

Student Marks Prediction Project By Machine Learning

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Abstract: *After the pandemic and major changes in the education system (online education system) and in students' personal lives, such as dealing with personal loss and social anxiety, which increase dropouts, learning losses, and the digital divide In traditional education system, we only consider the marks obtained by students to evaluate academic performance, but we should also consider the mental condition of the student in which he is being evaluated, just like when we increase time or any service to those who are handicapped. So, for a fair evaluation, or to put it another way, a student-centric approach, we predict student academic performance by taking into account traditional factors as well as his emotional state, interest, and what he has done in his free time or in his interested field data by developing ML models using various algorithms. To do so, we will first create some sets of questionnaires to collect data for our research project, and then, using data analysis and classification, we will implement different ML models and test their accuracy, recall, and precision*

Keywords: *Machine Learning ,Python*

I. INTRODUCTION

Following the pandemic and significant changes to the educational system and students' personal life, such as coping with bereavement and social anxiety, dropout rates and academic losses increased, the digital divide, too. Up until now, we have only evaluated a student's academic success based on the mark they received. The existing educational system results in a dreadful experience for more than 50% of students who are not good at what they are doing, according to the current academic performance evaluation method and honest feedback from a student who is average or below average in education. When more than 50% of students lack enthusiasm for studying, the educational system has failed. We considered a strategy where we would evaluate student using the current educational system while also including additional information, such as their emotional state and interest. Moreover, their work in interested sector. This might make their appraisal of the educational system fairer. The primary goals of this are to raise student general performance and prevent dropouts. The performance of the student is dependent on a number of elements, including their mental state in addition to their grades and academic course work. In light of this, we will carry out a survey in which we will inquire about things like your home, your grades in the 10th and 12th grades, your financial situation, etc. We can determine where the learner is falling behind and where he or she needs to improve by carefully examining these answers. We can help students perform better by adding these answers as an additional feature to our machine learning model.

II. Related Work:

Havan Agrawal and Harshil Mavani in "Student Performance Prediction using Machine Learning" In this essay, a model is put out to forecast student success in a university setting. The method used is a form of machine learning known as neural networks. Moreover, the importance of a number of distinctive qualities, or "features," is considered in order to determine which of these are connected to student achievement. The last section contains the experimental data that shows how well machine learning works in this situation.

Le Hoang Son¹, Hamido Fujita in "Neural-fuzzy with representative sets for student performance prediction" "The multi- input, multi-output student academic performance prediction problem is addressed in this study with a novel approach. The MIMO SAPP seeks to forecast a student's success going forward once they have enrolled in college.

Byung-Hak Kim, Ethan Vizitei, and Varun Ganapathi investigated "Student Performance Prediction with Deep Learning," a method in which a machine predicts students' future performance as they interact with online coursework.

Thi Dinh, Ha Dinh, Thi To Loan Pham, Loan Loan, Giap Cu Nguyen, Nguyen Thi, Nguyen Thi Lien Huong in "An Empirical Study for Student Academic Performance Prediction Using Machine Learning Techniques" This study looks at a machine learning approach that predicts a student's final grade point average based on personal traits, academic achievement in the first and second years of college, a gap year, and university entrance scores. The information was gathered via a poll of graduate students from three separate years as well as the university's student management information system.

In "Multiclass Prediction Model for Student Grade Prediction Using Machine Learning," give a thorough examination of machine learning methods to forecast students' final course marks while increasing the accuracy of the prediction. In this paper, two modules will be emphasised. Using a dataset of 1282 genuine student course grades, we first assess the accuracy performance of six well-known machine learning approaches, including Decision-Tree , SVM, NB, kNN, Logistic Regression (LR), and Random Forest (RF).

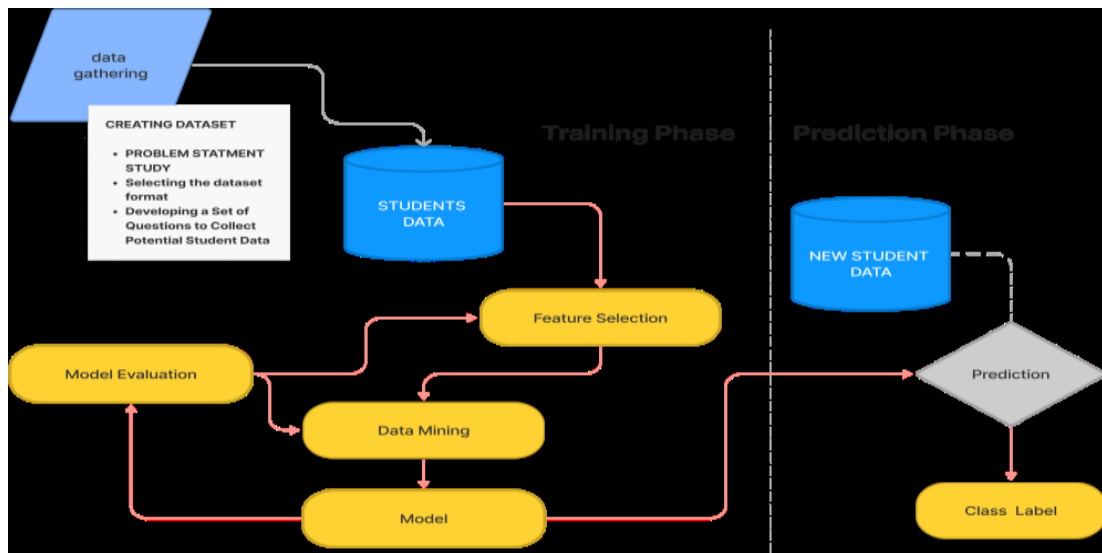
In "Predicting Student's Performance Using Machine Learning Methods: A Systematic Literature Review," explored the causes of the lack of studies on the various prediction techniques and significant factors that influence a student's academic performance. This systematic study's goal is to learn more about the machine learning methods and traits that are currently used to predict student success.

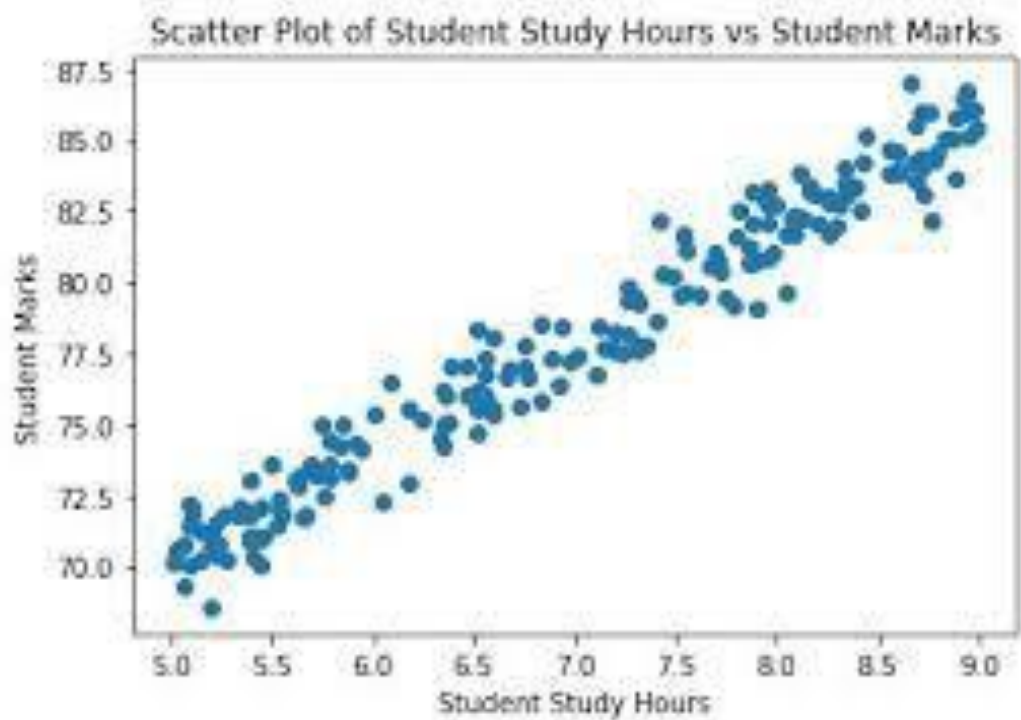
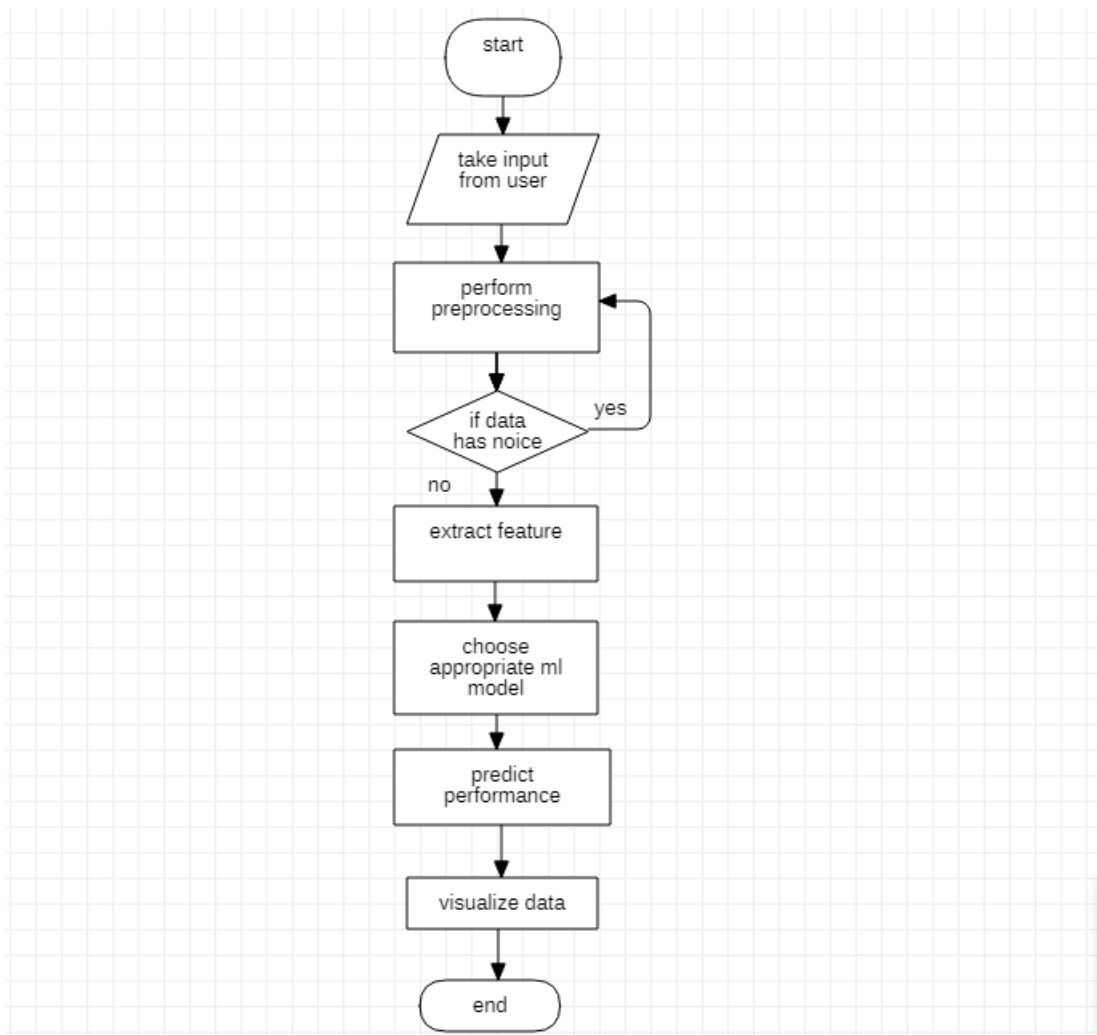
Nabil, M. Seyam and A. Abou-Elfetouh, in "Prediction of Students' Academic Performance Based on Courses' Grades Using Deep Neural Networks," The main goal of this paper is to explore the efficiency of deep learning in the field of educational data mining, especially in predicting students' academic performance and identifying students at risk of failure. This study used a dataset gathered from a public 4-year university to create prediction models to forecast students' academic success in upcoming courses based on their current grades. the previous courses of the first academic year using a deep neural network (DNN), a decision tree, a random forest, gradient boosting, logistic regression, a support vector classifier, and K- nearest neighbours.

III. METHODOLOGY:

Successfully comprehending the problem statement and implementing the new Model design are key stages in model development. After deciding on a suitable data set format, it is crucial to match it to the needs of our problem statement and designed model because we want to study how human emotions affect students' overall performance. To do this, prepare the right set of questions to collect data from

students in our data set format, which can improve the accuracy of our predictions. There are some key features of the data set which will impact most on the model like age, address, family income, travel time extracurricular activity etc. This feature and functionalities will helps to analyze the general performance of students. The proposed system will help to keep track and retrieve the student performance in a particular course and semester, It will able to research the factor that affect the student general performance. The proposed framework looks at a student's demographics, study-related traits, and psychological aspects in order to obtain as much data as possible from peers, instructors, and parents. The most recent information is gathered via school reports and enquiries, such as student grades, demographic statistics, and elements connected to social and academic life. Attempting to forecast academic success with the highest level of accuracy possible using a variety of effective data mining techniques. The framework is successful at pinpointing the student's areas of weakness





Data Collection: Gather data on students' past performance. This could include variables like hours studied, previous exam scores, attendance, etc.

Data Preprocessing: This involves cleaning the data, handling missing values, and transforming categorical variables into numerical ones if needed.

Exploratory Data Analysis (EDA): Analyze the data to understand distributions, correlations, and patterns. This step helps in feature selection and engineering.

Feature Engineering: Create new features or transform existing ones to better represent the underlying problem and improve model performance.

Model Selection: Choose appropriate machine learning models for the task. Common choices for regression tasks like predicting student marks include linear regression, decision trees, random forests, and gradient boosting models.

Model Training: Train the selected model on the training data.

Model Evaluation: Evaluate the model's performance on a separate validation or test dataset. Common evaluation metrics for regression tasks include mean squared error (MSE), mean absolute error (MAE), and R-squared.

Here's a sample analysis summary:

Data Analysis: The dataset consists of X features and Y samples. There are no missing values, and the distribution of marks appears approximately normal.

Feature Importance: After training the model, feature importance analysis indicates that "hours studied" and "previous exam scores" are the most significant predictors of student marks, followed by "attendance" and "study time."

Model Performance: The chosen model achieved an R-squared score of 0.85 on the test set, indicating that it explains 85% of the variance in the data. The mean squared error (MSE) on the test set is Z.

Limitations: One limitation of the model is that it assumes linear relationships between predictors and the target variable. Additionally, the dataset may not capture all factors influencing student performance.

IV. CONCLUSION:

Hence, Using the Proposed System we can predict student academic performance Using machine learning model by not only considering academic grades of student but also considering economic, social, geographical background of Student. Using this system, it will be easy to postulate the career decision of Student and it will help to change the current Evaluation System of Student general Performance. Also, with machine learning it can be said that project is a sincere effort to design and implement the student general performance prediction model. We successfully gathered data from students and created our own dataset in suitable format. future feature selection techniques could be different. on the datasets, several classification techniques can also be applied.

V. REFERENCES:

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