

Student Habits and Performance Analysis

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1. Introduction

This project aims to explore the relationship between students' habits and their exam scores. The goal is to help schools improve overall academic performance by identifying behavioural patterns that may contribute to underachievement or failure. By analysing areas where students fall short, we can better understand the factors affecting their success. The project incorporates data visualizations, machine learning models, and various analytical techniques to draw meaningful conclusions and accurate interpretations from the data.

2. What the Program Does

2.1 Data loading (Preloading)

- Opens and reads a dataset from a spreadsheet file
 - Checks if the file exists and catches any errors while loading
- If any errors are found it will return errors e.g. FileNotFoundError

2.2 Data Cleaner

- Looks for missing or repeated data and flags it
 - Checks that study hours are within a realistic range (0–24 hours a day)
- With a usual study time of 6.5 – 4.5 hours per day

2.3 Student Analyser

- Calculates the average and median study hours grouped by mental health ratings
- Measures how well sleep patterns match up with exam performance
- Spots students who spend way more or way less time on social media than average

2.4 Visualizing the Story

- Histogram shows how much time most students spend studying per day, Using the graphs we can see that most students study less than 4 Hours a day but for a longer period of time where as those who study longer per day often study for shorter period of time
- Scatter Plot compares sleep hours to exam results, Using the Scatter plot we try to see if there is any correlation between students sleep patterns and the way they performed in an exam. However we see a mix of results showing us the correlation between sleep and exam results is weak.
- Box Plot reveals how diet quality might relate to final scores. In the box plots we see that bad diet quality performs slightly worse than both the other categories of diet with the category of fair Diet Quality being the best for students performance.

2.5 Score Predictor (Machine learning)

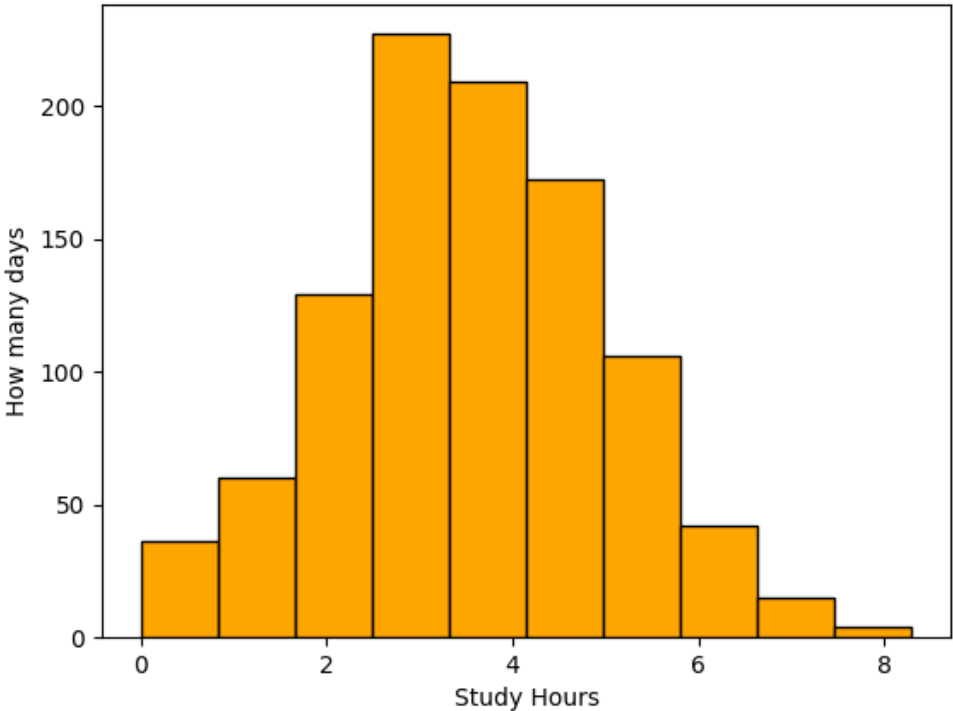
- Prepares data by converting text into numbers. I used an encoder to convert string values into integer so that the machine could interpret it properly and could give accurate predictions
- Trained a simple model to predict exam scores based on habits of students
- Then saved the model using pickle to make sure the model will not be lost and could be reused in case of need

4. Conclusion

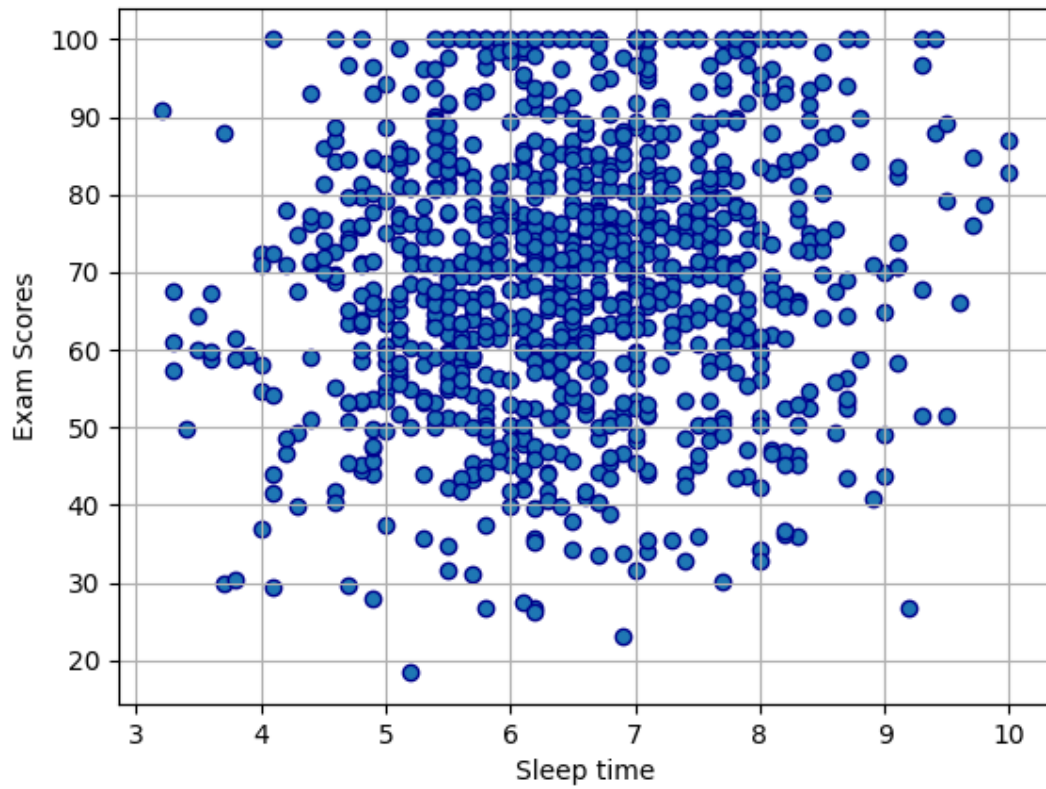
Based on the data, we can conclude that students who maintain a balanced diet, follow a consistent sleep schedule, and commit to steady, regular study habits tend to achieve higher exam scores. The model predicts an average score of approximately **78.33%** for students who follow such a pattern.

However, it's important to recognize that not all students thrive under the same routines. While structured habits benefit many, others may perform better using different study methods tailored to their personal learning styles. This highlights the need for flexible academic support systems that accommodate individual differences while still promoting healthy habits.

Histogram showing students study hours per day



Scatter plot showing students sleep times compared to exam scores



Box plot showing diet and final scores

