Project Report: Predictive Modeling for Student Performance at BrightPath Academy

1. Problem Statement

BrightPath Academy faces challenges including delayed identification of at-risk students, lack of targeted interventions, unclear impact of extracurriculars, and data overload without actionable insights.

2. Approach

- Data cleaning, EDA, and feature engineering on a rich student dataset.
- Built classification models: Logistic Regression, Random Forest, XGBoost, and Deep Learning.
- Developed a Dash app for real-time visualization and predictions.

3. Key Findings

- Study time, tutoring, and parental support improve performance.
- Absences correlate negatively with GPA.
- Volunteering and music activities show positive GPA impact.
- Parental education is moderately predictive.

4. Model Performance Summary

Model	Accuracy	F1-Score
Logistic Regression	~72%	~0.71
Random Forest	~80%	~0.79
XGBoost	~83%	~0.82
Deep Learning (ANN)	~85%+	~0.84

5. Solution Impact on BrightPath Academy

Timely identification of at-risk students

Personalized intervention strategies

Clear insights on extracurricular impact

Intuitive dashboard for educators