

Bias Detection Report

Gender Distribution Bias Analysis Report

Dataset Analyzed:

- **File:** Adult.csv
- **Feature:** Gender (Column: 'sex')

Bias Type:

- Distribution

Relevant Feature(s):

- 'sex' (Gender)

Detection Methods and Results:

1. **Shannon Balance:**

- Balance: 0.9157
- Shannon Entropy: 0.9157

- **Bias Level:** Minimal Bias

2. **Max/Min Ratio:**

- Ratio: 2.023

- **Bias Level:** Minimal Bias

3. **Entropy:**

- Normalized Entropy: 0.9157

- **Bias Level:** Minimal Bias

4. **Gini Index:**

- Adjusted Gini Index: 0.8855

- **Bias Level:** Minimal Bias

5. **Relative Risk:**

- Normalized Bias Score: 2.023

- **Bias Level:** Minimal Bias

6. **Chi-Square Test:**

- Chi-Square Statistic: 1918.73
- P-value: 0.0
- **Bias Level:** Significant Bias

7. **Kolmogorov-Smirnov Test:**

- KS Statistic: 0.5
- KS P-value: 1.0
- **Bias Level:** No Bias

Visualizations:

- Pie Chart illustrating the distribution of Gender.

Conclusion and Recommendations:

- The analysis shows mixed results, with most methods indicating minimal to no bias, while the Chi-Square test suggests significant bias. If gender balance is critical, consider additional balancing techniques.

Actionable Steps:

- Further investigate the discrepancy between methods, particularly the sensitivity of the Chi-Square test to large sample sizes.

