Prediction On Impact Of Electronic Gadgets In Students Life Using Machine Learning

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Abstract

Now-a-days electronic gadgets play an important role in students' life as a source of learning. The Dependency of services provided by electronic gadgets has reached a large scale. Electronic gadgets like smart phones have a major impact on people in their day-to-day life. Among all, students are the most affected ones, as they rely on electronic gadgets for their academic activities. The major impact is that it can affect the students mental and physical health. Students are getting addicted to these electronic gadgets as it becomes inevitable. This study uses machine learning techniques to demonstrate how electronics affect students' daily lives. To examine the addictiveness of gadgets among the students, we just created a questionnaire to determine how many electronic devices they use and how long they use them for?, And whether the usage of electronic gadgets shows any improvement in their academic performance?. Machine learning employs the preprogrammed algorithms, to predict output values for the given input data. It is considered to be an aspect of artificial intelligence. Machine learning algorithms are used in a variety of fields, such as computer vision,voice recognition, medicine etc,. where it is difficult or impractical to create conventional algorithms to perform the necessary tasks. The collected dataset is taken to analyze the

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performance of prediction for various Machine Learning algorithms like K-Nearest Neighbour, Random Forest,Decision Tree,Logistic regression, Support Vector Machine. As a result of this study, accuracy of several performance measures were evaluated. In the future the prediction performance can be improved by using optimization techniques.

Keywords:Electronic gadgets, students, Machine learning algorithms, Academic performance, improved performance.

I. Introduction

One of the most amazing electronics that uses electricity to do specific tasks is an electronic device. The actions can be efficiently carried out by electronic devices at a given time. Because it improves the quality and effectiveness of people's lives.

Electronic devices help the young generation to improve their listening abilities and improve communication skills. Electronic gadgets promote independent learning among young people. The significant use of gadgets rises among the young people too soon. Each student can customize their electronic devices to match their unique needs.

In the 20th century, the technological devices reached its popularity worldwide. They eventually help the students on their study works mainly during the phase of self study. The visual representation helps them to stimulate their senses and can understand the concepts more than the text books. Students are so dependent on their smartphones and laptops that they frequently stay up all night studing, playing games, chatting, and surfing the web. Too much screen time of gadgets lead them towards vision impairment, anxiety, sleeplessness, obesity and depression as the students eventually get addicted to the devices. It leads to the clash of social-life balance of the students as they start to lose their interest in

their surroundings and students have a common misunderstanding that they can multitask while using electronic gadgets, which are now a major part of their lives and a major source of knowledge.

Without technological devices, individuals are now unable to envision their future. Particularly, students are more negatively impacted than other groups by their addictiveness on electronic devices. This is because students must rely on these devices to travel from home to academic activities. Students are not an exception in these situations, but their expectations are raised by the latest technology. The World Health Organization(WHO) has reported that electromagnetic radiation can damage the DNA. It further triggers the release of the free- radical which can lead to the immunity loss, changes in metabolism level and the brain impairment.

Machine learning predicts the precise result by using past information as input. It involves analysing computer algorithms, which may develop dynamically using experience and data. However, multitasking is a myth in accordance with the students' studies and concentration. A supervised learning algorithm's outcome variable must be predicted from a specified set of predictors. K-Nearest Neighbor(KNN), Logistic Regression, Support Vector Machine (SVM), Random Forest, Decision Tree and some others are examples of supervised learning.

The phrase "Machine Learning" denotes artificial intelligence (AI). This software tool

helps you to become more effective at anticipating outcomes without having to actively design it. There is a fundamental methodology for machine learning that the algorithm accepts both the program's input and output. The ML algorithm creates a model using data samples known as training data. Machine learning is concerned with training computer programmers to access and utilize information to analyze on their own.
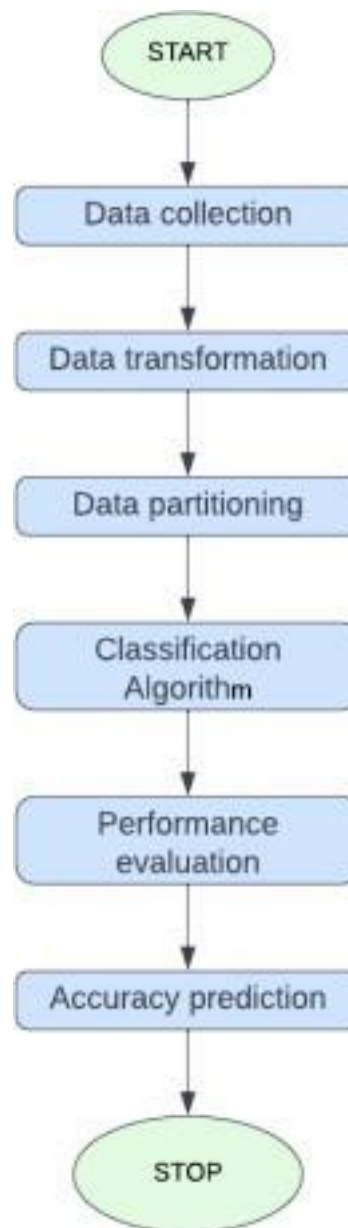

Fig 1.Workflow Diagram

II. Literature Review

H.M. Rafi Hasan et al., (2019) presented Machine Learning Algorithm for students performance prediction by collecting the students performance mark, attendance mark, presentation mark and assignment mark in the paper. They collected the dataset with 1170 records and predicted the performance of the future result with the help of machine learning algorithms like K-Nearest Neighbors Algorithm(K-NN), Support Vector Machine Algorithm(SVM), Decision tree classifier and Random forest

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classifier. They achieved 80% accuracy in all different algorithms.

Lidia et al., (2020) analyzed the Machine learning algorithms to predict the students performance. They used 284 articles as research articles and used the 2019-2020 research papers as a reference one. They handpicked and selected 284 research papers that obey the inclusion criteria. They used the Naive Bayes Algorithm , Artificial Neural Networks(ANN),Decision Tree, Logistic regression and Support Vector Machine(SVM). The ANN shows the best levels of accuracy among all the algorithms they had used.

Rahul et al.,(2021) presented the Student Performance Prediction using Technology of machine learning. For predicting, they have used various effective machine learning algorithms. Their mainly focussed algorithms are linear Regression, Decision Tree, Naive bayes classification and K-nearest neighbors(K-NN). They shared that the improvements have been carried out throughout the research. They conducted the survey around various environments to understand the criteria .

J.Dhilipan et al.,(2021) presented the Prediction of students using machine learning , the real objective, which is to have a general understanding of the AI algorithms used to identify academic development. They collected data from the students and transformed those data into features. They used the Entropy, K-Nearest Neighbour (KNN), Logical regression and the Decision Tree technique for research. They

achieved nearly 85% of accuracy in all algorithms. Vladimir et al.,(2019) presented Machine learning based on predictive analytics on students performance in STEM Education. They analyzed and tested various algorithms including Decision Tree, K-Nearest Neighbors(K-NN)Algorithm, Naive bayes classification, Artificial Neural Network(ANN) regression etc,. They also performed the formative surveys of graduate students to understand their opinion on machine learning.

Anusha et al.,(2019) analyzed Prediction of Student Performance using Machine Learning. They explained about all the dataset and the big data with good explanation.They used the K-means clustering method to unravel the well known clustering problems,also used Naive bayes as is simple and fast to execute the records and even used the Logistic regression. They achieved nearly 0.82% accuracy after training and predicting using the test data.

Kiran et al.,(2020) presented the Machine learning methods for analyzing the impact of social media on students academic performance . They importantly talk about the Social Networking Sites (SNS) like twitter and facebook as they widely connect the large number of people. They used Support Vector machine(SVM) , K-Nearest Neighbor (K-NN) Algorithms and linear regression methodologies. They shared that they don't achieve 100% accuracy as their goal is mainly based on Twitter and Facebook.

Ajay et al.,(2019) developed the Predicting and

Tracking Student Performance in Degree Programs Using Machine Learning Approach. They collected the dataset from the students of different backgrounds. The dataset contains 250 records with the required attributes for the prediction. They predicted the performance of the students and gave the results in the values like good, average, above average and excellent categories.

Ivana et al.,(2017) performed Machine learning methods in predicting the student academic motivation. They shared that it is important to predict the students' academic motivation to improve their results as it helps students. They used many algorithms such as Decision Tree, Support Vector Machine(SVM) and included the RBF kernel too. Whereas the Support vector Machine(SVM) shows the lowest accuracy in result analysis. In their research, the NeuraL Network model showed the most successful Prediction based on their behavior course.

Iii. Prediction On Impact Of Electronic Gadgets

Usage of electronic gadgets by the students are obtained in the form of a dataset based on average hours spent on the devices on gender. By performing statistical calculations, the software was better able to understand the data. 70% of the data are used to train the model, while 30% are used to test it. This data split is in a 70:30 ratio.

This proposed work used the information from 115 participants. The data are categorized using the machine learning method. To assess how well the model generalizes from

number of dataset helps to provide more information about the data.

Dataset Description

The dataset used here is a primary dataset. Primary dataset is a questionnaire form which consists of 120 records. After a pre-processing done on data, the dataset has 115 records. The prediction on impact of electronic gadgets in student life dataset is based on the parameters such as Id, Gender, Year of study, Devices, Previous CGPA, Current CGPA, CGPA, Hours and Marks.

Name	Dataset Name	Values	Representation
Gender	Gender	categorical	1-Female

Year	year	Integer	year
Devices	devices	Integer	-
Previous CGPA	previous	Float	-

reduce the risk of over-fitting, partitioned the original dataset into a variety of training and test

Current CGPA

current Float -

training data to unknown data and to

subsets.

including more people. Large

CGPA CGPA Integer Range Hours hours Integer

Hours Marks marks categorical - Table 1.Dataset

description

Iv. Result And Discussion

The Prediction on Impact of electronic gadgets in students life using Machine Learning was made with Machine Learning algorithms like K-NN, Random Forest,Decision Tree, Logistic Regression and SVM. Logistic Regression shows the highest accuracy of 91.43% among all algorithms.

Further, the algorithms can be hybridized to reduce the Error Rate. The size of the dataset can be increased by widely used performance criteria, including recall, accuracy, precision, F1 score, and support. The confusion matrix is employed for estimating the performance metrics. The confusion matrix must be scaled using the true positive, true negative, false positive, and false negative values.

Confusion Matrix

The many outcomes of the categorization tasks' results and predictions are represented by a confusion matrix. The classification results can be seen more clearly. We can evaluate the model qualification's quality with its assistance.

Confusion matrix:
Precision

PERFORMANCE MEASURE

This section discusses the performance metrics necessary for the experiment. A crucial component of reliable opinion mining is performance metrics.The performance is validated using the most

$$888888888888888888 = \frac{8888}{8888+8888}$$

Recall
$$888888888888 = \frac{8888}{8888+8888}$$

F1-Score
$$881 - 8888888888 = \frac{8888}{8888+\frac{1}{2}[8888+8888]}$$

Accuracy
$$888888888888888 = \frac{8888+8888}{8888+8888+8888+8888}$$

Error rate
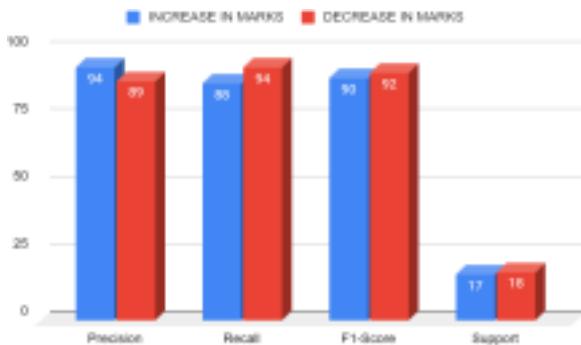$$8888888888\ 8888888 = \frac{8888+8888}{8888+8888+8888+8888}$$

TN

TP FN

1.The instances of the predicted class are shown in each column of the confusion matrix. 2.The instances of the real class are shown in every row of the confusion matrix.

• True Positive: The amount of times our real positive values match our positive predictions. It was accurate for you to forecast a positive number.

• True Negative: The amount of times our actual negative values match expected negative values. You correctly anticipated a negative result, and that is exactly what happened.

• False Positive: The amount of times our algorithm incorrectly forecasts negative numbers as positives. You anticipated a negative value, but it is really positive.

• False Negative: The amount of times our algorithm incorrectly forecasts negative numbers as positives. You anticipated a negative value, but it is really positive.

Fig 2.Comparison of predicted values

V. Result

The results for algorithms such as Decision Tree showed results with 82% , Random Forest with 85%, SVM with 90% and K-NN with 91% accuracy and Logistic Regression with 91.43%. So, Logistic Regression algorithms outperformed other algorithms with 91.43% accuracy.

ALGORITHM	ACCURACY
K-NN	91%
Decision Tree	82.86%

Random Forest	85.71% 91.43% 90.15%
Logistic Regression	
SVM	

Table 2.Accuracy evaluation of algorithms.

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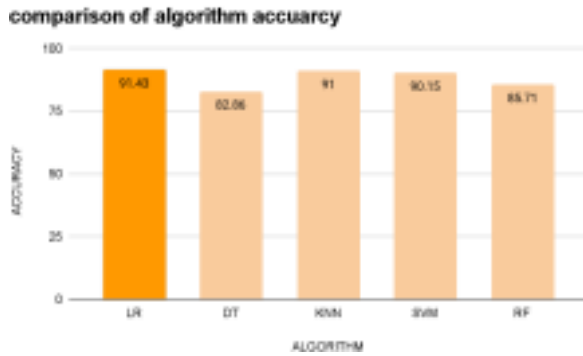[6] J. Dhilipan *et al* "Prediction of students'

Fig 3.Comparison of Algorithms evaluation

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