Bias Detection Report

Student Romantic Relationships Bias Analysis Report

Objective:

The objective of this analysis is to investigate whether being in a romantic relationship affects students' academic performance, specifically their grades in G1, G2, and G3.

Dataset Overview:

The dataset used for this analysis includes features such as 'romantic' (indicating relationship status) and performance metrics 'G1', 'G2', and 'G3'. The data was successfully loaded and examined for analysis.

Methods Used:

- Statistical Fairness

- Z-Score Bias

- Residual Analysis

- Pearson Correlation

- Hilbert-Schmidt Independence Criterion (HSIC) [pending resolution]

Findings:

- **Statistical Fairness:**

  - G1: Minimal risk difference of 0.0174

  - G2: Negligible risk difference of -0.0016

  - G3: Small risk difference of -0.0243

- **Z-Score Bias:**

  - G1, G2, G3: Minimal bias with Z-scores close to zero.

- **Residuals:**

  - Variations calculated within each group.

- **Pearson Correlation:**

  - Weak correlation across all grades, suggesting minimal relationship influence.

Interpretation:

The analysis indicates minimal to no significant bias or correlation between romantic status and academic performance across G1, G2, and G3.

Recommendations:

- Address the HSIC calculation issue in a different environment.

- Explore additional contextual variables for a comprehensive understanding.

- Consider qualitative insights for further contextual analysis.