Bias Detection Report

Bias Detection Report: Education and Race Correlation

Introduction

This report explores the correlation between the 'education' and 'race' features in the provided dataset. Various methods were applied to detect potential bias and analyze the relationship between these two categorical features.

Data Overview

The dataset consists of multiple features, with 'education' and 'race' being the focus of this analysis. The dataset was processed to ensure these features were adequately prepared for correlation analysis.

Methodology and Results

1. **Cramér's V Analysis**

   - **Result**: 0.0749

   - **Bias Level**: Level 1 (No Bias)

   - **Interpretation**: Suggests no significant association between 'education' and 'race'.

2. **Elift Analysis**

- **Result**: 6.4367

- **Bias Level**: Level 5 (Extreme Bias)

- **Interpretation**: Indicates potential strong correlation in specific category combinations.

3. **Statistical Parity Analysis**

- **Result**: Max Z-value of 0.4980

- **Bias Level**: Level 2 (Minimal Bias)

- **Interpretation**: Shows slight variations in the distribution of categories between 'education' and 'race'.

4. **Wasserstein-2 Distance Analysis**

- **Results**: Varied distances; e.g., 'Bachelors' and 'White' (114.02), 'Preschool' and 'White' (1344.08).

- **Interpretation**: Significant distributional differences exist in some category combinations, indicating potential bias.

Conclusion

The analysis presents mixed findings. While Cramér's V and Statistical Parity suggest little to no bias, Elift and Wasserstein-2 highlight areas of potential concern. The results underscore the importance of context when interpreting bias, suggesting further investigation into specific category combinations.