Bias Detection Report

Bias Analysis Report

Introduction

This report analyzes the impact of the 'Language' feature within the COMPAS dataset. The primary objective is to explore potential biases that this feature may introduce.

Methodologies Used

The analysis employed several bias detection methods:

- **Shannon Entropy** and **Balance Metric** to gauge diversity and balance.

- **Gini Index** to assess inequality.

- **Max/Min Ratio** and **Relative Risk** to evaluate distribution bias.

Challenges were encountered with the Kolmogorov-Smirnov test, leading to its exclusion from the final analysis.

Findings

- **Shannon Entropy**: Low diversity observed with a value of 0.0387.

- **Balance Metric**: Low balance with a value of 0.0387.

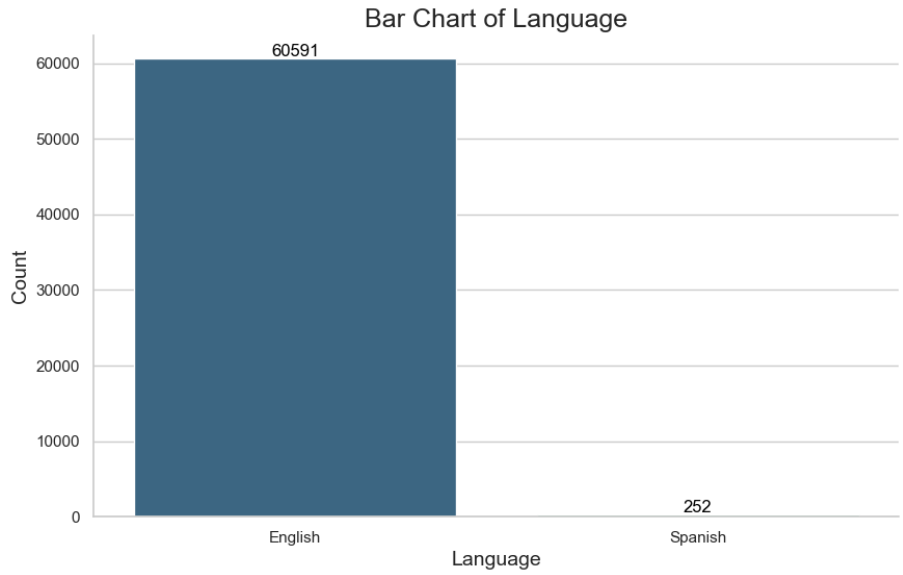
- **Gini Index**: Low inequality with values of 0.0083 (corrected) and 0.0166 (adjusted).

- **Max/Min Ratio**: Extreme bias indicated by a ratio of 240.44.

- **Relative Risk**: Notable bias with a high risk for 'English' and low for 'Spanish', resulting in a normalized bias score of 240.44.

Visualizations

Below is the bar chart illustrating the distribution of the 'Language' feature.



Conclusions

The analysis indicates significant distribution bias in the 'Language' feature, primarily driven by the dominance of the 'English' category. This may have implications for equity and fairness within the system.

Recommendations

- Consider balancing the dataset or employing methods to mitigate language bias in decision-making processes.

Appendix and References

Additional data and references are available upon request.