

Bias Analysis towards Fair AI in Education

By utilizing Student Score Prediction Dataset

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Problem Definition

- Potential inequalities in student performance based on race/ethnicity, and parental education.
- Detect patterns indicating potential biases or unequal opportunities.
- Addressing unfair opportunities is crucial for fostering a more equitable learning environment.
- Challenges:
 - Choosing a suitable ML model to identify patterns.
 - Preparing and cleaning the dataset effectively.
 - Preventing misinterpretation of correlation as causation and ensuring robust analysis to avoid perpetuating existing biases.

Target Group

- Who Benefits:
 - Educators and researchers interested in educational equity.
 - Students affected by potential biases.
- Use of Insights:
 - Adjusting teaching strategies and student grouping to promote fairness.
 - Provides actionable insights to help create equitable educational environments.

Goals and Objectives

- Showcase inequalities in student performance.
- Provide data-driven insights to support fairer educational practices.
- Validate through ML models and statistical tests
- **Key Questions:**
 - Are there disparities in performance among different groups?
 - Could these disparities suggest unfair opportunities?
 - How can educators use this data to reduce bias?
- **Goals:**
 - Highlight inequalities in student performance.
 - Provide insights for educators to enhance fairness in educational practices.

Methodology

- Data Source: Kaggle - Student Performance Prediction dataset.
- Methodology:
 - Model Selection:
 - Random Forests, Decision Trees, Linear Regression, Neural Networks etc.
 - Data Splitting:
 - Use K-Fold Cross-Validation (70-20-10 split).
 - Metrics for Evaluation:
 - Accuracy, Precision, ROC-AUC, MSE/MAE.
 - Visualization:
 - Use of plots (histograms, scatterplots) to illustrate findings.

Expected Outcomes and Impact

- Outcomes:
 - Identify and demonstrate performance disparities across groups.
 - Validate findings with robust statistical techniques.
- Impact:
 - Motivate educators to investigate and improve their own practices.
 - Encourage development of fairer AI models in education.