

**SATISFACTION OF ONLINE EDUCATION IN COVID-19 OF BANGLADESH BY
MACHINE LEARNING**

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of
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APPROVAL

This Project/internship titled “SATISFACTION OF ONLINE EDUCATION IN COVID-19 PANDEMIC SITUATION PREDICTION WITH DATA MINING IN BANGLADESH” submitted by Lamisha Haque Poushy, ID:171-15-8958, Salauddin Ahmed Bhuiyan, ID:171-15-9130, 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 B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on **January 2021**.

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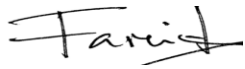
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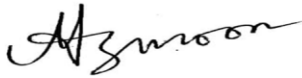
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DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Ms. Nazmun Nessa Moon, Assistant Professor, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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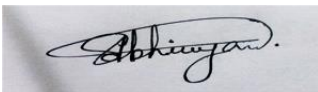
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ABSTRACT

Our research paper “SATISFACTION OF ONLINE EDUCATION IN COVID-19 PANDEMIC SITUATION PREDICTION WITH DATA MINING IN BANGLADESH” focus on education based online learning platform. Online education is becoming more popular all over the world because of COVID-19 pandemic situation. Counted how effective it will play by conducting a survey of 799 students from different academic institutions, schools, colleges and universities on the quality of online education in COVID-19 pandemic situations. Influence online measurement and overall satisfaction with online learning. We used an online google form as the method of data collection for this survey. This paper perused the prediction of online education through data mining and machine learning approaches in an online program. The data was collected through online questionnaires. To predict the satisfaction rate of online education we use Linear Regression algorithm and Logistic Regression model. The main goal of this study is to see student are satisfied with starting the new online class teaching system, whether it will have an ambivalent effect on students in the future.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

2020 was a memorable year where the fear that will paralyzed the whole world and also paralyzed human life is the COVID-19 pandemic the pestiferous affliction COVID-19 first find out on 17 November 2019 in the city of Wuhan at Hubei province in China [1]. According to WHO the pestiferous affliction COVID-19 was first detected in December 2019 in China [2]. This COVID-19 pandemic has lamed the world healthcare system and is affecting the subsistence of every human being. The first three cases of COVID-19 stretch to Bangladesh on 8 March 2020 [3]. In order to obstruct the stretch of the disease the government of Bangladesh decided that all of the communication shut off like museums, close to all educational institutions, restaurants, office, market, movie theatres and maintain social distance. Shutdown every country's border connection and travel. As a result of around more than 23.1 million students in class were suspended in COVID-19 situation. Many countries' education institutes started regular online teaching to students by Google Meet, Zoom, Ziteboard, Skype, Screencastify, FaceTime.in order to promote online education keep running general education going on the university first started offering online education soon later started colleges and schools institutions. Now google meet, Zoom and Facebook live offer services deliver such as online teaching and classroom. However we face some problem on online education platform such as access to the internet limited, unavailability of electronic devices, lofty cost of internet, speed of low internet, Whether these virtual education platform cam meet the needs of students and teachers, whether network learning is capable of high quality teaching and learning, online education can become an effective medium of special time education in Bangladesh and perspective of Bangladesh suggestion developed the network online education according to the research result. At present time, researchers in many countries are trying to figure out in their research how useful online learning methods are for students. Samiha Binte Tariq and Tasnia Fami mention in her own article that 49.30% of the students become victims to poverty in her school level students 51.70%, college level students 42.40% and university level students are 19.0% according to SANEM [3]. T.Sultana, R.H. Khan published a paper from

Bangladesh Education Journal where they use 150 students' data(public and private university). The result of this study is that e-learning is satisfied urban and rural area students, measuring the satisfaction level e-learning of public and private university students [4]. Also many colleges and universities provide various tutorials for better understanding. However, COVID-19 pandemic situation, online education is largely conducted by teachers in their own institutions. Subsequent studies discussed the satisfaction of online learning or education platforms and did not focus on quality of interaction. This paper is evaluated based on all the past information of the data in online education platforms in Bangladesh students. Are students satisfied with online education platforms? We used a Logistic Regression algorithm, linear regression model and saw which one gave me a better accuracy output in this method.

1.2 Motivation

People of every country have kept running their education system online because education is the basic needs and backbone of a nation. The expansion of education is necessary to sustain every nation. That's the reason students are joining online education platforms and completing their running course. If you take your education then you improve yourself, grow your national GDP and work in a better place. If you are educated, you teach your future generation so we thought to find out if the students are satisfied with this online class teaching. And what effect it will have on a student's humanity in the future.

1.3 Rationale of the Study

Choosing the topic for the rationale of this study is to keep running this education system to grow a nation's backbone. The need for constructing the probability of adapting recent course delivery via online education technologies known as blended class and online learning could be take in their decision. Plan making procedure shaped the reasoning for the topic of this study. In a general way, this study will subscribe to present learning about online education and the role of students. It is Faith that the dynamic findings of the research will retain a basis for future inquiry.

1.4 Research Question

- Which one is better? - Physical class, Online class
- Which costs you more money for educational purposes? - Physical class, Online class
- Why physical class is better? - Understood better , Good conversation , Concentrate better
- Why online class is better?- Anytime attend class, The teacher can be contacted at any time, No transportation problem
- Feedback of student understanding to teaching?
- Teacher and student communication?
- Are you satisfied in online education?- Yes, no

1.5 Expected Outcome

Expected outcome of this study is to predict the students satisfied with this online class teaching.

Through this survey to know the mean cost that students consume daily using online platforms.

1.6 Report layout

In this research paper is arranged into the basis of following chapters-

Chapter 1 -: Presenting an overview satisfaction of online education in COVID-19 pandemic with data mining in Bangladesh, motivation, rationale of the study and expected output.

Chapter 2 -: Background discusses the other author paper and benefits, research summary, challenges and scope of the problem.

Chapter 3 -: This chapter discusses research subject and instrumentation, data statistical analysis and implementation requirements

Chapter 4-: Experimental results introduction and discussion experimental results and descriptive analysis and summery.

Chapter 5 -: Presenting a short summery of the study, conclusion and list of reference

CHAPTER 2

BACKGROUND

2.1 Introduction

We choose “SATISFACTION OF ONLINE EDUCATION IN COVID-19 PANDEMIC SITUATION PREDICTION WITH DATA MINING IN BANGLADESH” to predict whether students are like online education or not. In this background chapter, we will discuss related work or the literature review to satisfaction of online education prediction with data mining of different types of author paper work.

2.2 Related Works

Different researchers and scholars from different countries have conducted research on the success of online education and development of their online education technique. Many scholars and researchers in Bangladesh worked on online education systems. Following are some common studies that have been done on online education, Sushmita Dutta and Marzia Khatan Smita [5] recently work on an online education system to discourse impact of tertiary education system through the students in Bangladesh. They collected 50 university student’s data semi-structured interviews and used data analysis methods. They find some problems of tertiary level education in Bangladesh and provide some essential information or steps that should be taken into this COVID-19 situation then it will be possible to give good education in future.

M. E. Hossain et al. [6] identified the correlative factors that more affect students for higher education in Bangladesh, on the basis that they collected 182 students data from several public universities and private universities in bangladesh. in this study used binary logistic regression to predict the importance of the factor of student satisfaction. Predict facilities of bus service to find random sampling methods, urban and rural area student’s satisfaction level, they find accuracy level those students who are undergraduate. Also showed both male and female both university student’s satisfaction level

The scholar of M. M. Uddin [7] discussed only the one public university that's Dhaka university students in Bangladesh among 417 data collected and only analyzed 388 students. The studies main focus is quality of online service and information impact of online teaching and impacts

online teaching and how improve to deliver better online education teaching and platform to students. The author used SMART-PLS 3.0 software, Structural Equation Modelling (SEM) method to find more precise estimated values and used DMISM (Delone and Mclean information system success model) model. Author interpretation that student's satisfaction is 44%. Syed Saad Andaleeb [8] worked from higher education students who are getting graduated, author used multiple regression to predict the satisfaction and adept 9 factor model in this paper.

H. C. Mahonta [9] shows a model study has been done on 250 students of a degree college dinajpur, Bangladesh. Author used a study model of RATER or SERVQUAL. And used SPSS (v, 23) software to find the mean of result. The author highlighted the limitations of this study. Many students do not share their right to counsel. Lack of personal understanding mistake. And one of the biggest limitations is data samples.

A Portugal scholar S. Moro et al. [10] finds student's satisfaction by a gust model with a nine dimension factor. The Author uses an online review data set of 80 thousand students and finally works on 60 thousand students online review data set feature of 29 input also CRISP-DM method. Previously the author [5] used the same model but different method (DMISM) to find predicates of satisfaction.

Erman Yukselturk et al [11] collected 189 surveys on DROPOUT STUDENTs about ONLINE EDUCATION PROGRAM. They use k-Nearest Neighbour (k-NN), Decision Tree (DT), Naive Bayes (NB) and Neural Network (NN) algorithm for prediction. They got 87%, 79.7%, 76.8% and 73.9% for 3-NN, DT, NN and NB. They got 63% accuracy but after preprocessing they got 83% accuracy.

Nurbiha A Shukor et al [12] studied about 20 undergraduate students about the course Web-based Multimedia Development. They use k-Nearest Neighbour (k-NN), Decision Tree (DT), Naive Bayes (NB) and they got 78% accuracy.

Elaf Abu Amerieh et al [13] predict about student's online academic curricular. They propose a new model about data mining technique. . They use Decision Tree (DT), Naive Bayes (NB) and Neural Network (NN) algorithm for prediction. They got 25.8% accuracy but after testing the new comer student they got more than 80% accuracy.

Tingui Chen et al [14] collected 800 surveys on user satisfaction with online education. They use BP Neural Network Algorithm for prediction data and the prediction accuracy reached 77.5%.

Hung et al [15] surveyed on 7,539 students about Program Evaluation of K-12 Online Education. They used EDM applications and got 87.6% accuracy.

2.3 Research Summary

Now-a-days every country is enhancing their education system day by day, in continuity online education is a part of it. In this pandemic situation, the spread of online education has become widespread. So it is important for us to know whether the students are able to understand the online teaching or not. This study focuses on predicting student satisfaction with online education in this pandemic situation.

2.4 Scope of the Problem

The focus of the study is on whether students are satisfied with this online teaching or whether they understand it properly while teaching online. The study helps all types of students to the role of online education in the current situation and what problems they are facing. It will bargain relevant material for students and other scholar's undertaking similar research.

2.5 Challenges

I. Data Collection

Data mining means collect more data and predict something. In this pandemic situation everyone stays home. That's why we decided to collect data from online. When we give to question school and college level student they did not understand what they should fill and everyone doubted that this information is it efficient or not who fill the online form.

II. Model selection

Model selection is one of the hardest parts of a research. The success of any research paper depends on accurate data set and Model selection. If we can choose the model correctly, there should be a positive outcome. On the other hand choosing a bad one may lead to failure as a sure fact. For this study, we use the point that linear regression algorithm and logistics regression model. As we know Google provides a free virtual GPU (Colaboratory). So, we worked at google CoLab to find out our best algorithms.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter we presents the methodology of this survey and makes out many strategies which describe which one (physical education or online education) is preferred by students in BD. The review will include the Research Subject and Instrumentation, Data Collection Procedure, Statistical Analysis. Implementations for the research paper, data collection, research topic, pre-processing, processing and its result will be discussed in this chapter. We use Linear Regression, Logistics Regression for implementation. We use pandas, numpy, scikit, sklearn libraries for implementation.

3.2 Research Subject and Instrumentation

Data is the main part of the research. It is a very critical part for a researcher to find out perfect data and perfect algorithms or models for our research work. Also, the questionnaire is a critical stage in the survey research procedure, the questionnaire must be pertinent and perfect in trying to capture the summery of the research objective. We also need to study about related research papers.

Then we need to make several decisions:

1. Which data should be collected?
2. How to ensure that collected data are ok?
3. How should each data be organized?
4. How should each data be labeled?

3.3 Data Collection Procedure

This survey, we used a questionnaire like a dataset. It contains questions formulated based on the research questions presented in this study. The query were set in a way that examines which one prefers students, physical class, or online class. These data are mainly selected on the satisfaction of online education according to the student's institute type, gender, age, the

physical class is better or online class is better, cost of internet, feedback, teacher-student communication, satisfaction rate.

1) Data Pre-processing

Data pre-processing refers to the pre-phase of processing datasets. Generally, raw data sets are not able to perform according to the algorithm and generate expected outcomes. So according to our research data pre-processing is required. In this phase, we have collected 799 surveys. And to preprocess we sort our data in Google Spreadsheet (Figure-3.1). Then we converted each data to the numeric value. Then we organized each data to check the accurate prediction rate.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Gender	Age	Institute	hours	IU	cost	Internet	platform	better	pcb	ocib	st	tc	group
2	1	22	3	6	0	700	3	3	1	0	0	2	0	
3	0	23	3	3	0	700	1	3	1	0	0	2	3	
4	0	24	3	3	0	500	3	3	1	0	1	2	4	
5	0	22	3	6	0	600	5	3	1	0	0	7	1	
6	0	24	3	3	0	500	3	3	1	1	1	3	3	
7	0	23	3	3	1	800	2	3	2	1	1	4	0	
8	1	23	3	5	0	500	2	3	1	1	2	2	2	
9	0	23	3	3	0	500	2	3	1	2	2	3	0	
10	0	23	3	3	0	500	4	3	1	1	0	3	2	
11	0	23	3	2	1	200	2	3	1	0	2	3	0	
12	0	24	3	6	0	850	2	3	1	0	2	9	1	
13	0	23	3	3	0	500	1	3	1	0	0	2	1	
14	0	24	3	3	0	700	3	3	1	1	0	4	2	
15	0	23	3	4	1	900	8	3	2	0	2	7	2	
16	0	24	3	3	1	1200	2	3	2	2	0	3	3	
17	1	22	3	4	0	600	2	3	1	1	2	4	0	
18	0	13	1	4	0	1000	9	2	1	0	0	3	0	
19	1	21	3	5	0	1000	6	2	2	2	2	5	2	
20	0	12	1	4	0	700	20	2	1	2	2	6	0	
21	0	19	3	6	0	500	12	3	1	2	1	4	1	
22	0	19	3	3	0	7000	5	3	1	1	2	4	0	

Figure 3.1: Numeric dataset

Besides, we have preprocessed data on WEKA. First we upload .CSV file on WEKA, then we convert it into .arff file which is denoted as attribute file format with the end goal to classify our accuracy of prediction. Figure 3.2 exhibits a screen capture of the organizing part of the .arff file which is constructed with software tools WEKA.

```

File Edit Format View Help
@relation fd
@attribute Gender numeric
@attribute Age numeric
@attribute Institute numeric
@attribute hours numeric
@attribute IU numeric
@attribute cost numeric
@attribute Internet numeric
@attribute platform numeric
@attribute better numeric
@attribute pcib numeric
@attribute ocib numeric
@attribute st numeric
@attribute tc numeric
@attribute syp numeric
@attribute ccb numeric
@attribute satisfied numeric

```

(a) Attribute section of .arff file

```

File Edit Format View Help
@data
1,22,3,6,0,700,3,3,1,0,0,2,0,0,0,1
0,23,3,3,0,700,1,3,1,0,0,2,3,2,0,1
0,24,3,3,0,500,3,3,1,0,1,2,4,0,0,1
0,22,3,6,0,600,5,3,1,0,0,7,1,0,1,1
0,24,3,3,0,500,3,3,1,1,1,3,3,0,0,1
0,23,3,3,1,800,2,3,2,1,1,4,0,0,0,0
1,23,3,5,0,500,2,3,1,1,2,2,2,0,0,1
0,23,3,3,0,500,2,3,1,2,2,3,0,1,0,1
0,23,3,3,0,500,4,3,1,1,0,3,2,0,0,0
0,23,3,2,1,200,2,3,1,0,2,3,0,1,1,0
0,24,3,6,0,850,2,3,1,0,2,9,1,2,0,1
0,23,3,3,0,500,1,3,1,0,0,2,1,2,0,1
0,24,3,3,0,700,3,3,1,1,0,4,2,2,1,1
0,23,3,4,1,900,8,3,2,0,2,7,2,2,0,0
0,24,3,3,1,1200,2,3,2,2,0,3,3,0,0,0
1,22,3,4,0,600,2,3,1,1,2,4,0,0,0,1
0,13,1,4,0,1000,9,2,1,0,0,3,0,2,1,1
1,21,3,5,0,1000,6,2,2,2,2,5,2,2,0,0
0,12,1,4,0,700,20,2,1,2,2,6,0,2,0,0
0,19,3,6,0,500,12,3,1,2,1,4,1,2,0,1

```

(b) Data section of .arff file

Figure 3.2: .arff format of dataset

2) Data Organizing

For organizing the data, we have stored it in a Microsoft Excel file. Besides, we have created sub-folders.

3) Labeling Data

At this part we use Google spreadsheet and Python in Google CoLab. The dataset is given below.

1	Gender	Age	Institute	hours	IU	cost	Internet	platform	better	pcib	ocib	st	tc	syp	ccb	satisfied
2	1	22	3	6	0	700	3	3	1	0	0	2	0	0	0	1
3	0	23	3	3	0	700	1	3	1	0	0	2	3	2	0	1
4	0	24	3	3	0	500	3	3	1	0	1	2	4	0	0	1
5	0	22	3	6	0	600	5	3	1	0	0	7	1	0	1	1
6	0	24	3	3	0	500	3	3	1	1	1	3	3	0	0	1
7	0	23	3	3	1	800	2	3	2	1	1	4	0	0	0	0
8	1	23	3	5	0	500	2	3	1	1	2	2	2	0	0	1
9	0	23	3	3	0	500	2	3	1	2	2	3	0	1	0	1
10	0	23	3	3	0	500	4	3	1	1	0	3	2	0	0	0
11	0	23	3	2	1	200	2	3	1	0	2	3	0	1	1	0
12	0	24	3	6	0	850	2	3	1	0	2	9	1	2	0	1
13	0	23	3	3	0	500	1	3	1	0	0	2	1	2	0	1
14	0	24	3	3	0	700	3	3	1	1	0	4	2	2	1	1
15	0	23	3	4	1	900	8	3	2	0	2	7	2	2	0	0
16	0	24	3	3	1	1200	2	3	2	2	0	3	3	0	0	0
17	1	22	3	4	0	600	2	3	1	1	2	4	0	0	0	1
18	0	13	1	4	0	1000	9	2	1	0	0	3	0	2	1	1
19	1	21	3	5	0	1000	6	2	2	2	2	5	2	2	0	0
20	0	12	1	4	0	700	20	2	1	2	2	6	0	2	0	0
21	0	19	3	6	0	500	12	3	1	2	1	4	1	2	0	1
22	0	19	3	3	0	2000	5	3	1	1	2	4	0	2	0	0
23	0	21	3	4	0	700	5	3	1	1	2	7	0	2	0	0
24	0	22	3	6	1	1100	5	3	1	1	2	7	1	2	1	1

Figure 3.3: Dataset

4) Data Storing

We store all the data in Google drive because it makes our work easier. In Google Drive, we can use those online stored data in our project. We have saved all the data as CSV files. Then we have stored them in Google drive so that they are not lost. Later, we could use those data in our project work through coding by following some simple step or code.

3.4 Statistical Analysis

Figure 3.3 represents the statistical analysis of the containing attribute in our dataset which built with 799 individuals data.

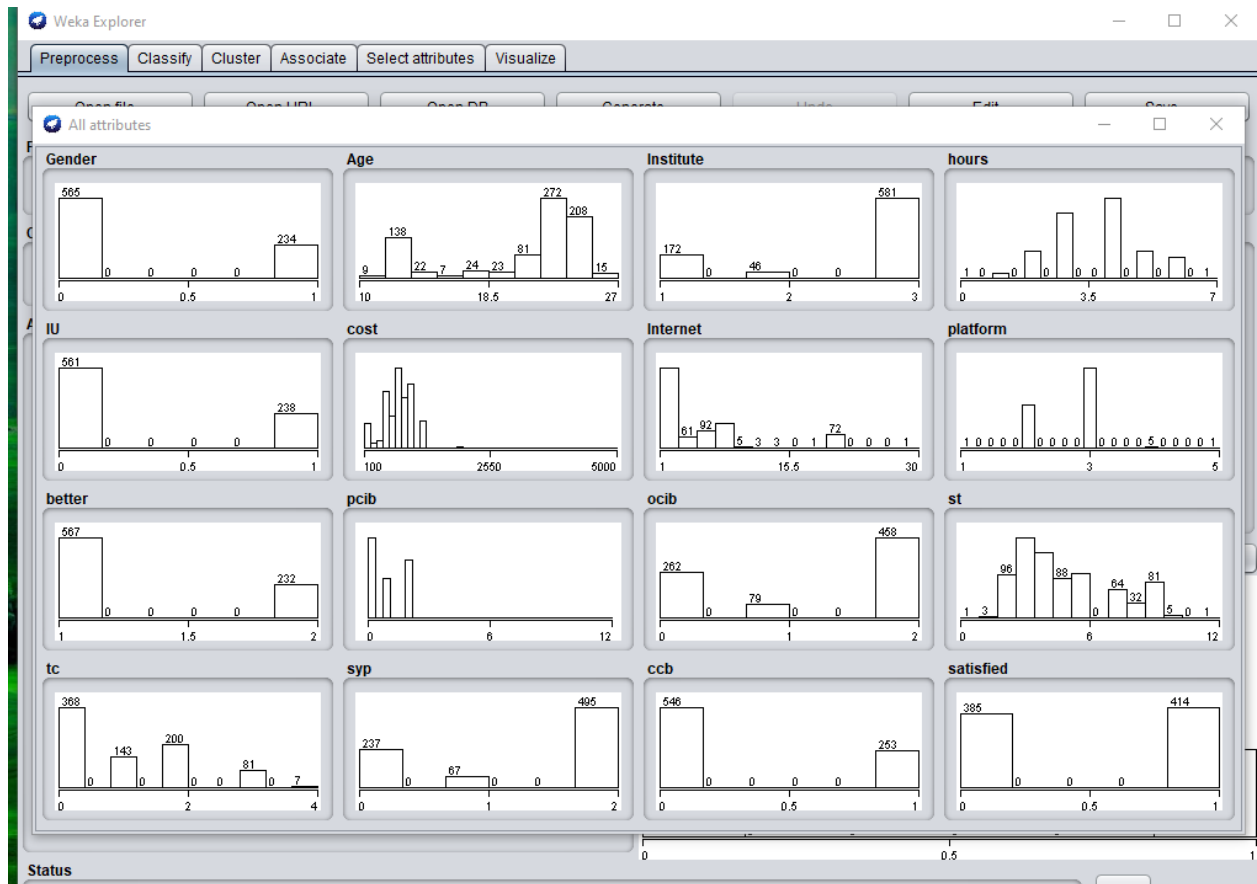


Figure 3.4: Statistical Analysis of Experimental dataset

3.5 Implementation Requirements

- Python 3.8

Python 3.8 is a Python version. It is a high level programming language. Most of the researchers use it to do their research. It is a highly recommended programming language for AI based work and it is very popular among new generation's programmers because it is very easy to learn and understand.

- WEKA

WEKA (Waikato Environment for Knowledge Analysis) is an assortment of machine learning calculations for information mining tasks. It's open source programming under the GNU general Public license.

- Google CoLab

Google CoLab is a free to use open source distributor of Python programming language. We can work here online through our browser as well as through Jupyter notebook. But the main benefit of Google CoLab is it provides us free online virtual GPU access.

- Hardware/Software Requirements

1. Operating System (Windows 10)
2. Web Browser (Preferably chrome)
3. Hard Disk (Minimum 4 GB)
4. Ram (More than 4 GB)

CHAPTER 4

EXPERIMENTAL RESULT AND RESULT DISCUSSION AND SUMMERY

4.1 Introduction

This chapter will discuss the data analysis and illustration of survey results. Data analysis and explanation were foundation the research objectives. Presentation outline and analysis of the collected data was calculated using frequency and percentage.

4.2 Experimental Setup

For our model implementation and code implementation we have collected the data first. The procedure is given below,

- As we have worked with satisfaction of online education prediction, we had to collect student data from different educational levels like school, college, university.
- The largest part of our allotted time for the research project was spent in collecting students from the school, college and university by taking surveys.
- We have collected data from online by using Google Form.
- After we have labeled the data, they become perfect for further use.
- Then we have converted them to numeric type.
- Then we have preprocessed our data.

4.3 Model Summary

We have used linear regression, logistics regression for implementation. We use pandas, numpy, scikit, sklearn library for implementation. These have provided accuracy in our work. In fact, by

researching other such works, we have found that using all the parameters gives the best results with the model. We then have taken the opportunity so that we can optimize the model with best accuracy and output from it.

4.4 Experimental Results & Analysis

We have run our dataset to create a model from the given data. It provided us with the desired output. Then we have compared the results of the people who prefer physical class or online class most. Tables and graphs used in the Analysis of data.

4.5 Descriptive Analysis

4.5.1 Gender Response

Table 4.1 Gender of respondents

Gender	Frequency	Percent
Male	565	71%
Female	234	29%
Total=	799	

Table 4.1: Gender respondents

The above Table 4.1 indicates that the gender distribution was 234(29%) female and 565 (71%) male.

This indicates that the majority of respondents are male. The following figure 4.1 shows the graph of table 4.1 by pie chart.

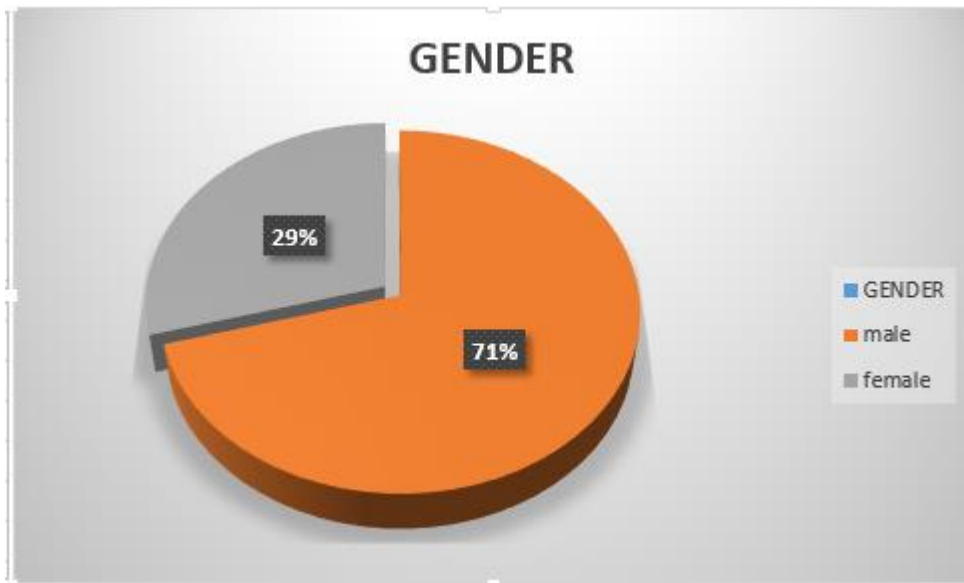


Figure 4.1: Gender of respondent

4.5.2 Age of respondents

The table 4.2 shows specifically every student who is respondents to the survey. Table show frequency 10, 12, 15 and 14 (2%) of the respondents are at the age of 14, 15, 18, 26, the next responses are the 7, 9, 4 (1%) are at age 16, 17, 19 years, the next response are the 19 and 22 (3%) are at the age between 19 and 25 years, and last response are the 81 (12%) are at the age of 21 years. Frequency 73 (11%) of the respondents are at the age of 22. Frequency 199 (31%) of the respondents are at the age of 23. Frequency 186 (29%) of the respondents are at the age of 24. The following figure 4.2 shows the graph of table 4.2.

Age	Frequency	Percent	Valid Percent
14	10	2	2%
15	12	2	2%
16	7	1	1%
17	9	1	1%
18	15	2	2%
19	19	3	3%
20	4	1	1%
21	81	12	12%
22	73	11	11%
23	199	31	31%
24	186	29	29%
25	22	3	3%
26	14	2	2%
27	1	0	0%

Table 4.2: Age of respondents

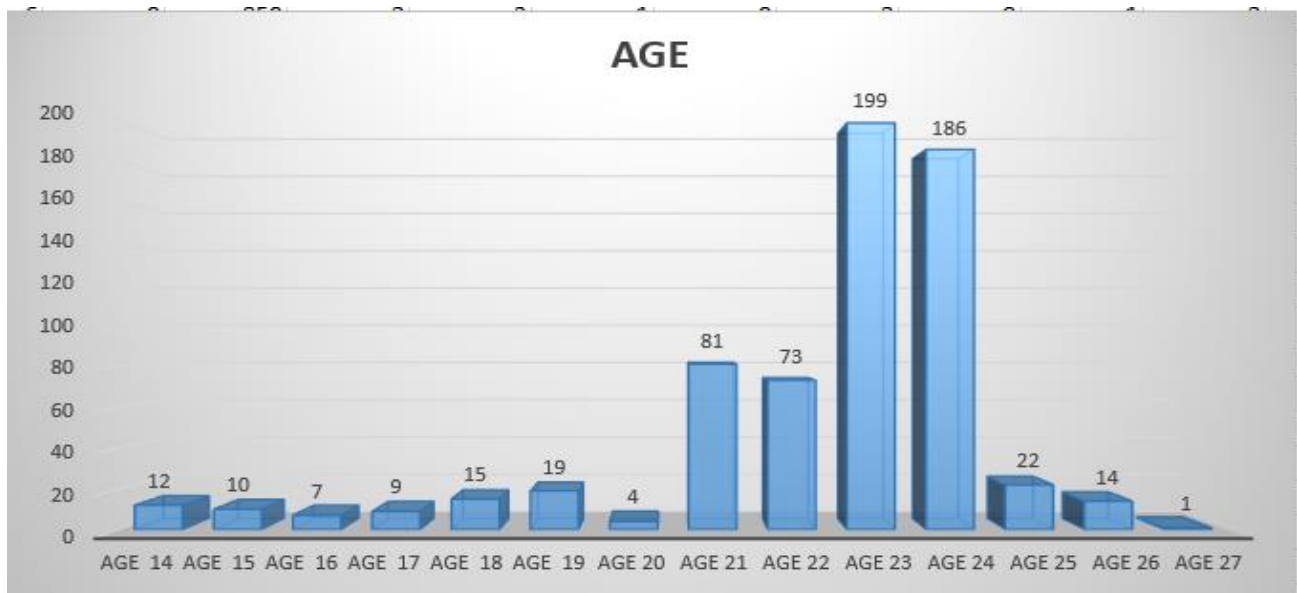


Figure 4.2: Age of respondents

4.5.3 Internet using

Students which type of internet uses Broadband or Cellular data. Figure 4.3 shows the amount. The figure shows 70% use Broadband and 30% use Cellular Data.

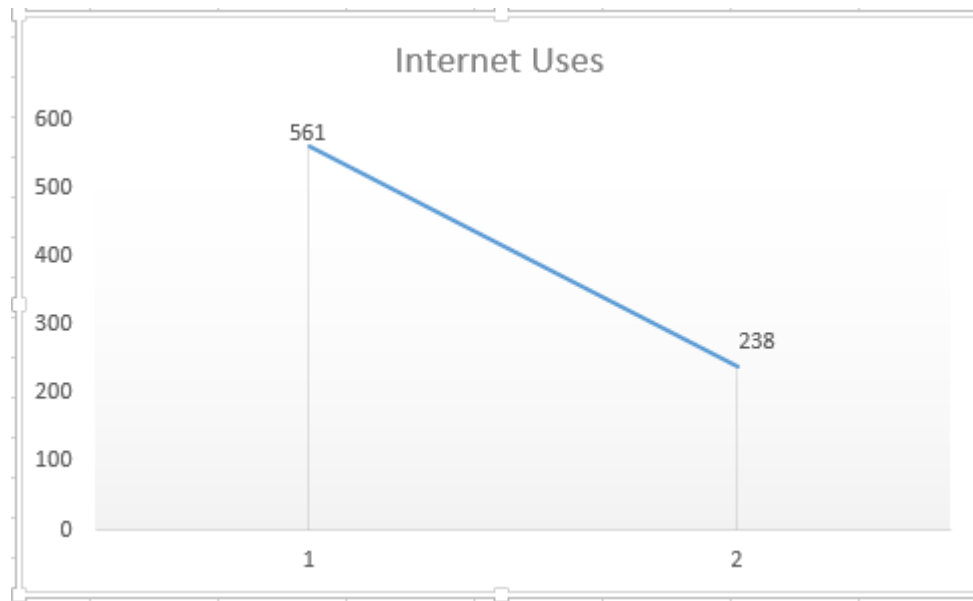


Figure 4.3: Internet using of respondents

4.5.4 Students uses platform

In this figure 4.4 we tried to show students which platform to use to join an online class. Here, (1) Ziteboard, (2) Zoom, (3) Google meet, (4) Screencastify, (5) Facebook live where we see (3) Google meet used many students and then used zoom platform.

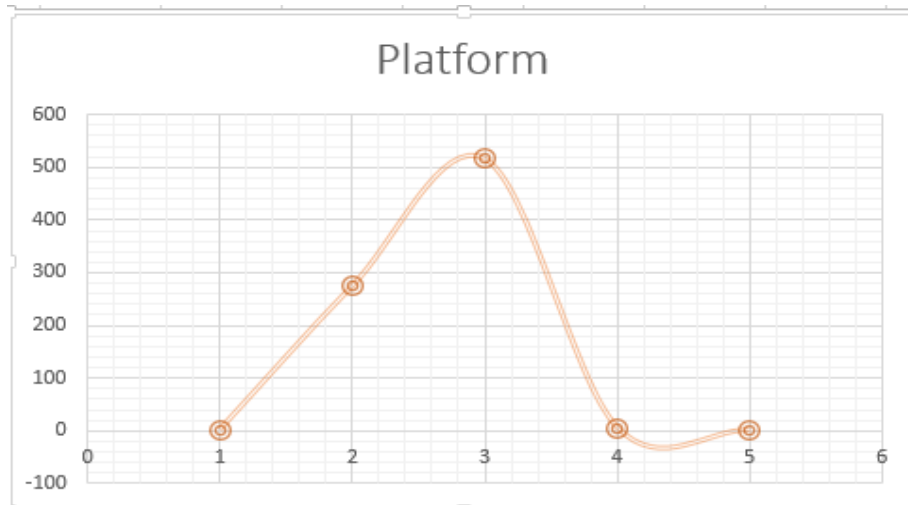


Figure 4.4: Uses platform of respondents

4.5.5 Which one is better

Figure 4.5 better shows that which one is better for them to class where '0' means physical class and '1' means online class and there are 71% (567) students responding to physical class better and 29% (232) students responding that online class is better. The following figure 4.5 shows the difference.



Figure 4.5: Which one is better choose respondents

4.5.6 Students taking course/subject

The table 4.3 shows 368 (46%) respondents to taken this course because of the pandemic situation, next respondents are the 143 (18%) response to taken online course to save time, the next respondents are the 200 (25 %) response to taken online course because students prefer the online course because it offers flexibility, the next respondents are the 81(10 %) response to taken online course Get more CGPA and the last respondents are 7(1%) respondents to Get illegal way. The following figure 4.6 shows the graph of table 4.3.

Why students taking this course/subject

course	Frequency	Percent	Valid Percent
Because of the pandemic situation	368	46.0	46%
.To save time	143	18.0	18%
I prefer the online course because it offers flexibility	200	25.0	25%
Get more CGPA	81	10.0	10%
Get illegal way (copy from internet/others)	7	1.0	1%

Table 4.3 Course respondents

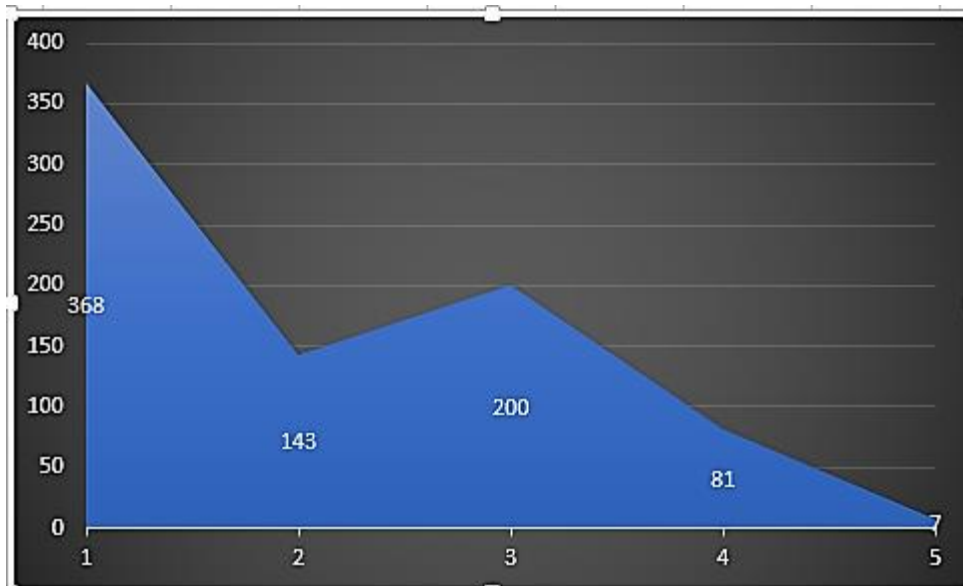


Figure 4.6: Course taken

4.5.7 Linear operation

We need a best accuracy for this study for which we have run different type of algorithm to know which one give a good outcome. That's why we run linear regression model at WEKA and logistic regression algorithm at python.

4.5.8 Linear Regression

We used linear regression at WEKA and chose the function of linear regression. Linear regression model show the correlation coefficient rate is 0.8291 mean 82.91%. The following figure 4.7 shows in bellow

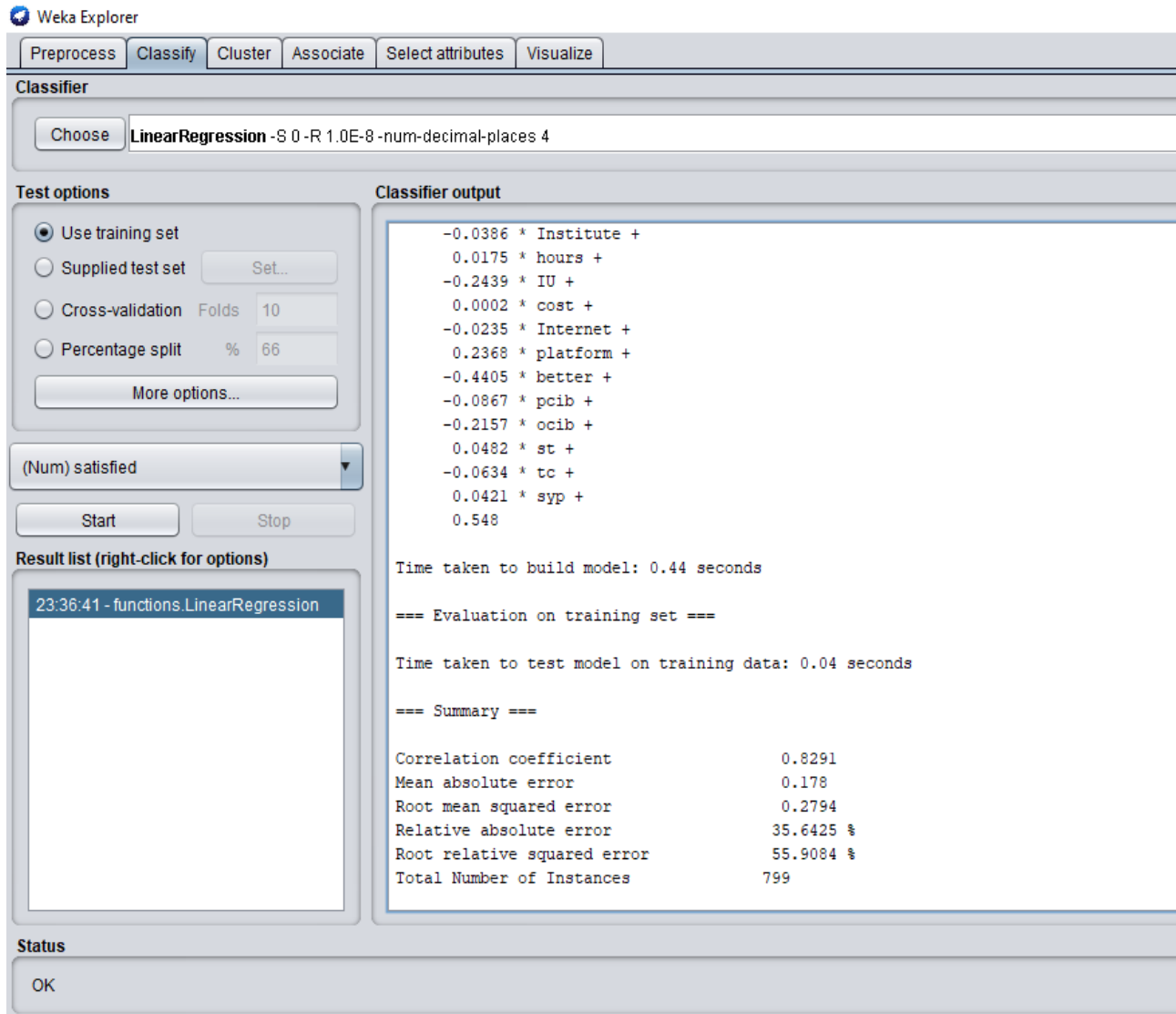


Figure 4.7: linear regression

4.5.9 Simper Linear Regression

We used linear regression at WEKA and chose the function of Simper linear regression. Simper linear regression model show the correlation coefficient rate is 0.5199 mean 57.99%. The following figure 4.8 shows in bellow

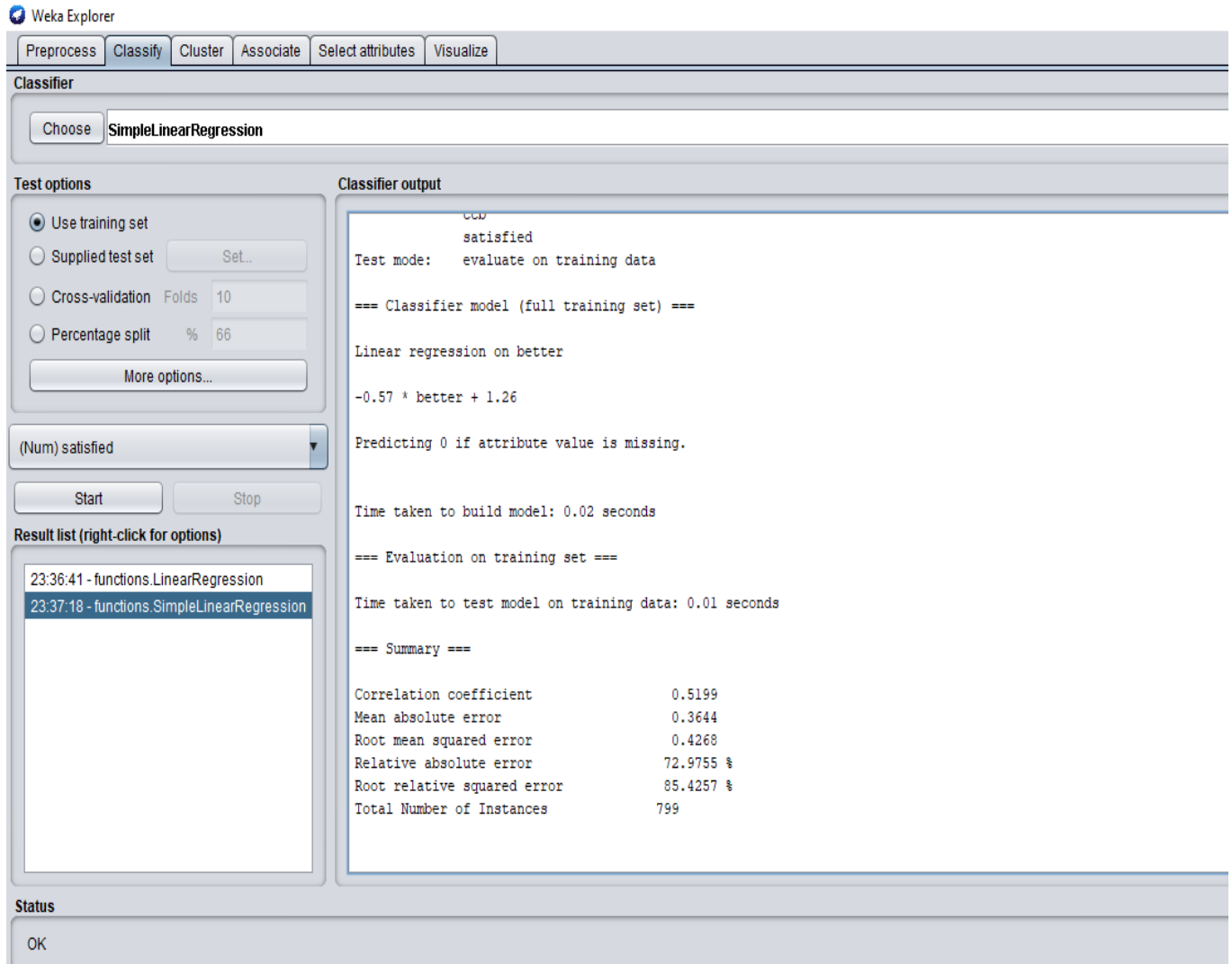


Figure 4.8: Simple linear regression

4.5.10 K-Star Algorithm

In classification on WEKA we use tree and choose K-Star algorithm and show the correlation coefficient rate is 0.8524 mean 85.24%. The following figure 4.9 shows in bellow

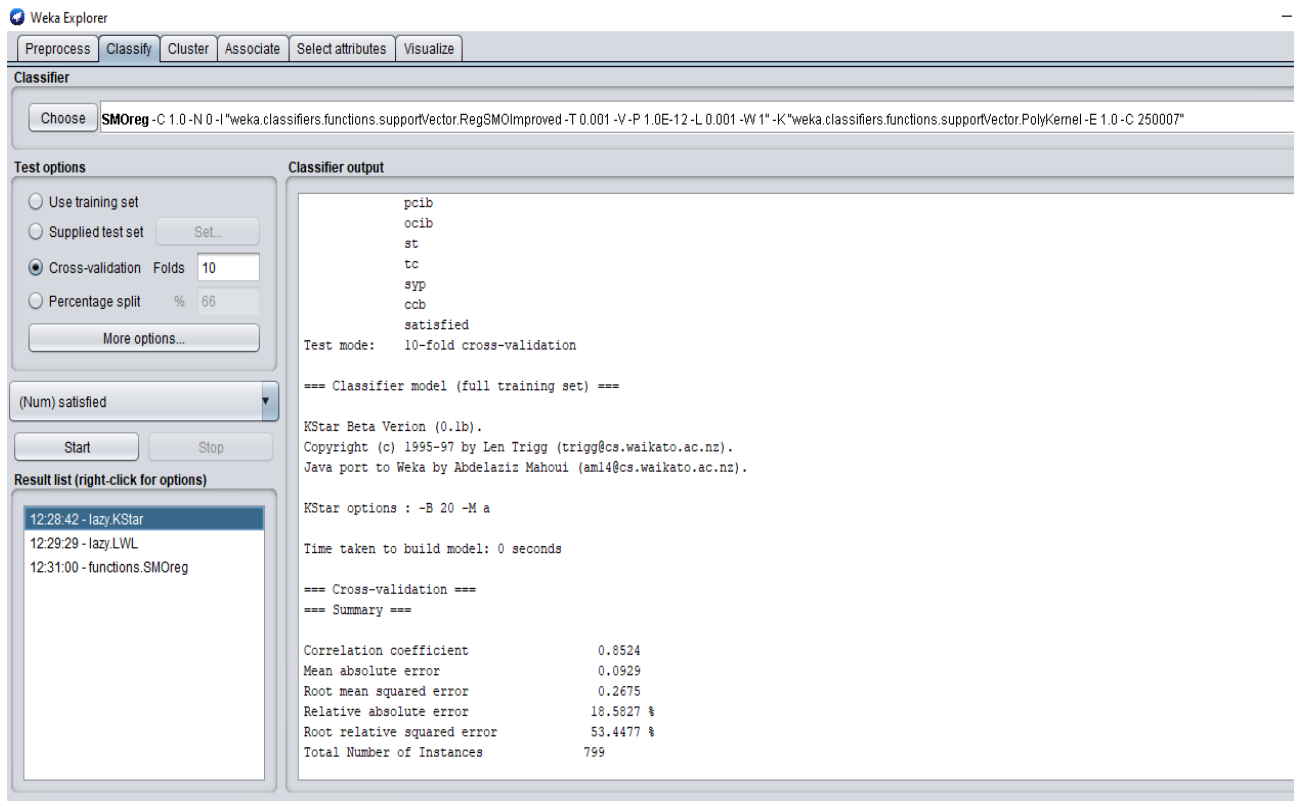


Figure 4.9: K-Star algorithm

4.5.11 Locally Weighted Learning Algorithm

We take another algorithm and choose Locally Weighted Learning (LWL) and show the correlation coefficient rate is 0.7824 mean 78.24%. The following figure 4.10 shows in bellow

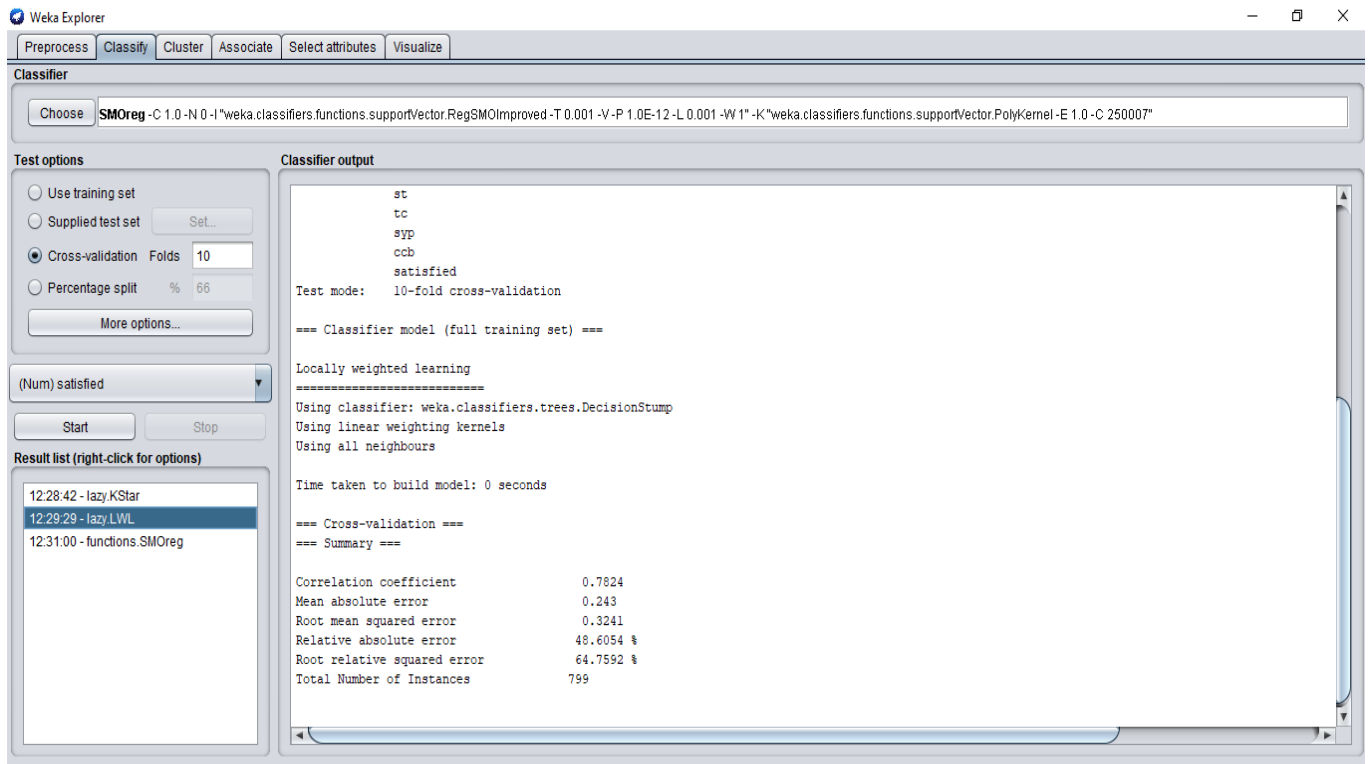


Figure 4.10: Locally Weighted Learning (LWL) algorithm

4.5.13 Logistic Regression

We conducted experiments on 799 data in this logistic regression model and divided in two part, one is train data and another is test data. We train all data but test few of data. Here, figure 4.12 we tested 30% of data.

```

[52] from sklearn.model_selection import train_test_split

[54] X_train,X_test,y_train,y_test=train_test_split(x,y,test_size=0.30,random_state=0)

```

Figure 4.11: train and test

4.5.14 Logistic Regression using Visualizing Confusion Matrix

Use a confusion matrix to visualize the results of the model in the form of a confusion matrix using numpy, seaborn and matplotlib. Here, figure 4.13 show the matrix value.

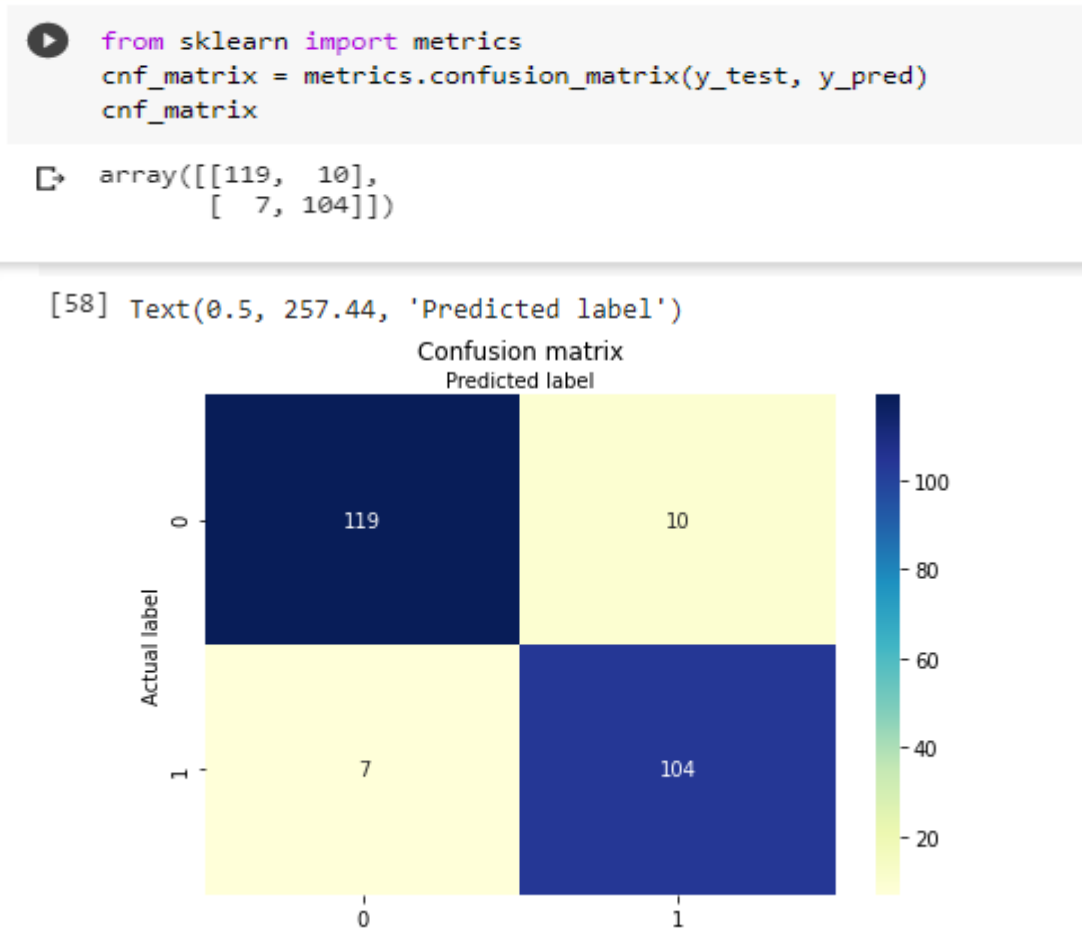


Figure 4.12: Confusion matrix

4.5.15 Confusion Matrix Evaluation Metrics

In this Confusion Matrix Evaluation Metrics we see the final outcome and data accuracy. This Confusion Matrix Evaluation Metrics speck out how accurate our data. Here, figure 4.14 show the accuracy rate 0.92916, figure 4.15 show the precision rate is 0.912281.

```
print("Accuracy:",metrics.accuracy_score(y_test, y_pred))  
Accuracy: 0.9291666666666667
```

Figure 4.13: Data accuracy

And the precision rate is 0.912281.

```
[60] print("Precision:",metrics.precision_score(y_test, y_pred))  
Precision: 0.9122807017543859
```

Figure 4.14: Data precision

4.5.16 Satisfaction Rate

End of the period in this study calculated the data and find out student satisfaction rate. Collected 799 data from school, college and varsity and figure 4.16 indicated 1 and 2, here 1 is “YES” and 2 is “NO”. The response of 385 students “YES” and 414 students “NO”. The percent is “YES” 48% and “NO” 52%.

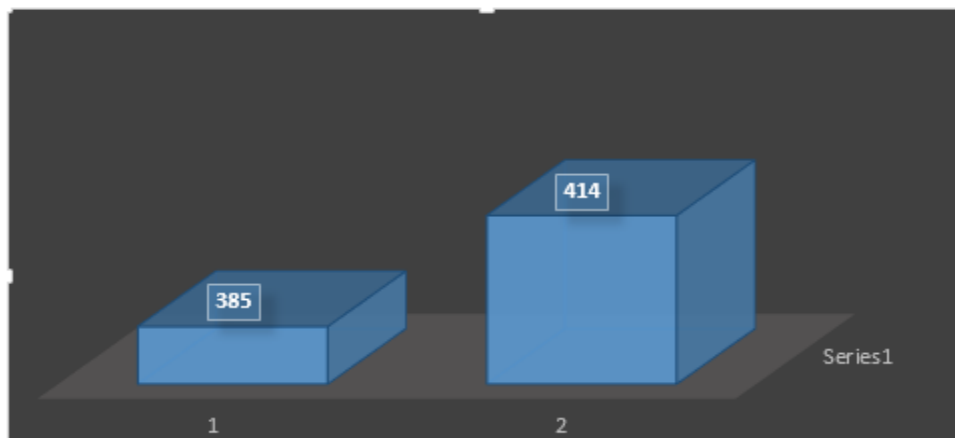


Figure 4.15: satisfaction chart

4.6 Result of Accuracy

In this study we used different type of algorithm and tree to find out different accuracy, in this table 4.4 all accuracy are given below.

Accuracy Rate of Different Classification Algorithm

Algorithm	Accuracy
Linear Regression	0.8291
Simple linear Regression	0.5299
Logistic Regression	0.92916
K-Star algorithm	85.24
LWL algorithm	78.24

Table 4.4: Accuracy rate of different classification algorithm

4.7 Summary

Here In this chapter we discussed about the results of the survey of performance and the results of the survey include analysis of experimental results, and also expressive analysis, this research questions. We get effective responses that makes research to become helpful the output of this expressive and frequency analysis. Also Logistic Regression gave the best result, the accuracy is (0.92916) 92.916%.

CHAPTER 5

SUMMARY OF THE STUDY AND CONCLUSION

5.1 Introduction

In this chapter we will discuss the findings of the results and conclusion of this study, first it will discuss the major findings of each study as confirmed in the research objectives, second the conclusion from the findings of the study.

5.2 Summary of the Study

After findings we focused on to discuss the questions asked the respondents.

5.2.1 Student educational institute?

About 6.0% different school students respond, 21.0% college students and the major part is university students 73.0%. The most of the school and college student not satisfied because of they are started newly and difficulty to access to internet via online class

5.2.2 Which platform are students using?

We tried to show students which platform to use to join an online class. Here, Ziteboard 0.0%, Zoom 34.0%, Google meet 65.0%, Screencastify 0%, Facebook live 1.0% where we see Google meet many students and then use the zoom platform.

5.2.3 Which one is better?

When we make the survey question, we need to know which one is preferred by the student online class or physical class. The response of the study 567 students physical class the percent is 71% and 232 students responded to the online class the percent is 29%.

5.2.4 Why are you taking this course/subject?

The above 368 (46.0%) respondents to taken this course because of the pandemic situation, next respondents are the 143 (18.0%) response to taken online course to save time, the next

respondents are the 200 (25.0 %) response to taken online course because students prefer the online course because it offers flexibility, the next respondents are the 81(10.0 %) response to taken online course Get more CGPA and the last respondents are 7(1.0%) respondents to Get illegal way.

5.2.4 Are you satisfied?

This survey total amount of data is 799 and the response of 48.0% students satisfied and 52.0% students not satisfied.

5.3 Recommendations

In the light of the findings of this study, the following recommendations are made:

1. Students should be monitored by parents and teachers on how they learning something new.
2. Students should better manage their study time.
3. Students should continue their regular study in pandemic situations.
4. Students should balance their educational knowledge and know more about their educational sites with the help of online platform.

5.4 Conclusion

In This study we collected student own experience data and a survey on online education platforms in Bangladesh during the COVID-19 pandemic situation. Through review and analysis of online student data, we have come to the conclusion that zoom and google meet provide high quality service and also some colleges take live classes to students through Facebook. Students pace some problems such as the inability to submit the education time, fall behind and a video delay on the class time. We found a scientific ecological model index with elements that affect satisfaction and a measure of satisfaction by examining the questionnaires from it is based on the personal satisfaction of the students that they have realized through the online platform.

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APPENDIX

Satisfaction of online education

Form description

1. What is your gender? *

Female

Male

2. How old are you? *

Short answer text

3. your educational institute? *

School

Collage

University

4. Hours spent online per day for class. *

0

1

2

3

4

5

6

7

8

9

10

Hour

5. Internet are you using? *

- Broadband(wifi)
- Cellular Data(mobile)

6. How much money you used? *

- 300-500 taka
- 500-700 taka
- 1000+ taka

7. How many Internet uses? *

- Less than 1 GB
- 1-3 GB
- 3-5 GB
- More than 5 GB

8. Which platform are you using? *

- Ziteboard
- Zoom
- Google meet
- Screencastify
- Facebook live

9. Which one is better? *

- Physical class
- Online class

10. more money for educational purpose? *

- Physical class
- Online class

11. Why physical class is better? *

- Understood better
- Good conversation
- Concentrate better

12. Why online class is better? *

- Anytime attend class
- The teacher can be contacted at any time
- No transportation problem

13. How many course/subject? *

- | | | | | | | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

14. Why are you taking this course/subject? *

- Because of the pandemic situation
- .To save time
- I prefer the online course because it offers flexibility
- Get more CGPA
- Get illegal way (copy from internet/others)

15. Are you doing group study in online? *

- Yes
- No

16.solve your problem via online? *

- From teacher
- From classmates
- By own through online platform

17. complete other course before ? *

- Yes
- No

18. How did you find out class? *

- Advising
- Schedule before
- Provide class link
- Sms

19. Feedback of student understanding to teaching? *

- 25%
- 50%
- 75%
- 100%

20. Teacher and student communication? *

- 25%
- 50%
- 75%
- 100%

21. Are you satisfied? *

- Yes
- No

Satisfaction of Online Education

ORIGINALITY REPORT

5%	5%	0%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	biglistofwebsites.com Internet Source	2%
2	www.eurodl.org Internet Source	1%
3	kwansei.repo.nii.ac.jp Internet Source	1%
4	erepository.uonbi.ac.ke Internet Source	<1%
5	docplayer.net Internet Source	<1%
6	etd.uum.edu.my Internet Source	<1%
7	journal.oscm-forum.org Internet Source	<1%
8	researchspace.ukzn.ac.za Internet Source	<1%
