

Exam Score Analysis

Observations and Inferences

Naveen Parthasarathy

Table of Contents

- Introduction
- Analysis
 - Key statistics
 - Observations
 - Model
- Inferences
- Conclusion

Introduction

- Conduct analysis of StudentPerformanceFactors file.
- Primary focus is to develop visuals and provide key insights.
- As such,
 - Power BI - visuals, insights
 - Python - visuals, models

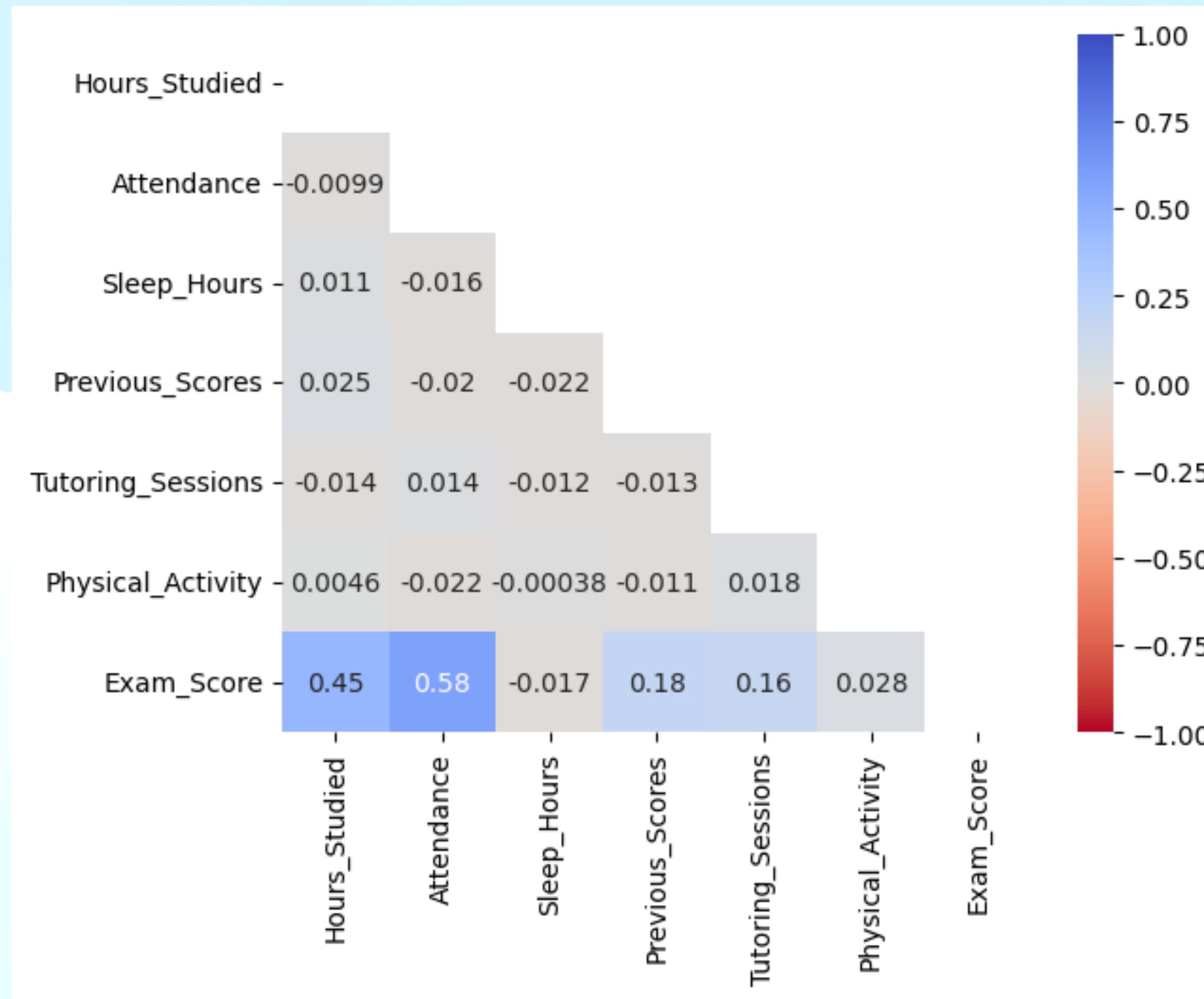
Analysis

Key Statistics

- Total Students - 6607
- Exam Score -
 - Average = 67.24
 - Lowest = 55
 - Highest = 101
 - Average Score change from previous score = -0.0016%
- Average Attendance - 79.98

Analysis

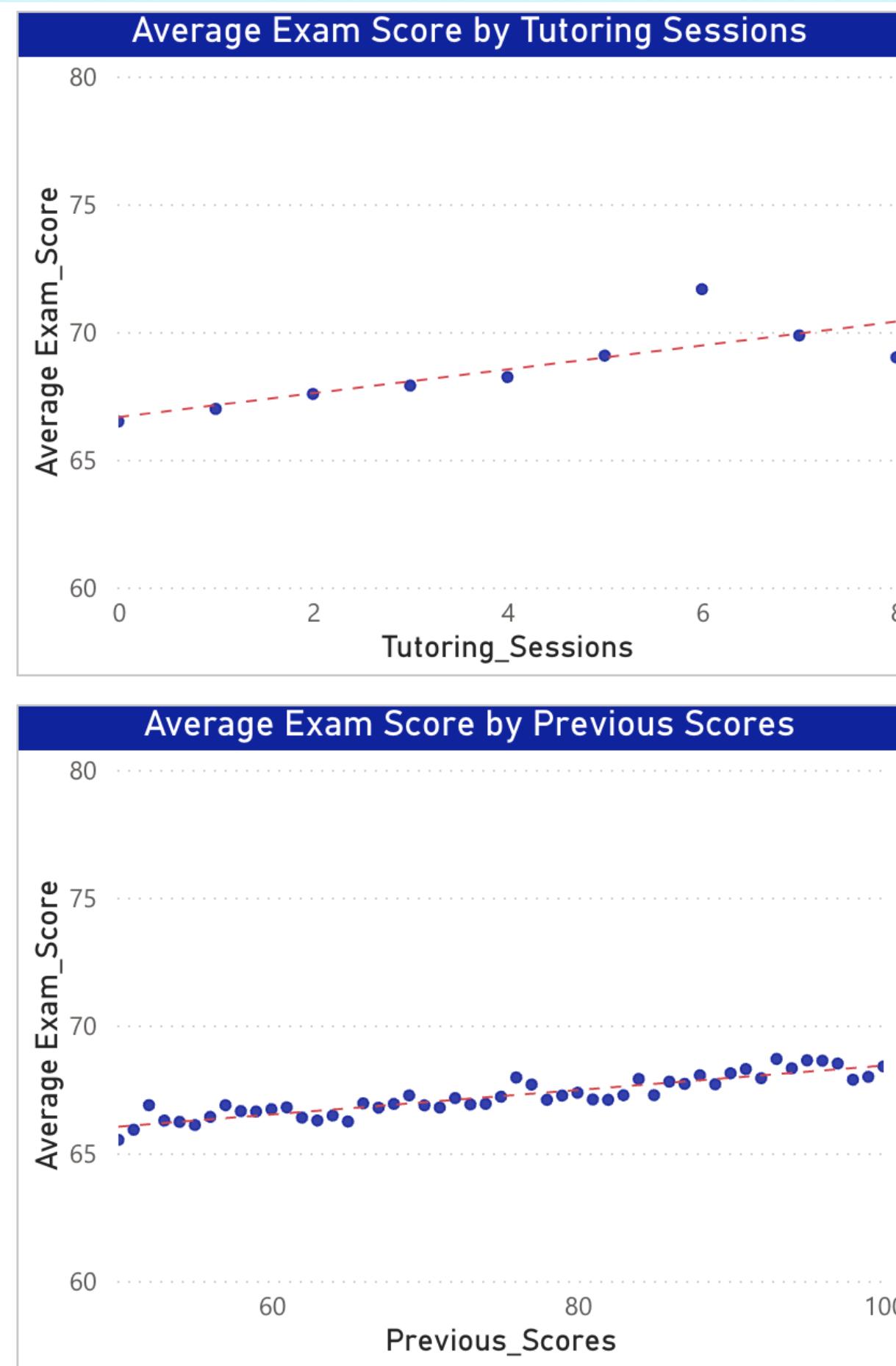
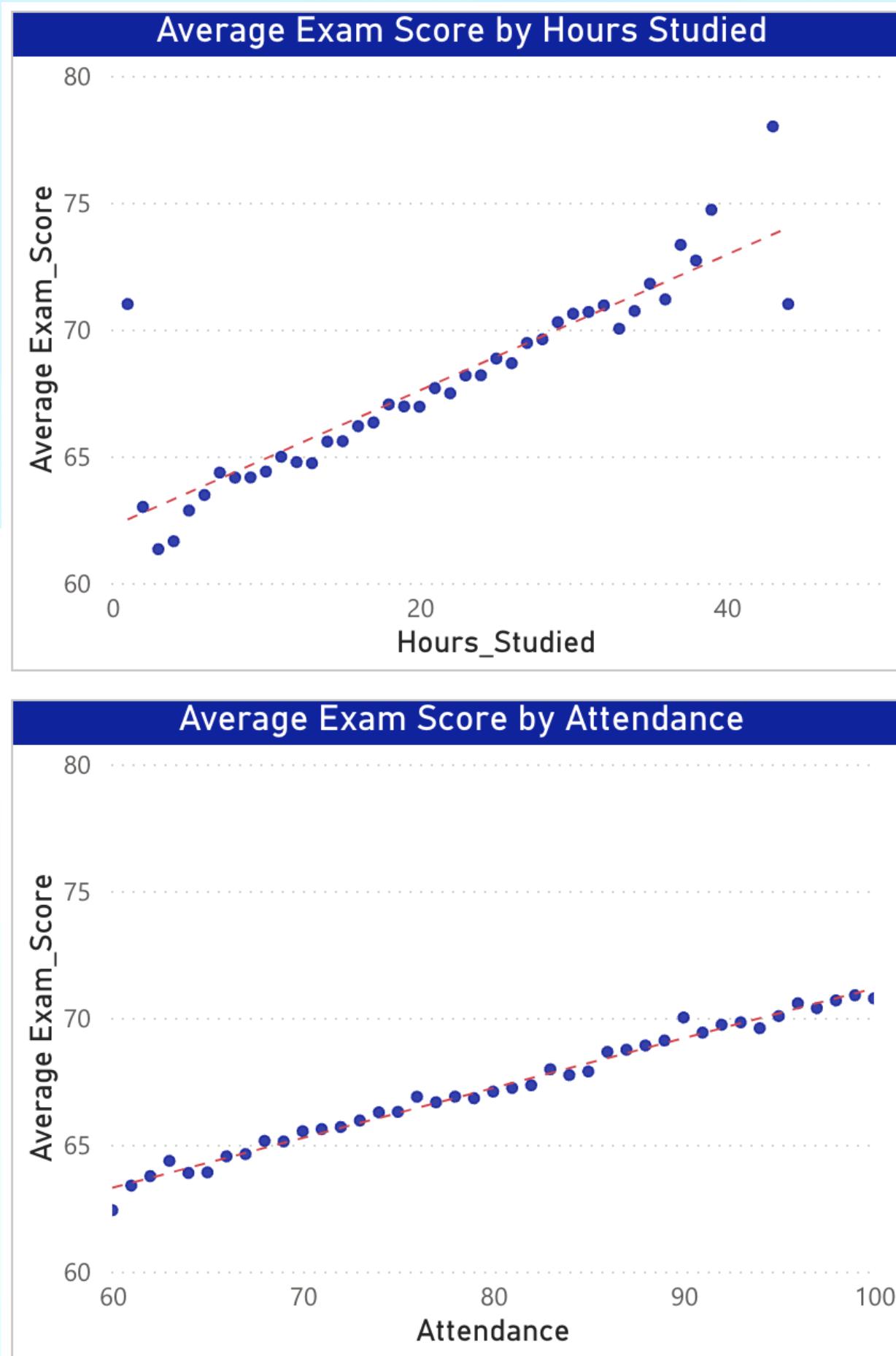
Observations



- Correlation Matrix of Quantitative variables on Exam Score
- Measures degree and direction of relationship between variables
- Attendance is highest, followed Hours_Studied, Previous_Scores and Tutoring_Sessions
- All the others are neutral => not much effect on Exam_Score

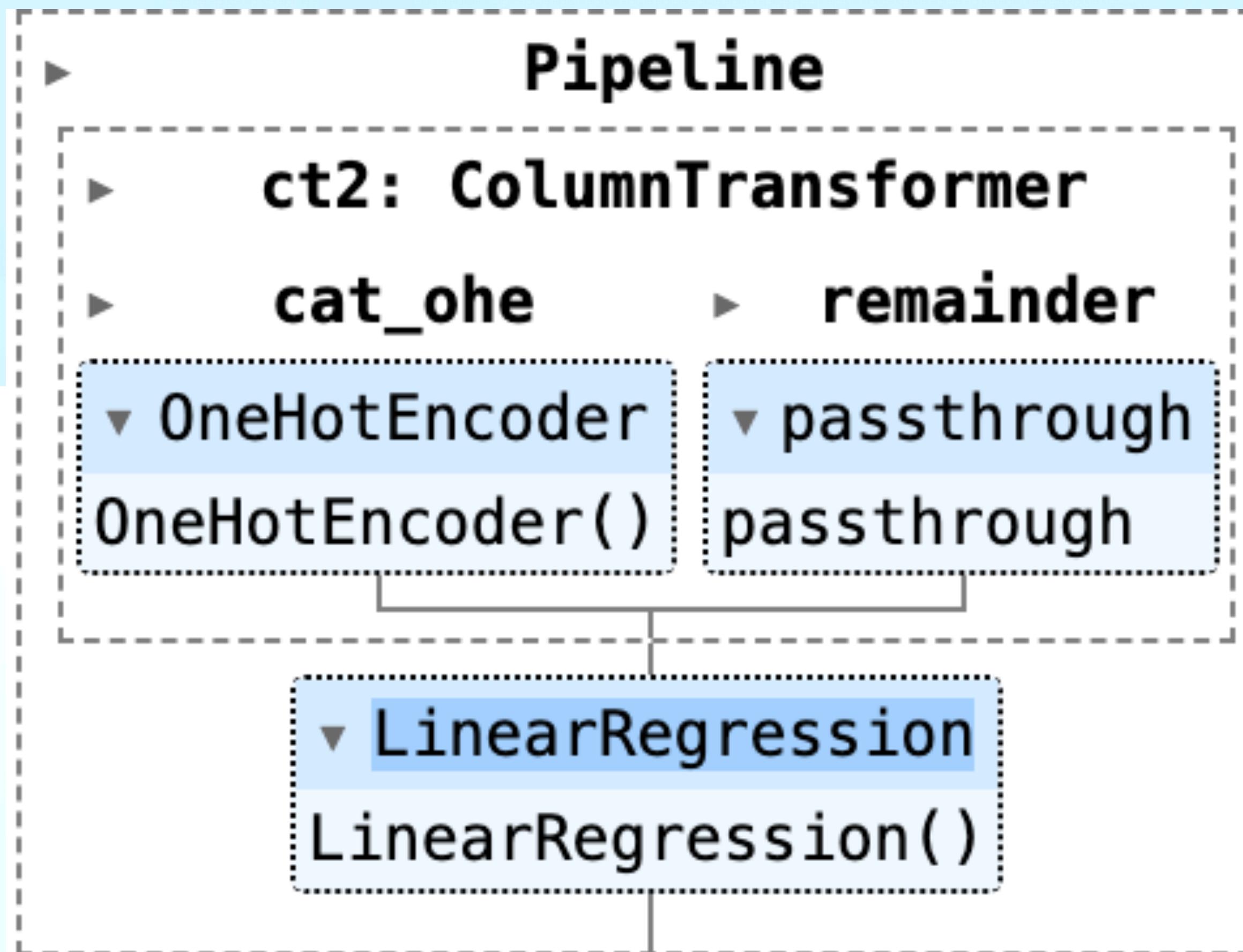
Analysis

Observations



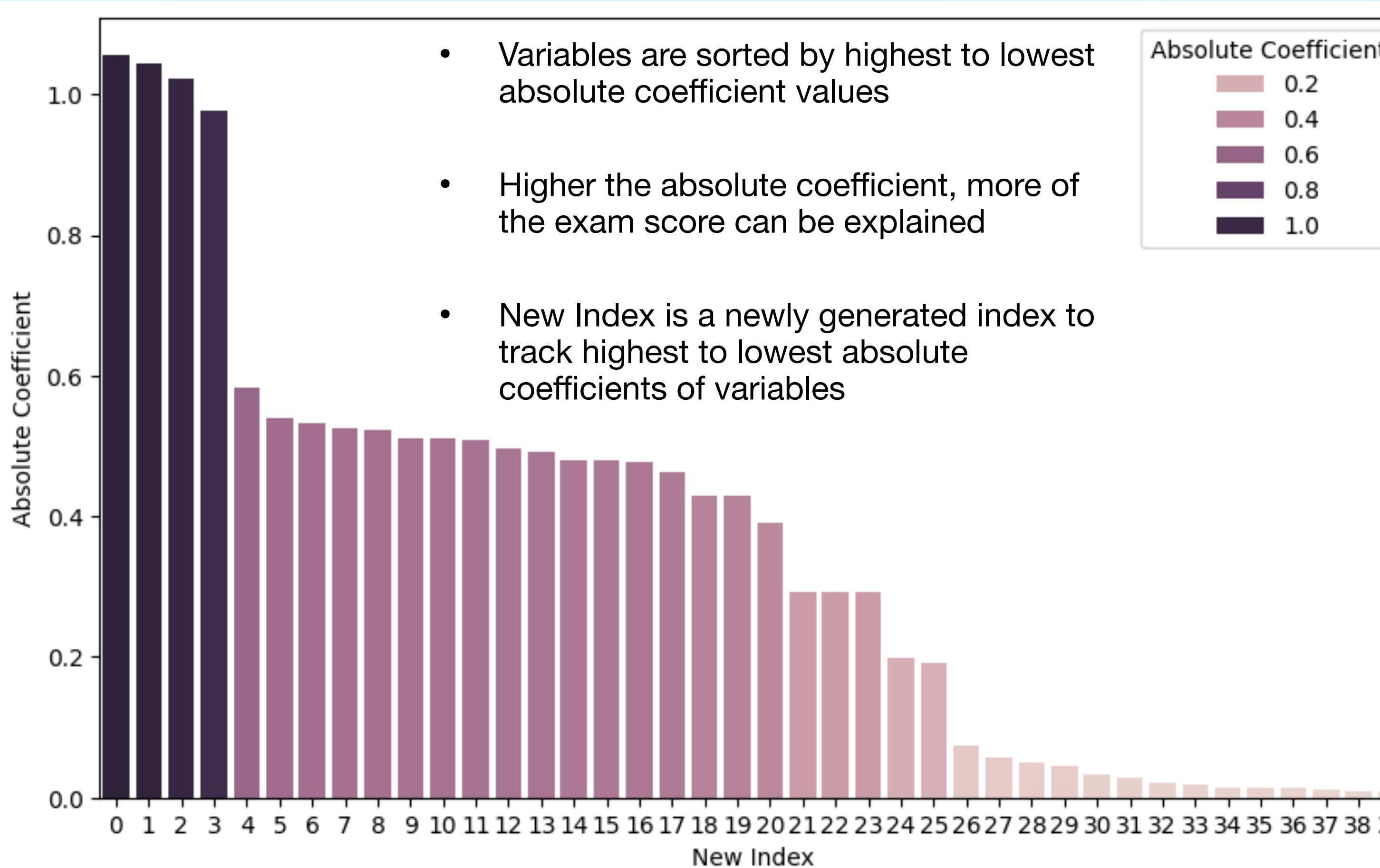
- Average exam score was plotted against correlated variables
- Increasing trend line => positive relationship
- Inference: Average exam score increases linearly with increase in hours_studied, tutoring_sessions, attendance or previous_scores
- What about qualitative variables?

Analysis Model

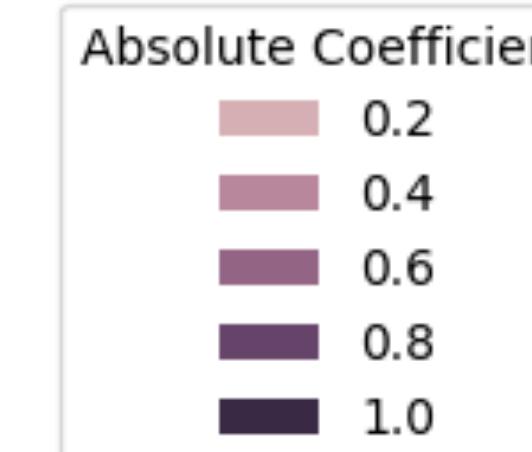


- Transformed qualitative variables
- Created a Linear Regression ML model
- Generated insights -
 - Inferences:
 - Model is able to predict 77% of the variance in Exam Score with the given features.
 - MSE of the model is 3.256
 - RMSE of the model is 1.8
 - Our predictions for Exam Score are on average 1.8 units away from the actual score.

Analysis Model

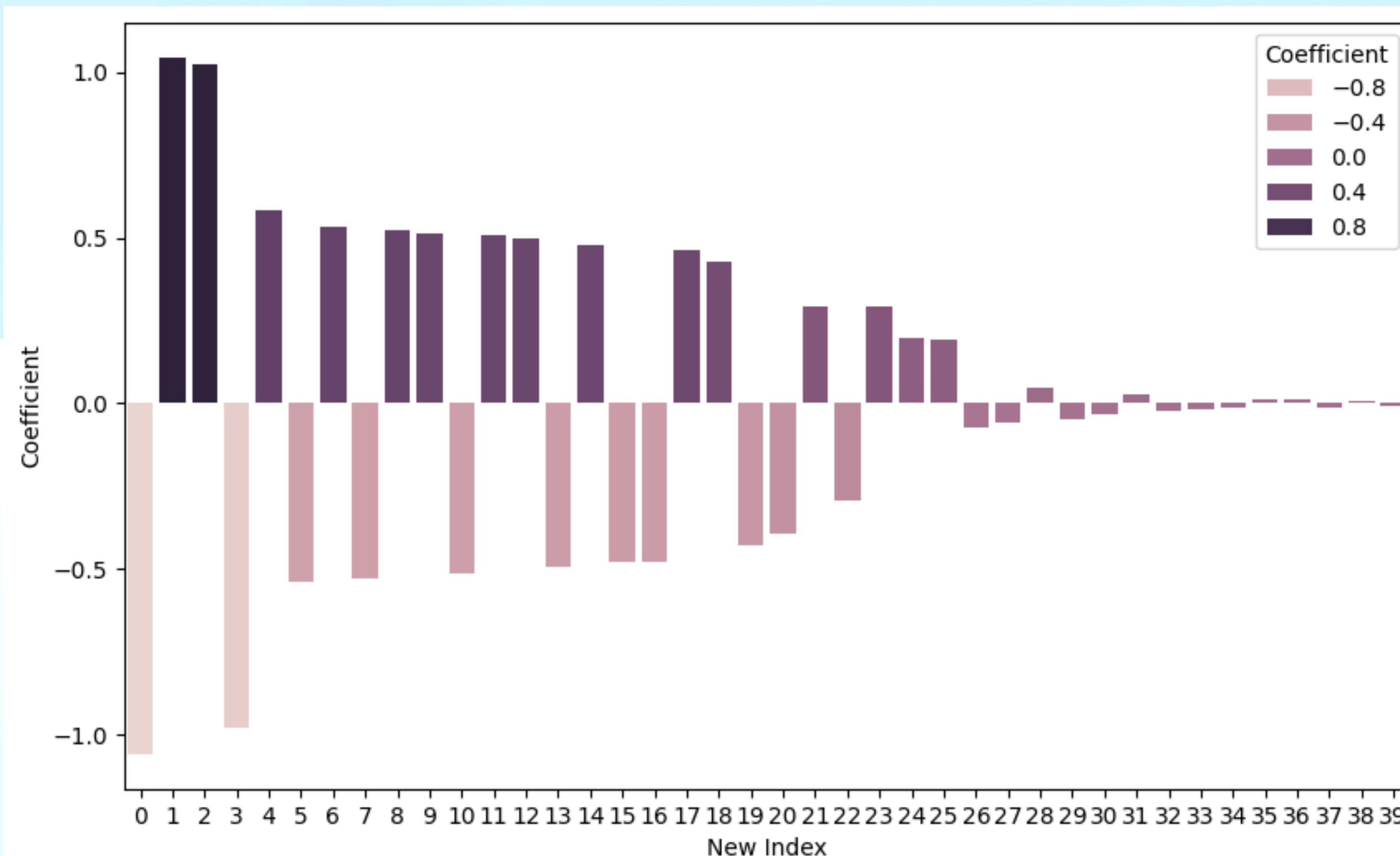


- Variables are sorted by highest to lowest absolute coefficient values
- Higher the absolute coefficient, more of the exam score can be explained
- New Index is a newly generated index to track highest to lowest absolute coefficients of variables



- Top 5 qualitative features -
 - Access to resources: Low
 - Access to resources: High
 - Parental Involvement: High
 - Parental Involvement: Low
 - Family Income: High
- Bottom 5 features (quantitative and qualitative)-
 - Gender Female
 - Access to resources: Medium
 - Sleep Hours
 - School Type Private
 - School Type Public

Analysis Model



- Top 5 positive features -
 - Access to resources: High
 - Parental Involvement: High
 - Family Income: High
 - Motivation Level: High
 - Teacher Quality: High
- Top 5 negative features -
 - Access to resources: Low
 - Parental Involvement: Low
 - Peer Influence: Negative
 - Family Income: Low
 - Motivation Level: Low

Inferences

- Average exam score increases linearly with increase in hours_studied, tutoring_sessions, attendance or previous_scores
- Our predictions for Exam Score are on average 1.8 units away from the actual score.
- Low and High Access to Resources & Parental Involvement explain a lot of a students exam score
- School Type, Gender and Sleep hours don't provide much information to understand exam scores

Conclusion

- Improve hours_studied, tutoring_sessions, attendance or previous_scores for maximal effect -
 - Provide study-only periods, additional tutoring sessions and incentivize regular attendance.
- Access to resources, Parental Involvement, Family Income and Motivation are the key qualitative measures to focus on for improving exam scores.
 - Conduct regular Parent-Teacher conferences
 - Incentivize higher exam scores
 - Provide easier access to books, stationery etc.

A close-up photograph of a minaret's facade, featuring a repeating pattern of light-colored hexagonal tiles and darker blue hexagonal panels with intricate geometric designs. The perspective is from below, looking up at the structure. Overlaid on the center-left portion of the image is the text "Thank you!" in a large, white, sans-serif font.

Thank you!