning algorithms. The findings demonstrate that now the second group may be autonomously identified with such a great accuracy of 91.58% when employing a random forest classification [8].

By utilizing and contrasting several ML algorithms, Baashara et al. forecast the academic achievement of students just at post - graduate level, specifically their CGPA. The most effective predictive method is ANN. The findings show that each predictor significantly affects the result [9].

Nadeem et al. research numerous methods of machine learning in the research and use the best algorithm to create a prediction system. The forecasting model offers several strategies to increase revenues in institutions using the Decision Tree approach. Full comprehension of this forecasting model can help institutions increase their employment and income by identifying and lowering the likelihood of early repayment or deferred graduating [10].

Using machine learning (ML) methods, Zhou et al. create statistical models for the degree of AP and investigate the key factors that influenced the forecast outcomes. 5 different ML predicting models were created to forecast the intensity of AP using the statistical profile, blood flow and hematological parameters indices, and the CTSI level. With an AUC of 0.906 and an accuracy of 0.902, XGBoost outperformed other ML models in regards to predicting acute AP [11].

CHAPTER 3

METHODOLOGY

3.1 Explanation of the data

Data collection

In my research will collect real data set, for this purpose, I will use Google Forms. In this research paper, there are 200 data and 15 attributes. My selected question for collecting data

1. Age (your age)
2. Gender (Male| Female)
3. Result of primary level (your result)
4. Result of secondary level (your result)
5. Any year gap (yes| no)
6. Are you satisfied with your bachelor's subject (yes|no)
8. What do you do after completing a bachelor's degree (private job|preparation for govt job| teaching)
9. Are you enjoying your educational life (yes|no)
10. Are you complete post graduation after graduation (yes|no)
11. Do you change your subject post graduation level (yes|no)
12. Do you want to do your post-graduation in a foreign (yes|no)
13. Are you think to do post graduating will help your career (yes|no|maybe)
14. If you are female, why do you not continue studying after graduation (marriage|expensive|family problem)
15. Which level does a teaching candidate need to do (bsc|msc| Ph.D.)

3.2 Algorithm description

Machine learning is now contributing more to analysis. In my study analysis, I used four machine learning methods, which I will detail below.

3.2.1 Bagging

The Bootstrapping integration is a ML technique that combines a mechanism intended to increase the legality and reliability of algorithms employed during processing and retrieval, as well as what is thought to just be content. By adding, variability is decreased and overdosing is prevented. Bulk predictions are frequently made using bootstrap predictive models, which may be used to include a variety of predictive models. The subdivision or retrospective rule was implemented to every random subset, and a new forecasting measuring device forecasts from viewers of each foundation in the setting of hindsight this resource might be a simple general rule for all duplicates of the bootstrapping measurement device of a main training session carried out. Once the issue of segregation has been handled, the lowest student forecast grading system includes a bully vote in mass or by evaluating any open division possibilities. X is a guessable record, f_{bag} is the bagged forecast, and $f_1(X), f_2(X), \dots, f_b(X)$ are forecasts from users of each basis. It's going to be connected to Calculation.

$$f_{bag} = f_1(X) + f_2(X) + \dots + f_b(X) \dots \dots \dots 1$$

Because of the aggregation strategy, bagging efficiently lowers the variation of the a personal learning algorithm (— in other words, average reduces variability); yet, bagging does not constantly enhance a private base learner. Bagging is extremely beneficial with volatile, multi-variable trainees that prediction accuracy varies dramatically in response to minute adjustments in coaching input. This includes the call tree and K nearest algorithms. Sacking, on the other hand, produces less rise in anticipated outcomes for systems with high unit stability or bias because there is less fluctuation.

3.2.2 Logistic Regression

A quantitative analytical method called logistic regression uses observed data from a data set to forecast a down two, such as yes or no. Used which for inputs can be taken into account using a logistic regression model. The logistic regression can take into account the student's point average, Test score, and number of extracurricular activities in the event of university admission. Then it rates instances according to the likelihood of fitting into one of two performance groups using historical data about earlier outcomes utilizing the same inputs parameters.

Since it reduces complicated probability calculations to simple arithmetic problems, logistic regression is crucial. Although the computation alone is admittedly somewhat complicated, most of the tedious work is automated by contemporary statistical software. L means curves maximum value, k = logistic rate, x = real number, x0 = x value sigmoid midpoint

The function of logistic regression:

$$f(x) = \frac{L}{1 + e^{-k(x-x_0)}}$$

3.2.3 MLP classifier

An artificial neural network that produces a collection of outputs from a set of inputs is called a multi layer perceptron (MLP). A graph connecting the input and output layers of an MLP is made up of multiple layers of input nodes. Back propagation is used by MLP to train the network.

Multi-layer Perceptron classifier, or MLP Classifier, is connected to a neural net by the name itself. MLP Classifier, in contrast to those other different classifiers such Support Vectors or Naive Bayes Classifier, uses an underpinning Neural Network to carry out the classification.

A supervised learning system called a multi-layer perceptron (MLP) trains on a database to learn a function,

3.2.4 Naive Bayes classifier

A detection model that works well for multi class and binary categorization is called Naive Bayes. In comparison to numerical input variables, naive Bayes performs better in cases of categorical input parameters. It is helpful for anticipating information and for making forecasts based on previous outcomes.

The Naive Bayes Classifier is another one of the straightforward and efficient different classifiers that aids in the development of rapid machine learning models capable of making precise forecasts. Being a classification technique, it makes predictions based on the likelihood that an object will occur.

3.3 Data Implementation

In this part, I draw a graphic to help explain my analysis. Every aspect of this diagram is explained below the illustration.

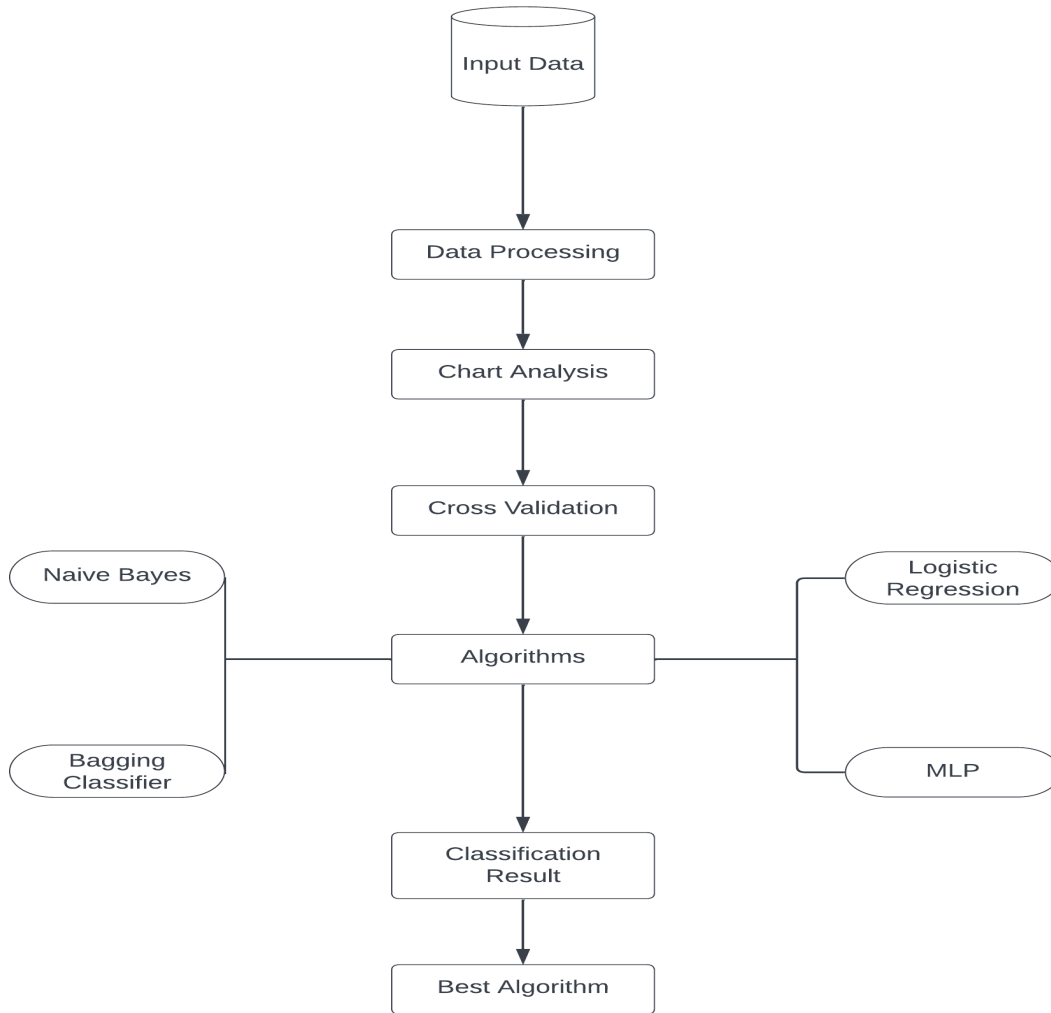


Figure 1: Diagram of Implementation Process

3.3.1 Input data : A system file holding data that will be utilized as input by a system or piece of software is known as input data. the source file Computational engineering is the branch of engineering technology that uses machines to study processes and structures that are calculable. There are 600 data use for this analysis.

3.3.2 Data Processing: Throughout machine learning terminology, data per-processing-processing entails the conversion of fresh characteristics into information that a machine learning model can comprehend and benefit from. Most true sets of data will contain a few incomplete data. This may be due to a variety of factors. The framework that generated the information might well have committed an error, resulting in measurement errors, or a valuation could be absent since it is irrelevant for a single subset. Data per-processing includes data cleaning, trying to import missing values, binning, and feature scaling.

Cross Validation: Cross-validation is indeed a method that entails training in our framework with a subcategory of the set of data and then evaluating it with the supplementary subcategory of a data set. Cross-validation gives a more precise guesstimate of out accuracy. Information is employed more "efficiently" because each analysis is employed for all these testing and training purposes. Cross-validation strategies such as k-fold cross-validation allow you to approximate the effectiveness of a model without compromising the test divide. Here I used 10-fold cross validation.

3.3.3 Algorithms: I utilised four algorithms for my investigation to determine the confusion matrix, correlation matrix, and so on. All of this information is provided in the table section.

1. Bagging Classifier
2. Logistic Regression
3. Multi-layer Perceptron classifier
4. Naive Bayes

3.3.4 Classification Result: I utilise Weka tools to discover the correlation matrix, confusion matrix, f 1 measure, and many other things after applying the method.

3.3.5 Best algorithm: I examined four algorithms, and one technique provided the greatest accuracy as well as the best confusion matrix result.

3.4 Chart Analysis

In this section, I analysis some visualization to fulfil my research. Here I gives five chart analysis to shown that ratio of different parameter.

3.4.1 Some analysis of ratio

Will you complete post graduation after graduation?
600 responses

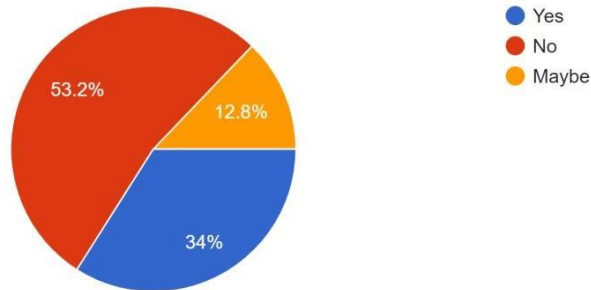


Figure 3.2: percentage of post graduation

In this chart I want to shown everyone that 53.2% student from 600 total number are want to do post graduation, and 34% do not want to do graduation after under graduation, and rest of 12.8% are confused.

What do you do after completing bachelor's degree?

600 responses

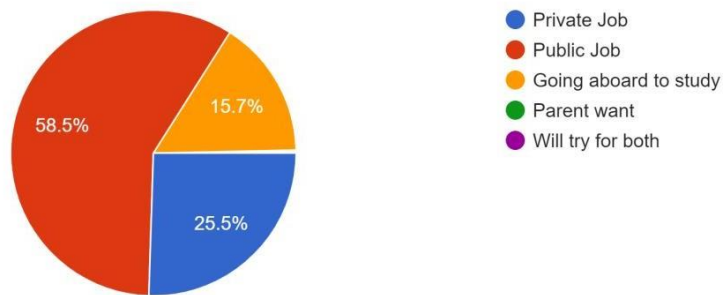


Figure 3.3: Cause of not continue study after graduation

In this chart of what do you do after completing bachelor's degree question, I want to shown everyone that 58.5% student from 600 total number are want to do public job, and 25.5% want to do private job after under graduation, and rest of 15.7% want to continue study in any foreign country.

CHAPTER 4

RESULTS ANALYSIS

4.1 Performance Analysis in Correlation Matrix

This table was the analysis result of my five algorithm. For finding this result I used weka tools.

Table 4.1: Evaluated the results of all algorithms

Classification	Class	TP Rate	FP Rate	Precision	Recall	F-Measure	ROC Area	PRC Area
Naive Bayes	Yes	0.256	0.053	0.250	0.256	0.253	0.669	0.238
	No	0.947	0.744	0.948	0.947	0.947	0.669	0.956
Bagging	Yes	0.00	0.00	0	0.00	0	0.666	0.121
	No	1.00	1.00	0.935	1.00	0.966	0.666	0.984
Logistic Regression	Yes	0.51	0.005	0.400	0.051	0.091	0.654	0.151
	No	0.995	0.949	0.938	0.995	0.965	0.654	0.957
MLP(Multi-layer Perceptron)	Yes	0.128	0.037	0.192	0.128	0.154	0.594	0.154
	No	0.963	0.872	0.941	0.963	0.936	0.952	0.952

4.2 Confusion Matrix and Accuracy Analysis

Table 4.2: Results of confusion matrix and accuracy

Classification	Accuracy	Label	Actual positive	Actual negative
Naive Bayes	90%	Predictive positive	10	29
		Predictive negative	30	531
Bagging	93%	Predictive positive	0	39
		Predictive negative	0	561
Logistic Regression	93%	Predictive positive	2	37
		Predictive negative	3	558
MLP(Multi-layer Perceptron)	90%	Predictive positive	5	34
		Predictive negative	21	540

This result represent that about 93% accuracy I get from bagging and logistic regression and for confusion matrix analysis the best algorithms for this research are logistic regression.

CHAPTER 5

CONCLUSION

5.1 Conclusion: I used machine learning algorithms to determine whether students are interested or not the admit or completing the post-graduation degree, and also analysis of the ratio and some factors that can think to do post-graduation after completing a bachelor's degree For this project, the data is collected offline. There are four different machine learning algorithms are use like: Naive Bayes, Bagging, MLP(Multi-layer Perceptron), and logistic regression. In this analysis, I got 93% accuracy from logistic regression algorithms. In this analysis there are 58.5% student from 600 total number are want to do public job, and 25.5% want to do private job after under graduation, and rest of 15.7% want to continue study in any foreign country. On the other hand, 53.2% student from 600 total number are want to do post graduation, and 34% do not want to do graduation after under graduation, and rest of 12.8% are confused.

5.2 Future work: I used four algorithms to predict here, and I want to use more in the future to identify it. I can employ a variety of techniques to achieve better and ideal results. Deep learning or artificial neural networks should be used in our future study for the greatest results.

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APPENDIX

Abbreviation:

ML : Machine Learning

DM : Data Mining

NB : Naive Bayes

BC : Bagging Classifier

LR : Logistic Regression

MLP : Multi-layer perceptron

CSE : Computer Science Engineering

EEE : Electrical and Electronics Engineering

BBA : Bachelor of Business Administration

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