

BrightPath Grade Predictor

Predictive Modeling



Institution: Belgium Campus

Course: MLG382

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# Problem Statement

BrightPath Academy faces challenges in identifying at-risk students early, understanding how extracurricular activities influence grades, and developing targeted support strategies. This project addresses these issues by building a predictive model for GradeClass and analyzing key factors affecting student outcomes.

# Hypotheses

We hypothesize that:

* Students with higher StudyTimeWeekly are more likely to achieve better grades.
* Higher Absences correlate with lower grades.
* Participation in Extracurricular activities positively impacts grades.
* ParentalSupport levels significantly influence student performance.

These hypotheses will be explored and tested in the notebooks/eda.ipynb notebook through data visualizations and statistical analysis.

# Preparing Data

In the Preparing Data phase, we first loaded the raw student dataset (2,392 records, 15 columns), validated that StudentID was unique for every row—confirming it served only as an identifier—and then dropped it to avoid introducing non‑predictive noise. Next, we ran data.info() to verify there were no missing values and that all remaining features were numeric, and used data.describe() to see that age clustered tightly (15–18 yrs, median 16), StudyTimeWeekly varied widely (IQR ≈ 9.7 hrs, max ≈ 20 hrs), and absences were right‑skewed (median 15 days, max 29). We also checked for duplicate rows (none found), applied IQR‑based outlier detection to flag extreme study‑time and absence cases for review, and computed skewness and kurtosis to highlight any features needing transformation or scaling.

# Exploratory Data Analysis (EDA)

## Univariate Analysis

## Perform Bivariate Analysis

# Preprocessing Data

# Evaluation Metrics

# Model Building: Part 1 (Baseline Models)

# Model Building: Part 2 (Deep Learning)

# Model Deployment