

# Supervised Method Pursued For Cogitation regarding educational application

Md. Touhidur Rahman  
Department of Computer Science &  
Engineering  
Daffodil International University  
Dhaka, Bangladesh  
touhidur15-10361@diu.edu.bd

Ayesha Binte Khair  
Department of Computer Science &  
Engineering  
Daffodil International University  
Dhaka, Bangladesh  
aysha15-11102@diu.edu.bd

Md. Arid Hasan  
Department of Computer Science &  
Engineering  
Daffodil International University  
Dhaka, Bangladesh  
arid.cse0325.c@diu.edu.bd

**Abstract**—*The phenomena behind this work is to determine the learner's perception about the E-learning system through educational apps by collaborating with their perspective. E-learning (learning through an educational application) has become a fundamental guidance stage in numerous educational institutions such as schools, universities, colleges, and different other instructive organizations across the world due to the up-gradation of science and technology. The data for this research was collected from google playstore by the reviewers. So by our analysis we have accomplished our results about public inspections and comments which represents their thoughts about learning through application. Though learning through apps are not the ultimate solution for all students, it's a good choice in this technological era, and it will be broadened more in the near future as most of the students are now dependent on virtual communications and they are more reliable on it.*

**Keywords**—*App review, mobile app, technology acceptance model, Machine learning, supervised algorithm, online education, e-learning.*

## I. INTRODUCTION

Nowadays people are depending on technologies, virtual communications, and interactions. Educational applications are also such a kind of thing where instructors and learners can participate collaboratively. The type of application referred to here is e-learning (Mobile app). In an educational or learning app, the learners can participate in their assigned tests, assignments, assessments, etc. to reach their goal. Learners are provided their required learning materials virtually. Though this is not the extreme solution for users to learn and there is still some conflict about its working percentage but it is improving. At present innovative things are being experienced in this field.

In this research we have collected data from several users of educational type mobile application. After manually labeling those data we preprocess the data and applied seven types of machine learning algorithms (Logistic regression, KNearest Neighbors, Decision Tree, GussianNB, MultiNB, Random Forest, SVC, XGBoost) to predict whether the application is suitable for learners or not. Through that we will be able to know the failure of those app and how to overcome.

## II. LITERATURE REVIEW

There are a capful of research works about learning through application by many authors. Our work is unique and we collaborate with some other paper. Here are some discourse about related works on education through educational application.

E-learning platforms are shifting educational circumstances from the traditional way to a more flexible and portable type of education[1]. They used demographic data, analyzed these for predicting the continuous intention for using e-learning among students of educational institutions. The outcome of the study is that learners should be notified about the knowledge content, technology efficiency, ease of use, and usefulness for acceptance of the built e-learning platform.

According to (Doaa Mohey El-Din Mohamed Hussein 18 April 2016) Sentiment analysis is a term that becomes very useful to various types of individuals[2]. But there are some obstacles to the detection of physical physibale polarity of sentiment. In this research, it is stated that Natural Language Processing is used for this type of textual analysis for identifying the polarity of people's opinions. In this research, they have got 69.5% accuracy from the lowest average of accuracy which is bipolar. So, this type of research is recommended.

They discovered new methods for increasing the accuracy of sentiment analysis through the help of Naive Bayer classifier[3]. They used methodology like negation handling, word-n grams & feature selection. They got a good percentage of accuracy ( 88.80%) for fast sentiment classifier with the help of using Naive Bayes. It is recommended for accuracy & speed improvement.

They observed Mobile learning is considered the most useful platform during this pandemic situation [4]. Though these systems are not eligible enough to uphold the emotions of students & students have fairness of low grades, which can be because of their sadness or loss of friends on this online platform. But in a critical situation, it is working hugely for teachers & learners all over the world. Extended technology acceptance model & theory of planned behavior model are considered for this research. It gives 89.37% accuracy as outcomes which denote that instructors & learners are both being benefited by this platform in this pandemic time.

This paper demonstrates that, mobile learning technologies are needed to be understandable to the instructors before teaching the students [5]. Math learning apps are highlighted in this research. There will be a simulator for learners for exploring the math related content with the open end structure. And the outcomes gives a positive vibe about these apps.

The theme of this research denotes that, during this present digitalized & pandemic time, it is required that educational or student - teacher's collaborative platforms should be re-formed for the better performance of the feature of the applications [6]. The outcome shows that re-formation

process will be more useful for both end users during this pandemic time. The adaptive Learning, Predictive Analysis and Text to speech methodologies are applied here

In this study, the acceptance of technological things among students in the education field are tested and also compared with their expectations on the basis of interactive quizzes and sharing screens [7]. Their study was based on a 2 years campus-wide project where they received their study's data from the stakeholders (students, teachers & staff) of the institution and they analyzed these data sets. The outcome of this study refers that, students are more likely to have expectations in interactive quizzes than sharing their screen during the lectures. They also found positivity in students in technology reformation.

Here the author stated that, recent technology is improving in the field of study or education [8]. But it will be more useful for the deaf and hard to hear students if there is a Rubric application for them in educational institution & they can be able to interact with this application more comfortably. The Ranking system is a methodology used here. In this application a check list, analyzing rating of previous apps are also done. The outcomes of the study seems effective for the deaf & hard to hearing students.

From the above studies, we can observe, they have focused on specific methods on the basis of user interaction and collaboration. If they focus on the user's expectations, acceptances and satisfactions then that will be more beneficial for users. In our study we focused on the interactions and healthy participation of users in these online platforms and we got satisfactory accuracy in our study which will be useful for further research. We used machine learning algorithms in our study, where different types of algorithms were applied to the data sets. We can get a more accurate result if our study will include some more real-life survey data from the core users of this platform.

### III. PROPOSED METHODOLOGY

For this work we have collected the dataset from google play store[a], in the dataset we applied several machine learning algorithms for train the dataset to predict the outcome of the train data. Though there are a lot of algorithms in machine learning but we use only those who's gives us more accurate result. So that we can predict a particular app is actually helpful or not. The research work flow is showed in fig 1.

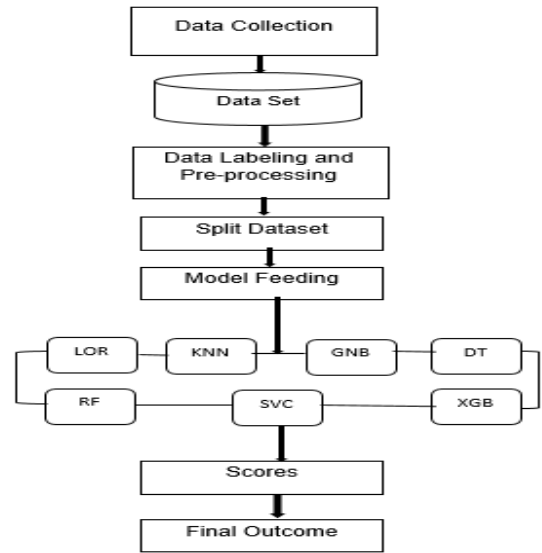


Fig-1: Workflow Diagram

#### A. Data Collection

We collect the data from the users review at educational mobile application in google play-store manually. The dataset contains total number of 10494 data which were manually labeled. In the dataset three classes are divided in numbers.

Table I Labeling amount

Class	Amount
Positive	8705
Negative	967
Neutral	823

#### B. Data preprocessing & Cleaning

After labeled the data we preprocess to find out if there any null value of unnecessary or invalid information. Basically we use python libraries for this process. Though the data was in string mode so that we encoded it into numeric mode. After that we fit the information as indicate by our model.

#### C. Model Selection

In this case, we are testing some classification algorithms applied to our data set. Then we divide our dataset into two parts: 80 percent for training purpose and 20 percent for testing purpose.

Table II Dataset

Variable	0,1
Class	Binary
Training Dataset	8395
Test Dataset	2099

After that, we tried to apply some algorithms (Logistic regression, KNeighborsClassifier, GaussianNB, Decision tree Classifier, Random forest Classifier, SVC, XGB) with the best accuracy, and then collected our results.

#### D. Performance calculation:

1. **Confusion Matrix:** which is also known as error matrix[9]. True positive, false positive, false negative, and true negative are the four values generated by the confusion matrix.
2. **Precision:** It is also known as positive predictive value [10]. A complete actual correct positive observation's prediction ratio is termed as precision. We can measure precision value through “(1)”.
3. **Recall:** The number of true positives divided by the number of true positives plus the number of false negatives is referred to as recall.

$$\text{Precision} = \frac{\text{True Positive}}{(\text{True Positive} + \text{False Positive})} \quad (1)$$

$$\text{Precision} = \frac{\text{True Positive}}{(\text{True Positive} + \text{False Negative})} \quad (2)$$

4. **F1 score:** The F-score also known as F-measure is a measure of a test's accuracy. We calculate F1 score as “3”

$$\text{F1 Score} = \frac{2 \times \text{Precision} \times \text{Recall}}{(\text{Precision} + \text{Recall})} \quad \text{“(3)”}$$

## IV. EXPERIMENTAL ANALYSIS & RESULTS

#### A. Experimental Setup:

For the analysis, we used a Windows 10 environment with an Intel(R) Core (TM) i5-8250U CPU running at 1.60GHz and 8GB of RAM installed. For the experiment we use python programming language version 3 and pycharm as IDE. We preprocess all of the data before running the algorithm with the highest level of precision.

#### B. Experimental Analysis:

The most precise precision for a machine learning-based investigation is authentic, perfect, and correct data input. As a result, before fitting the data to the model, we clean the data till it's ready to go. We are really pleased that we were able to clean data or label as efficiently as possible, ensuring that our majority of models run correctly and perform well in our dataset. We achieved almost 100 percent accuracy for testing datasets by randomly using seven machine learning algorithms or supervised classification models.. Our efforts will yield a true picture of the impact of online education through applications..

We're testing our algorithm to see whether it can forecast or decide the optimum outcome for the reviews of people. As a result of the actual result, we are able to identify an accurate statical report. So, after sorting the confusing matrix, we found that there were only a few numbers of values that were incorrect.

Figure 2 shows a graphical illustration of confusing matrices. In this scenario, the KNN model performs best, with only two values predicted incorrectly as false positives.

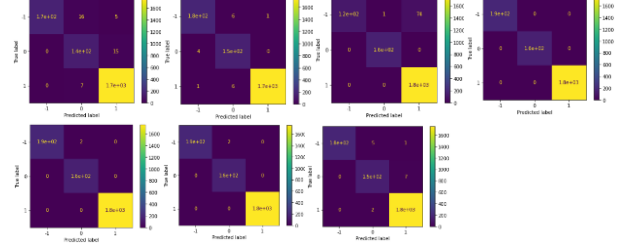


Fig. 2. Confusion Matrices for All Model

TABLE IV. CLASSIFICATION REPORT

Algorithm	Class	Precision	Recall	F1-Score	Accuracy
Logistic Regression	0	0.86	0.90	0.88	0.97
	1	0.99	1.00	0.99	
KNeighbours	0	0.93	0.97	0.95	0.99
	1	1.00	1.00	1.00	
GaussianNB	0	0.99	1.00	1.00	0.96
	1	0.96	1.00	0.98	
Decision Tree	0	0.99	1.00	0.99	0.99
	1	1.00	1.00	1.00	
Random Forest	0	0.99	1.00	0.99	0.99
	1	1.00	1.00	1.00	
SVC	0	0.96	0.96	0.96	0.99
	1	1.00	1.00	1.00	
XGBoost	0	1.00	1.00	1.00	1.00
	1	1.00	1.00	1.00	

There are a few more estimates to consider the appropriate model for our examination. We have double-checked the precision, recall and F1 score and backing to accomplish great precision. We have gotten some great results from these estimations. There was a class 0/1 that represented the reviewer's thought about the app, with “0” denoting “negative review” and “1” denoting “positive review”. The actual classification report for each algorithm and dependent variable as our binary class was shown in Table IV. Our applied model was KNN, GNB, DT, RF, SVC, XGB and their accuracy score were respectively 0.97%, 0.99%, 0.96%, 0.99%, 0.99%, 0.99% and 1.00%.

After completing our experiment on our student dataset, we discovered that there are five models (KNN, DT, RF, SVC, XGB) that are best fitted for our dataset. The overall conclusion was positive, and our experimental study work was quite successful in determining whether peoples were learning or not learning from educational app. Figure 3 shows a graphical representation of model correctness.

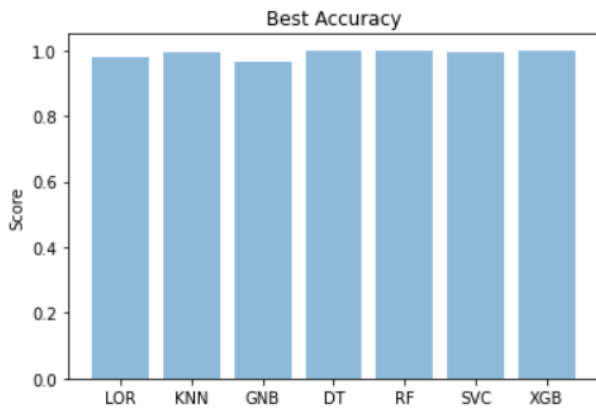


Fig 3. Graphical Representation for Best Accuracy of Applied Model

### C. Discussions

The experimental findings reveal that the algorithm perfume is used here with the greatest accuracy. We are all aware that not every data set is appropriate for every algorithm. As a result, we apply these algorithms for our datasets and get the highest level of accuracy. Online education has become the new normal in our society, yet some students have a lot of questions. The experimental findings reveal that the algorithm perfume is used with the greatest precision here. We are aware that not all data sets are appropriate for all algorithms. So, for our datasets, we utilize these methods, and we get the best accuracy.

### V. CONCLUSION

Learning through different applications is more flexible for learners, as they can have a better balance between work and studies. This survey will help us to justify whether a particular application is effective or not. For this work we tried to collect real time data from the educational application reviews. This will help us to understand the real results of the user's intuition.

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