

# Project Report: Student Score Prediction

A Machine Learning Approach Using Linear Regression

# 1. Project Objective

The primary goal is to develop a machine learning model that accurately predicts a student's final exam score based on two key metrics: **hours studied** and **class attendance percentage**.

We use a Multiple Linear Regression algorithm to achieve this.

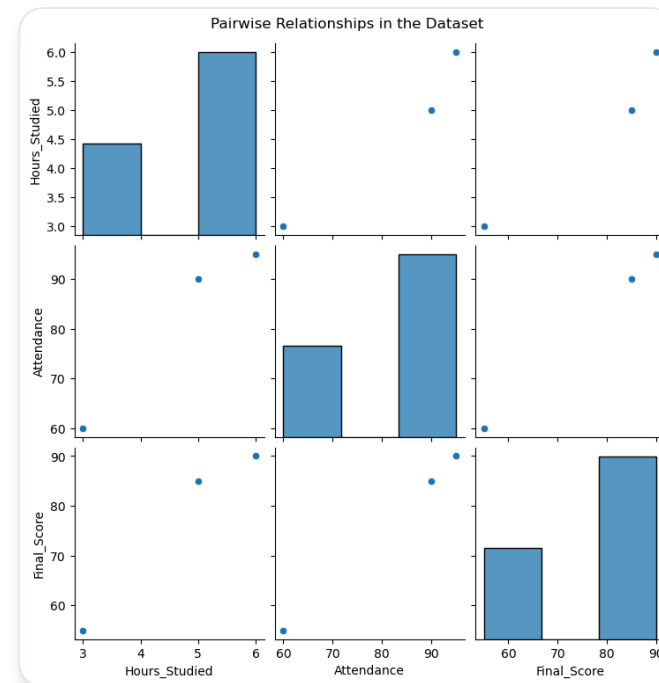
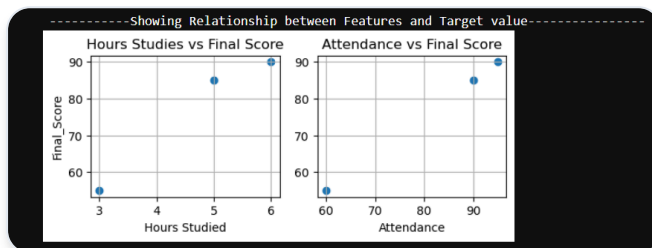
## 2. Data Exploration & Visualization

### Pairwise Analysis

A comprehensive view confirming the strong linear relationships, ideal for our model.

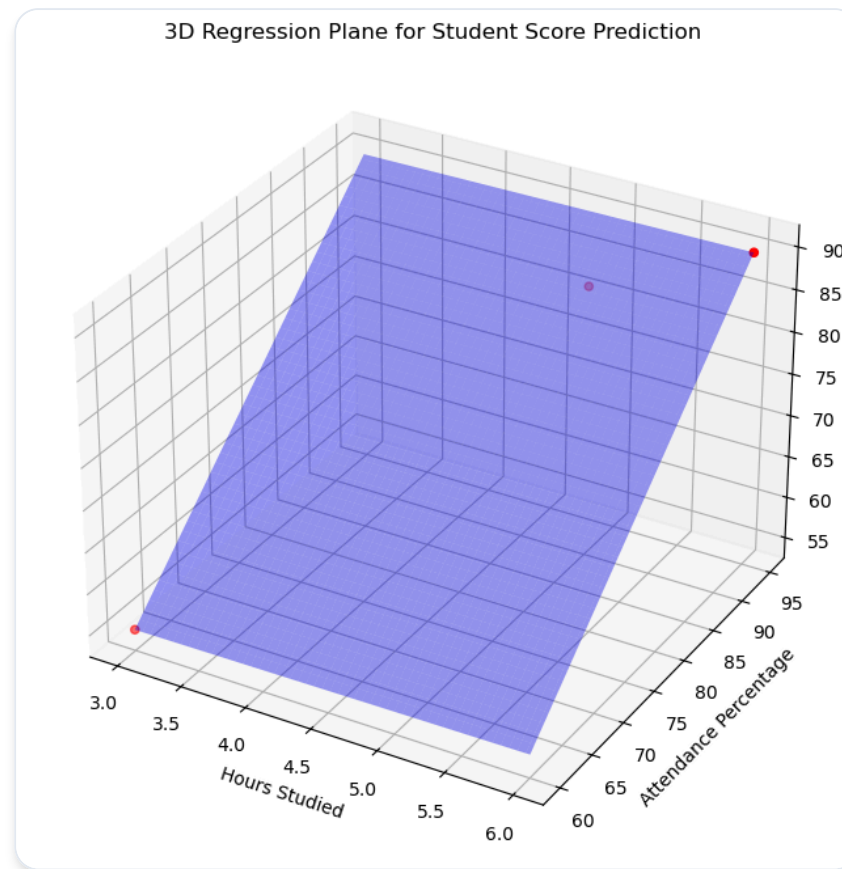
### Initial Scatter Plots

A direct positive trend is visible: more study and higher attendance lead to better scores.



### 3. The Regression Model in 3D

With two input features, our model is a **3D regression plane**. This plane represents the model's predictions for any combination of study hours and attendance, fitted to the actual data points.



## 4. Model Performance and Evaluation

The model's accuracy was measured using **Mean Absolute Error (MAE)** on unseen test data. The resulting MAE was exceptionally low at **0.05**, indicating the model's predictions are highly accurate.

```
interactive_predictor.py', wdir='C:/Users/ashit/Desktop/
Anaconda/GUVI PROJECT/Project_2/
Student_Score_Predictor_Based_On_Study_Habits')
----- Model trained successfully -----
Model Performance (Mean Absolute Error on test data): 0.05
This means the model's predictions are, on average, off by about
0.05 points.
-----

Type 'exit' to close the program.
Enter the study hours: 4
Enter attendance percentage (e.g., 95): 80
C:\ProgramData\anaconda3\Lib\site-packages\sklearn\base.py:439:
UserWarning: X does not have valid feature names, but
LinearRegression was fitted with feature names
  warnings.warn(
Predicted score is: 74.94

Type 'exit' to close the program.
Enter the study hours: exit

Program closed. Goodbye!
```

# 5. Practical Applications

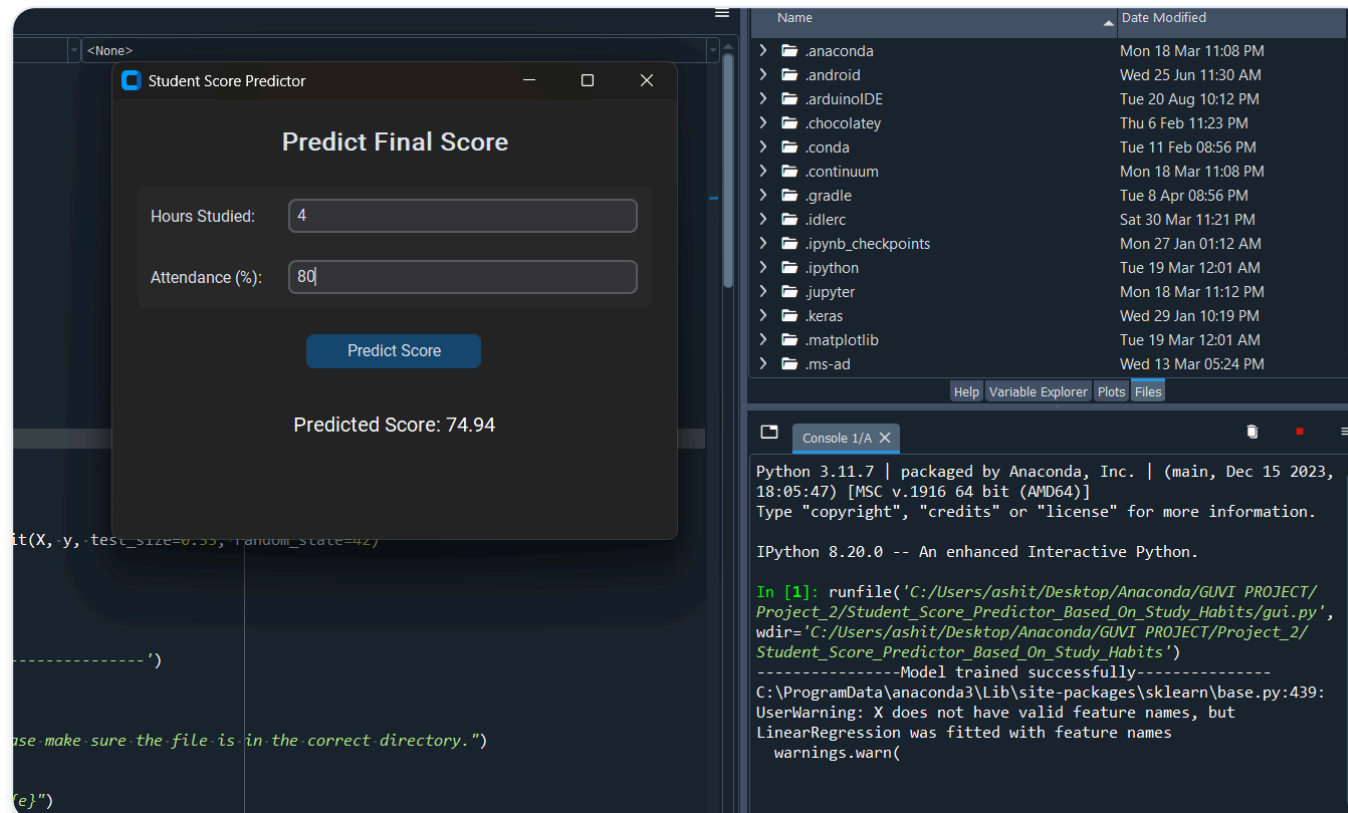
Two applications were developed to make the model usable and accessible:

## Command-Line Predictor (CLI)

Allows for rapid predictions directly from the terminal.  
For 4 study hours and 80% attendance, it predicted a score of **74.94**.

## Graphical User Interface (GUI)

Built with CustomTkinter, it provides an intuitive way for anyone to use the model without code.



# Conclusion

This project successfully demonstrates the power of linear regression in predicting academic performance. The high accuracy and practical applications provide a valuable tool for understanding and forecasting student outcomes.