SENTIMENT ANALYSIS IN PERSPECTIVE OF SHIFTING DIU CAMPUS TO ASHULIA FROM DHANMONDI

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

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APPROVAL

This Project/internship titled "**Sentiment Analysis in Perspective of Shifting DIU campus to Ashulia from Dhanmondi.**" submitted by **Md. Minhajul Abedin**, ID No: 183-15-11974 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 Bachelor of Science in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 14-09-22.
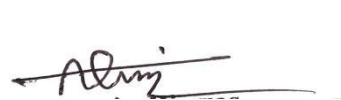
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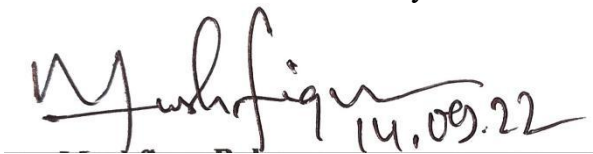Faculty of Science & Information Technology
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I hereby declare that this project has been done by us under the supervision of **Ms. Asma Mariam, Department of CSE** Daffodil International University. I also declare that neither this project nor any part of this project has been submitted elsewhere for an award of any degree or diploma.

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ABSTRACT

Recently Daffodil International University campus was shifted from Dhanmondi to Ashulia. As a result, different types of reactions were noticed among the students. A sentiment dataset was created on student's various reactions to campus changes. With this dataset, by using some machine learning algorithms like Naive Bayes & SVM we created some models and among them find out the best algorithm by which the sentiment analysis of the students can be analyzed easily with high accuracy.

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LIST OF ABBREVIATION

DIU – Daffodil International University

CSE – Computer Science and Engineering

ML – Machine Learning

RQ – Research Question

SA –Sentiment Analysis

CHAPTER 1
INTRODUCTION

1.1 Introduction

To identify the emotions of the students after shifting the campus we have collected a lot of questions and answer from the students and by using this data we have prepared some dataset and by this dataset, using some machine learning algorithms like Naive Bayes & SVM we created some models and among them find out the best algorithm by which the sentiment analysis of the students can be analyzed easily with high accuracy. It is a popular method for determining and classifying opinions about a product, services or ideas and feelings [1]. Sentiment analysis can be at document level, sentence level or feature level. Sentiments are extracted from full reviews. All comments are rated based on the overall sentiment of the comment holder. In this study, we carry out sentiment analysis on Daffodil International University student's perceptions of campus relocation from Dhanmondi to Ashulia. For this movement, we have noticed various changes in the students as well. By collecting their responses, we create a data set and with this dataset, by using machine learning algorithms we created some models and find out the best algorithm which the sentiment analysis of the students can be analyzed easily. By all these algorithms and models, we get better results and accuracy from Naive Bayes algorithm by using my collected dataset that was collected from students after shifting campus from Dhanmondi to Ashulia. It is a popular method for determining and classifying opinions about a product, services or ideas and feelings [1]. Sentiment analysis can be at document level, sentence level or feature level. Sentiments are extracted from full reviews. All comments are rated based on the overall sentiment of the comment holder. To identify the emotions of the students after shifting the campus we have collected a lot of questions and answer from the students and by using this data we have prepared some dataset and by using machine learning algorithms we created some models and find out the best algorithm which the sentiment analysis of the students can be analyzed easily. By all these algorithms and models, we get better results and accuracy from Naive Bayes algorithm by using my collected dataset that was collected from students after shifting campus from Dhanmondi to Ashulia.

1.2 Objective

- To study the reaction of the students after shifting the campus.
- To find out the difference in the overall environments between Dhanmondi & Ashulia Campus.
- To take decision about the student's reaction from the perfect model and algorithm which gives better results and accuracy than the other.

1.3 Motivation

Daffodil International University has recently shifted its campus from Dhanmondi to Ashulia. In this shifting purpose, a lot of change was noticed in the students also. They have different types of reactions to this. From this, we decided to collect all the reactions of the students in a data set and then by using machine learning algorithms we have created some models and among them find out the best model that can give a better result about the overall reaction of the students with high accuracy that the shifting gives the positive review to the mind of the students or not.

1.4 Rationale of the Study

For sentiment analysis which means to identify the emotional tone behind the body of the text of the student's review, we created such models by using some machine learning algorithms to easily find out the overall reaction and review of the students. Here our data set is about the reaction of the students of Daffodil International University. After shifting the campus from Dhanmondi to Ashulia several reactions were noticed among the students. Some of them gives positive reaction, some of them gives negative reaction and some of them was neutral. So, by creating some models we can easily find out the better model among them which can gives overall reaction of the students with high accuracy and better result [2]. For this, to find out the overall reaction review we create those models. It will also be helpful for the authority to see the student's review and their reaction about their campus shifting and if they find any negative reviews they can solve this problem.

1.5 Research Question

I have selected some question as my research work which is being answered stepwise.

- What is the overall reaction and review of the students about the campus shifting purpose?
- How the authority can understand the student's opinion and their problems?
- Can easily find out the differences between the two campuses after shifting?
- What are the facilities and advantages the students can get after shifting can also understand by their reactions?

1.6 Expected outcome

Throughout this research, we wanted to find out the overall reaction and analysis the sentiment of the students after shifting the campus from Dhanmondi to Ashulia. The overall outcomes can also notify as below-

- Can understand the student's reaction to the shifting.
- Number of students who give positive & negative reviews and who are neutral.
- By the overall reactions can also understand that which campus is better now.
- If a negative reaction comes at a large number, then can also find out the reason for their negative reactions and can also solve these problems.

1.7 Report layout

The summary of all chapters is described in the report layout. A brief summary of all chapters is given below:

Chapter 1: Discussion of the thesis motivation, Rationale of the Study, Research Question, and Expected Outcome.

Chapter 2: Discussion of the thesis background introduction, Sentiment Analysis, related work, research summary, the scope of the problems, and challenges.

Chapter 3: Discusses approximately the technique of my research work. Details works of data mining, machine learning technique. Here also mentioned approximately about the rate collection processes.

Chapter 4: Discuss details of the result outcome and mentioned about as and out of that's project with experiment and result.

Chapter 5: Discuss my research with future scope that can be performed and conduct the thesis.

CHAPTER 2
BACKGROUND

2.1 Introduction

Daffodil International University campus was shifted from Dhanmondi to Ashulia. As a result, different types of reactions were noticed among the students. To identify the emotions of the students after shifting the campus we have collected a lot of questions and answer from the students and by using this data we have prepared some datasets and by using this we have created some models by using some machine learning algorithms, here they are used for Sentiment Analysis. It is a popular method for determining and classifying opinions about a product, services or ideas and feelings. Sentiment analysis can be at document level, sentence level or feature level. Sentiments are extracted from full reviews [3]. All comments are rated based on the overall sentiment of the comment holder. In this study, I carry out sentiment analysis on Daffodil International University student's perceptions of campus relocation from Dhanmondi to Ashulia. For this movement, I have noticed various changes in the students as well. By collecting their responses, we create a data set and with this dataset, by using this dataset, by using some machine learning algorithms like Naive Bayes & SVM we created some models and among them find out the best algorithm by which the sentiment analysis of the students can be analyzed easily with high accuracy. By all these models we can get result but among them we choose that model which gives better result and accuracy from my collected dataset that was collected from students after shifting campus from Dhanmondi to Ashulia.

2.2 Sentiment Analysis

Sentiment Analysis means identifying emotions. Here in this research, we have worked with the student's data sets about their reaction to shifting the campus from Dhanmondi to Ashulia. By using Machine Learning algorithms, we have created some models by which anyone can easily find out the overall reaction of the students and by which it can also find out the differences between the two campuses and can justify that which campus is better to the students after the shifting process. For this, we take a lot of informative data from the students at a large number and by comparing the maximum number of students we can easily find out whether the overall reaction that it is positive, negative, or neutral.

2.3 Related work

In this period, we can see that much research work has done on the sentiment analysis of different topics. Such as, sentiment analysis of twitter data. Here POS-specific prior polarity features were introduced, to obviate the need for tedious feature engineering a tree kernel was used. The same level, both outperforming the state-of-the-art baseline by the new features and the tree kernel [4].

Here in Annual Review of Statistics and Its Application sentiment analysis is used here by counting the words from a dictionary of emotional terms the annual review was given. These methods progressively improve classification at the cost of increased computation and reduced transparency [5].

2.4 Research Summary

The main goal of the research work of sentiment analysis is to find out the overall reactions of the students on the campus shifting from Dhanmondi to Ashulia & by this research it can easily find out that in which campus the students feel better and they get enough facilities. For this, a large number of students of Daffodil International University gives their own reviews and that is used in the data set to use in some models which are created by machine learning algorithms to find the best result and highest accuracy. For this research purpose we studied a lot of papers that were about sentiment analysis on different topics by which we have decided to build such a model to easily identify the overall reaction and others necessary information.

2.5 Scope of the Problem

In my research work, we collect all the data from the students of Daffodil International University after shifting the campus. After collecting the dataset, we have built several models by using machine learning algorithms to check the highest accuracy and better result. But there can also face some problems to use the dataset in these models for this by using the data set we can cluster them and divide the positive, negative and neutral data separately. Then it can easily use in the model and gives the preferable output and accuracy and it can also be used in the future in different purposes.

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2.6 Challenges

The main challenge of this research is to find out the best model which gives the highest result and accuracy among several models. The first challenge is to collect a large number of data from the students and make a dataset then preprocess the necessary data and use the data set in different models and then compare among all the models to find one that gives better results and accuracy.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Introduction

Here our research topic name is Sentiment Analysis of the students based on the campus shifting. In this study, we carry out sentiment analysis on Daffodil International University student's perceptions of campus relocation from Dhanmondi to Ashulia. For this movement, we have noticed various changes in the students as well. By collecting their responses, we create a data set and with this dataset, by using machine learning algorithm we created some models and find out the best algorithm by which the sentiment analysis of the students can be analyzed easily. By all these models mentioned above, we get results and accuracy from my collected dataset that was collected from students after shifting campus from Dhanmondi to Ashulia.

3.2 Research Subject and Instrumentation

Sentiment Analysis means identifying the emotional tone behind the body of the text. Daffodil International University has recently shifted its campus from Dhanmondi to Ashulia. In this shifting purpose, a lot of change was noticed in the students also. They have different types of reactions to this. From this, we decided to collect all the reactions of the students in a data set and then by machine learning algorithms we have created several models and by result and accuracy of these models we can find out a preferable model that can give such a result about the overall reaction of the students with high accuracy that the shifting gives the positive review to the mind of the students or not.

3.3 Data Collection Procedure

For collecting the data, we prepared some questions & a large number of students filled up all these questions and gives ratings here they have some questions about their reactions and feelings after shifting the campus which means after sifting the campus if they feel better or not? Is the Ashulia campus environment good or not? Are they feel better or not? Is there a proper educational environment or not? Are they get the library, lab& classroom and others facilities or not? The students give their suitable answers and gave ratings then we collect all the data together and prepare a dataset to use in several algorithms to find out the preferable model with better result and high accuracy.

3.4 Implementation Requirement

For competing in this research and to find out the best model and algorithm to find out the overall Sentiment Analysis of the students of Daffodil International University based on their reaction of them after the campus shift some procedures must be followed they are given below particularly:
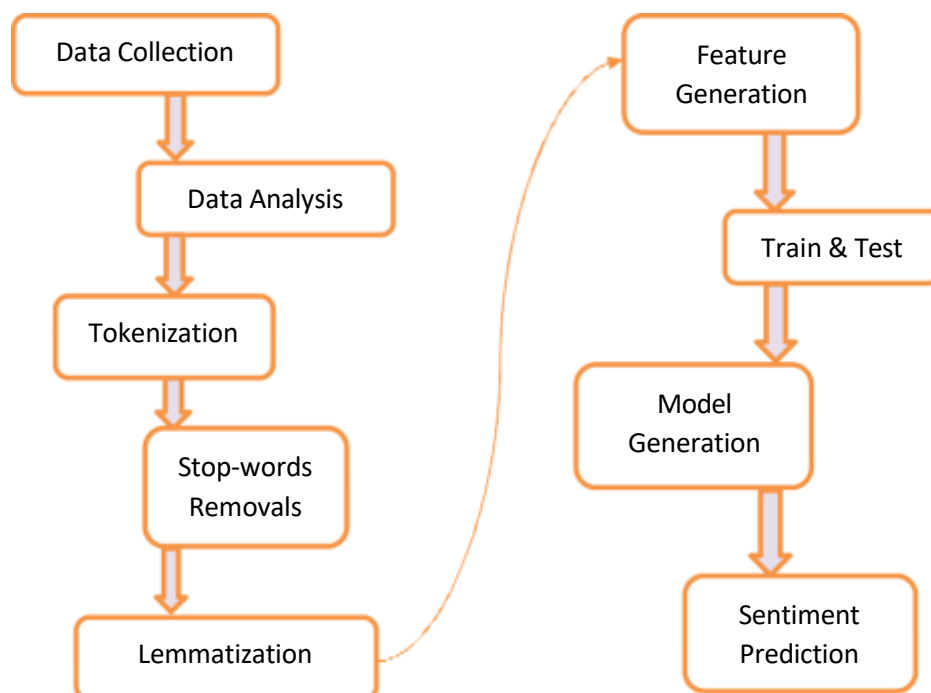
3.4.1   Research Methodology for Sentiment Analysis.

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3.4.2 Data Analysis:

For this research of sentiment analysis of the students, we have collected a lot of data from the students of different groups and campus and departments and different gender after collecting the data set then preprocess the dataset and then analysis the dataset and used this data set in several models to find the best model which gives better result and accuracy [7].

3.4.3 Data Pre-Processing:

Data preprocessing means preprocessing the data before its use. Because all kinds of data are not useable in the model but the data can come in different types. So before using the data in the model, by preprocessing change the data format and preprate the dataset for useable in the model. By preprocessing sometimes unnecessary data can also remove. It is a very important part of data mining. In research work, it is a very important part. Without data preprocessing the model cannot work properly and cannot give better results & accuracy [6].
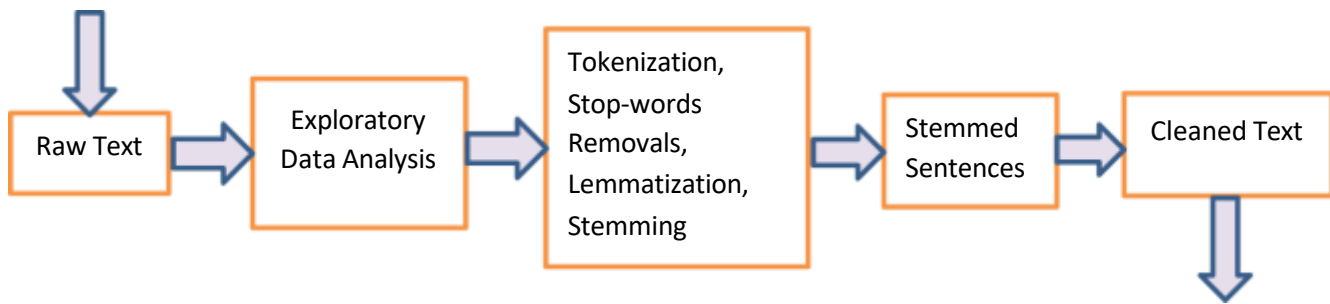
.

Fig 3.4.3.1: Data Preprocesing Procedures

Load Data

```python
import numpy as np
import pandas as pd

df = pd.read_csv('/content/gdrive/MyDrive/Thesis/Sentiment_Analysis.csv')
df.head(10)
```

	Review	Rating	Sentiment
0	How do you feel the study environment of Ashul...	4	Neutral
1	How do you feel the relationship between stude...	5	Positive
2	How are the lab facilities of Ashulia campus c...	4	Neutral
3	How are the results of students in Ashulia Cam...	5	Positive
4	How are the facilities of Ashulia campus compa...	5	Positive
5	How do you feel about coming from Dhanmondi ca...	4	Neutral
6	How do you feel about the complexity of the ne...	5	Positive
7	How is the sports environment of Ashulia campu...	4	Neutral
8	How is Ashulia campus compared to Dhanmondi wh...	3	Negative
9	How do you feel about club working and extra c...	4	Neutral

Fig 3.4.3.2: Sample of Collected Data

Pre-Processing Steps for Sentiment Analysis

Tokenization

Stopwords removals

Lemmatization

POS Tagging

```python
import nltk
nltk.download('punkt')
from nltk import tokenize

[nltk_data] Downloading package punkt to /root/nltk_data...
[nltk_data]   Package punkt is already up-to-date!
```

Fig 3.4.3.3: Pre-Processing Steps for Sentiment Analysis

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Tokenization

Sentence Tokenization

```
from nltk.tokenize import sent_tokenize
text="How do you feel about the security of Ashulia campus compared to Dhanmondi campus?"
tokenized_text=sent_tokenize(text)
print(tokenized_text)
```

```
['How do you feel about the security of Ashulia campus compared to Dhanmondi campus?']
```

Word Tokenization

```
from nltk.tokenize import word_tokenize
tokenized_word=word_tokenize(text)
print(tokenized_word)
```

```
['How', 'do', 'you', 'feel', 'about', 'the', 'security', 'of', 'Ashulia', 'campus', 'compared', 'to', 'Dhanmondi', 'campus', '?']
```

Fig 3.4.3.4: Sentence & Word Tokenization

Frequency Distribution

```
from nltk.probability import FreqDist
fdist = FreqDist(tokenized_word)
print(fdist)
print("2 most common :- ",fdist.most_common(2))
```

```
<FreqDist with 14 samples and 15 outcomes>
2 most common :-  [('campus', 2), ('How', 1)]
```

Fig 3.4.3.5:Frequency Distribution

```
#Frequency Distribution Plot

import matplotlib.pyplot as plt
fdist.plot(30,cumulative=False)
plt.show()
```
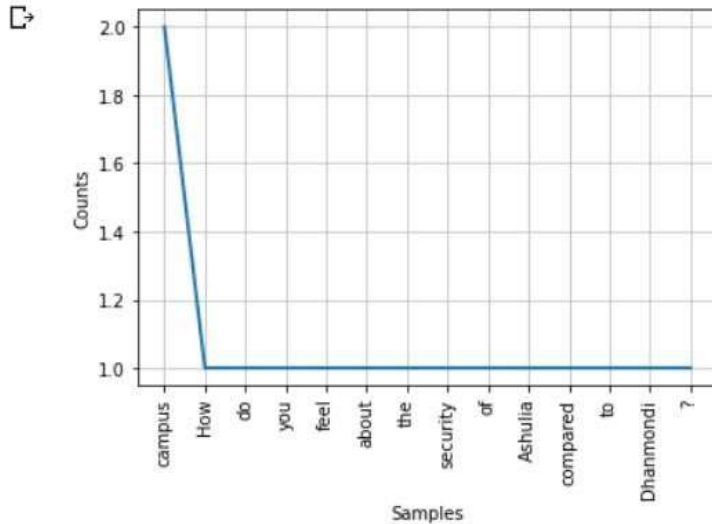

Fig 3.4.3.6:Frequency Distribution Plot

3.4.4 Sentiment Analysis Procedure

For identifying the emotional tone behind the body of the text is called Sentiment Analysis [8]. Here, we have to carry out sentiment analysis on Daffodil International University student's perceptions of campus relocation from Dhanmondi to Ashulia. For this movement, we have noticed various changes in the students. By collecting their responses, we create a data set and with this dataset, by using some machine learning algorithm like Naive Bayes, SVM we have created some models by which the sentiment analysis of the students can be analyzed easily. From all these algorithms and models mentioned above, we get better results and accuracy by using Naive Bayes algorithm from my collected dataset that was collected from students after shifting campus from Dhanmondi to Ashulia. In the result we can find out the total number of students who gave their response and who gave positive, negative and who were neutral. From the total dataset we used 75% dataset to train the dataset and the rest 25% data is used to predict the model.

CHAPTER 4
RESULTS AND DISCUSSION

4.1 Introduction

For getting a better result and high accuracy in this research of sentiment analysis of students [9] we have collected a huge number of data that was collected from the students after the campus shift. After collecting the data, we have used the data set to build several models before that I preprocessed the dataset and then used them in several models by using machine learning algorithms and find out the best model and algorithm which gives better result and accuracy than the others. It can be said that, it is very important to get a better result, to have a large dataset and better model that gives preferable result with high accuracy.

4.2 Sentiment Prediction

For this research on sentiment analysis of students, we have collected a huge number of data from the students after shifting the campus from Dhanmondi to Ashulia. After collecting the data, we have used the data set to build several models before that we preprocessed classified the dataset and then used them in several algorithms, for this at first train 75% data then test the others 25% data dataset in that models and find out the best model and algorithm which gives better results and accuracy than the others for predicting the Sentimental Analysis [10].
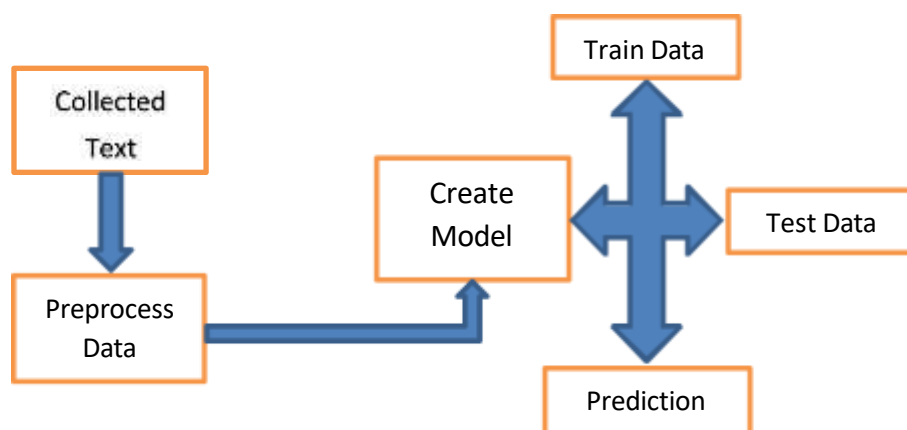

Figure 4.2.1: Identifying Sentiment Analysis Prediction

4.3 Results

For every question, I also gave the option for rating each question and the students filled up all the questions and gives their ratings for each. After collecting the answers, we prepared a data set then pre-processed them and train some of the datasets and by the rest of the data set predict the model.
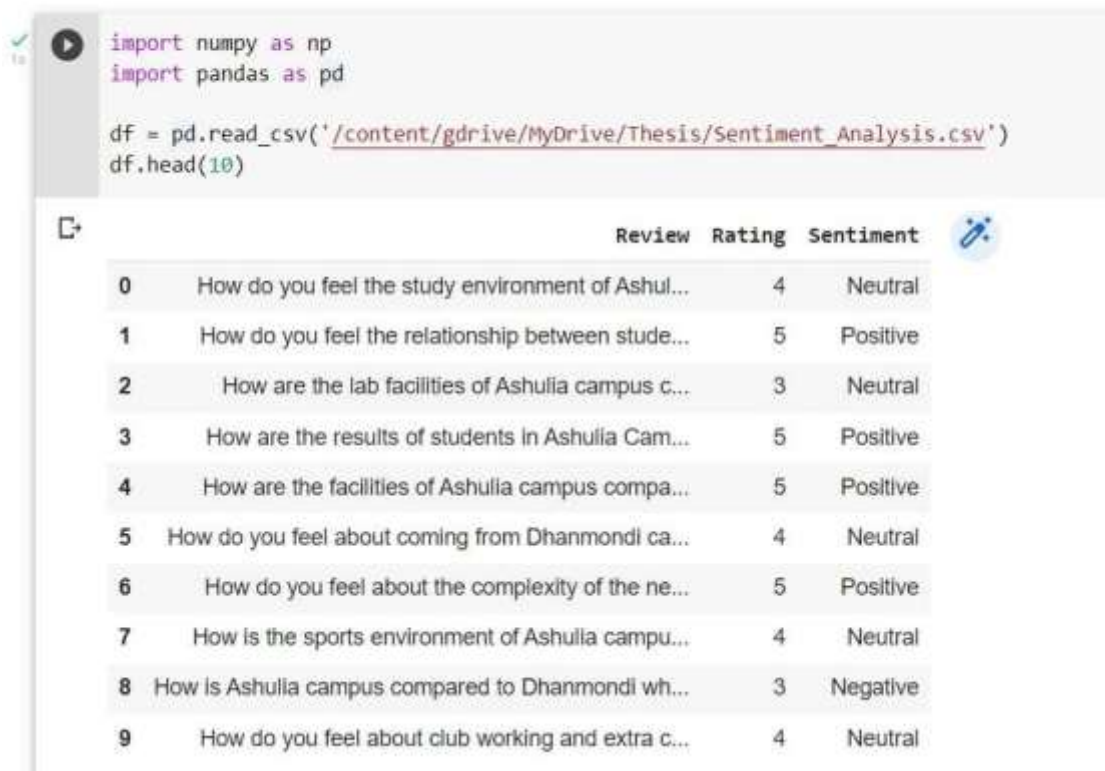
Load Data

```
import numpy as np
import pandas as pd

df = pd.read_csv('/content/gdrive/MyDrive/Thesis/Sentiment_Analysis.csv')
df.head(10)
```

	Review	Rating	Sentiment
0	How do you feel the study environment of Ashul...	4	Neutral
1	How do you feel the relationship between stude...	5	Positive
2	How are the lab facilities of Ashulia campus c...	3	Neutral
3	How are the results of students in Ashulia Cam...	5	Positive
4	How are the facilities of Ashulia campus compa...	5	Positive
5	How do you feel about coming from Dhanmondi ca...	4	Neutral
6	How do you feel about the complexity of the ne...	5	Positive
7	How is the sports environment of Ashulia campu...	4	Neutral
8	How is Ashulia campus compared to Dhanmondi wh...	3	Negative
9	How do you feel about club working and extra c...	4	Neutral

Figure 4.3.1: Load the data set in collab

Exploratory Data Analysis

```
[4] print(df.Sentiment.value_counts())

Positive    145
Neutral     136
Negative     87
Name: Sentiment, dtype: int64
```
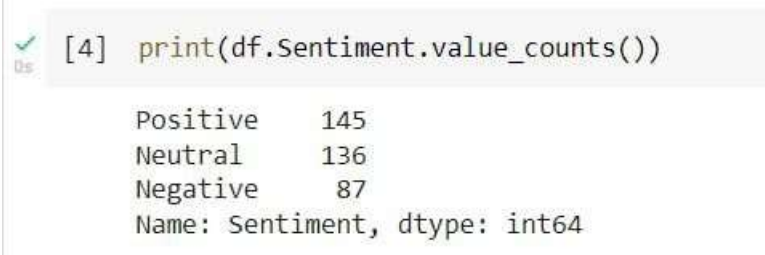
Figure 4.3.2: Number of reviews

Here by this exploratory data analysis it is seen that positive review rate is 145, neutral is 136 and negative review rate is 87.
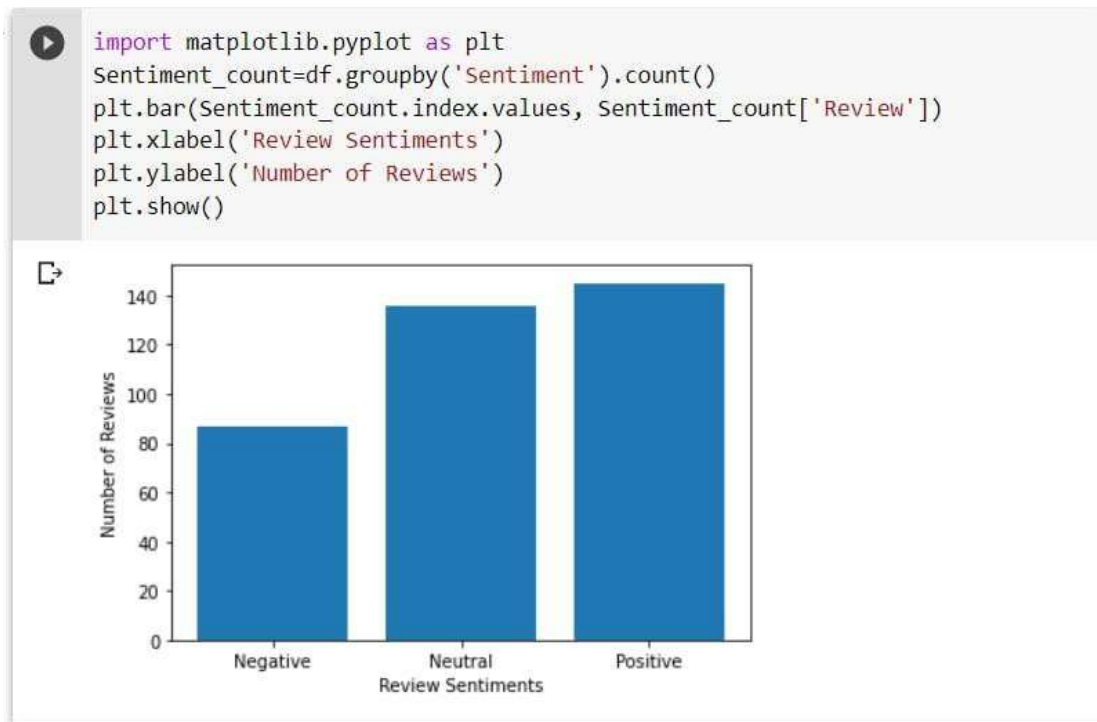
```
import matplotlib.pyplot as plt
Sentiment_count=df.groupby('Sentiment').count()
plt.bar(Sentiment_count.index.values, Sentiment_count['Review'])
plt.xlabel('Review Sentiments')
plt.ylabel('Number of Reviews')
plt.show()
```


Figure 4.3.3: Student's review in bar chart

4.3.1 Naive Bayes Algorithm:

The Bayesian graphical model that uses nodes corresponding to each of the columns or features is called the Naive Bayes algorithm (NB). This algorithm is used for identifying the sentiment of the students among all other algorithms it gives a better result.

Bayes theorem is represented by the following equation:

P(A|B) =P(A|B) P(B) /P(A)…………………………(1)

Where A and B are featured

- ● P(B|A) is the probability of B given A.

- ● P(A|B) is the probability of A Given B.

- ● P(B) is the prior probability of B.

- ● P(A) is the prior probability of B.

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The NB equation can be written as follows:

P(B|A) =P(a1|B) P(a2|B) …….P(an|B) P(B)………………..(2)

Where A = (a1, a2… an) represents a vector of n features.
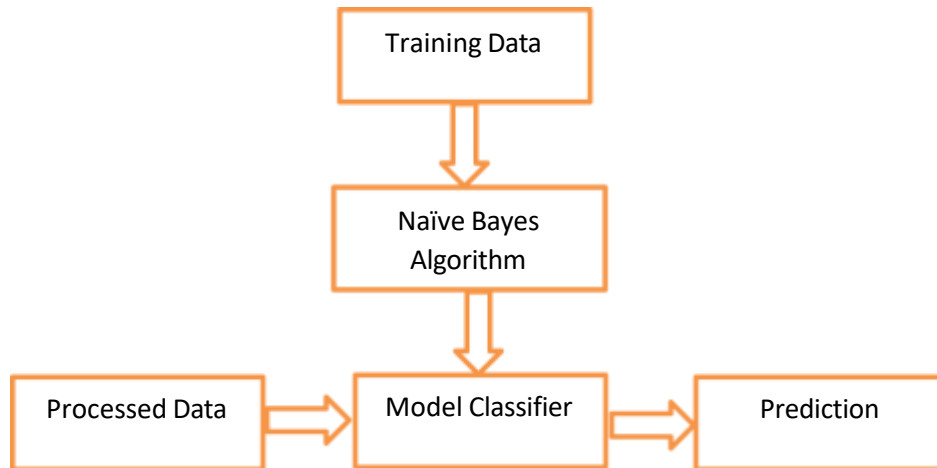
Figure 4.3.1.1: Naïve Bayes Algorithm

Figure 4.3.1.2: Model Generation & Evulation

After model generation with naïve bayes algorithm and by calling the train and test data find out best result and accuracy than the all others model and algorithm. Here, the accuracy of naïve bayes algorithm is 92.4%.

Algorithm Name	Accuracy
Naive Bayes	92.4%

Table 4.3.1: Accuracy of Naïve Bayes Algorithm

CHAPTER 05

CONCLUSION AND FUTURE WORK

5.1 Summary of the Study

Identifying the emotional tone behind the body of the text is known as Sentiment Analysis Daffodil International University has recently shifted its campus from Dhanmondi to Ashulia. In this shifting purpose, a lot of change was noticed in the students also. They have different types of reactions to this. From this, we decided to collect all the reactions of the students in a data set, and then by using machine learning algorithms we built some models among them Naïve Bayes algorithm is the best model that can give us a result about the overall reaction of the students with high accuracy that the shifting gives the positive review to the mind of the students or not.

5.2 Conclusion

Recently Daffodil International University campus was shifted from Dhanmondi to Ashulia. As a result, different types of reactions were noticed among the students. A sentiment dataset was created on student's various reactions to campus changes. With this dataset, by using machine learning algorithms we built some models and find out the best model which can help the sentiment analysis of the students can be analyzed easily with high accuracy. Through this research work the authority can also understand the student's reaction to the campus shift, they can also know about the positive and negative reviews about their campus and if they can find any negative reviews they can also find the problems and can solve them.

5.3 Future Work

Through my research topic Sentiment Analysis in Perspective of Shifting DIU campus to Ashulia from Dhanmondi. After find out preferable algorithm and model that can give such a result about the overall reaction of the students with high accuracy that the shifting gives a positive review to the mind of the students or not. In the future, the authority can also understand the student's reaction to the campus shift, they can also know about the positive and negative reviews about their campus and if they can find any negative reviews they can also find the problems and they can also use the result of this research as e document of a positive review of most of the students of Daffodil International University. These can also use in several sentiment analyses for better results and accuracy by following the mentioned processes.

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REFERENCES

[1] Dspace.daffodilvarsity.edu.bd, available at <<http://dspace.daffodilvarsity.edu.bd>>, last accessed on 01-11-2019 at 03:02:07 pm

[2] Ijeecs.iaescore.com, available at <<http://ijeecs.iaescore.com>>, last accessed on 01-11-2019 at 03:32:03 pm

[3] En.wikipedia.org, available at <<https://en.wikipedia.org/wiki>> last accessed on 01-11-2019 at 03:32:01 pm

[4] Geeksforgeeks.org, available at <<https://www.geeksforgeeks.org/>> last accessed on 01-11-2019 at 03:48:09 pm

[5] Marsdd.com, available at <<https:// https://www.marsdd.com />> last accessed on 01-11-2019 at 03:52:06 pm

[6] Thedailystar.net, available at <<https://www.thedailystar.net/lifestyle/uber-grows-dhaka-1405597>> last accessed on 01-11-2019 at 03:58:06 pm

[7] Dspace.daffodilvarsity.edu.bd/, available at<<http://dspace.daffodilvarsity.edu.bd>>, last accessed on 30-11-2019 at 05:26:06 pm

[8] Monkeylearn.com, available at<<https://monkeylearn.com/sentiment-analysis/>> last accessed on 30-11-2019 at 05:29:06 pm

[9] Umadevi V, "Sentiment Analysis Using Weka", International Journal of Engineering Trends and Technology (IJETT) – Volume 18 Number 4 – Dec 2014

[10] Sarah Alh, mold, Tarfa Albuhairi and Mawaheb Altuwaijri, "Arabic Sentiment Analysis using WEKA a Hybrid LeaTransApproach", IEEE Transl. J. Magn. Japan, 1 August 2016.

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