Bias Detection Report

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Dataset: source_files/Statlog.csv

Feature Analyzed: Purpose

Bias Type: Distribution

Relevant Feature: Loan Purpose

Analysis Results

Toolset Results

1. **Shannon Entropy and Balance Metric**:

   - **Balance**: 0.8027

   - **Shannon Entropy**: 2.6667

2. **Max/Min Ratio**:

- **Ratio**: 31.11

3. **Entropy**:

  - **Entropy**: 2.6667

  - **Normalized Entropy**: 0.8027

Literature Method Result
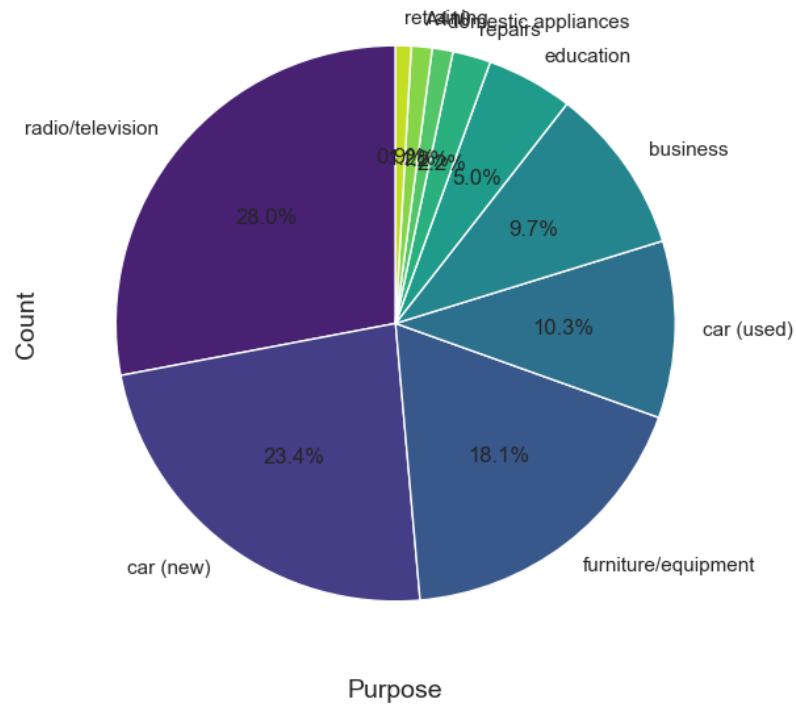
- **Jensen-Shannon Divergence (JSD)**: 0.1214

Bias Level

- **Overall Bias Level**: Level 3 (Moderate Bias)

Visualizations

The following visualizations illustrate the distribution of the loan purpose feature:

Bar Chart of Purpose

Count

Purpose

Purpose

Conclusion

The analysis reveals a moderate level of bias in the distribution of loan purposes. While there is some dominance of certain categories, the overall distribution is not extremely biased. This moderate bias should be considered in decision-making processes, particularly if fairness is a concern.

The dataset shows that with a balance metric and normalized entropy suggesting some balance, the high max/min ratio indicates significant dominance by certain categories, which is further supported by the JSD value.

Recommendations

- Consider potential impacts on decision-making or fairness due to the moderate bias.

- Further analysis or adjustments may be needed if the dataset is used for sensitive applications.