Bias Detection Report

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Dataset Analyzed

The analysis was conducted on the 'Adult' dataset, focusing on the features 'occupation' and 'income'.

Features Examined

- **Occupation**: Categorical feature representing job titles.

- **Income**: Categorical feature indicating income level.

Types of Bias Detected

The task was to detect correlation bias between 'occupation' and 'income'.

Tools and Methods Used

1. **Cramér's V**: Evaluated the association between 'occupation' and 'income'.

   - **Result**: Cramér's V = 0.3519

2. **Elift**: Analyzed correlation through association confidence.

   - **Result**: Max Elift = 2.0099

3. **Statistical Parity & Z-scores**: Evaluated proportion differences among categories.

   - **Result**: Max Z-value = 0.5688

4. **Lipschitz Function**: Assessed distribution differences.

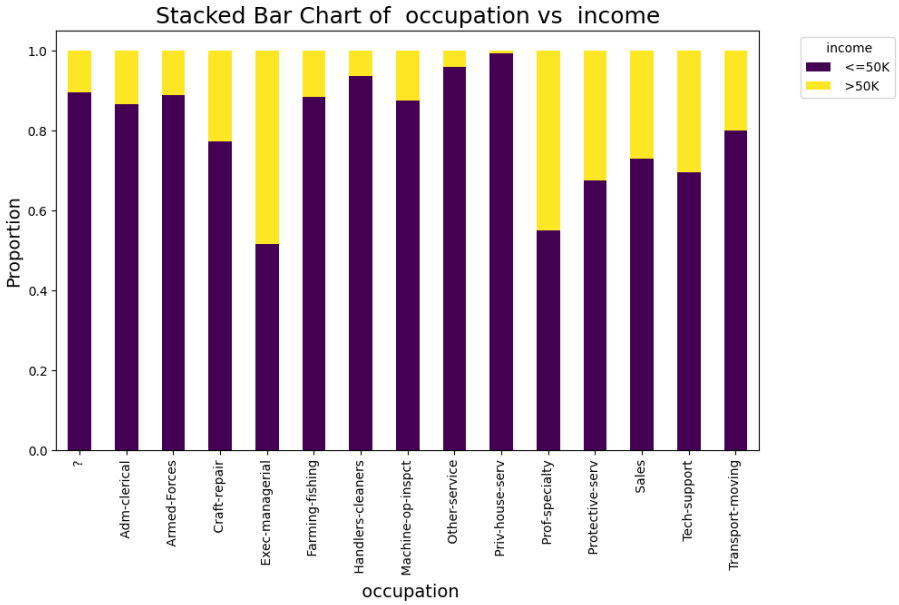
   - **Result**: Max Delta = 0.5688

5. **Total Variation Distance**: Measured distribution differences.

   - **Result**: Max TVD = 0.2432

6. **Chi-Square Test**: Evaluated the independence between 'occupation' and 'income'.

   - **Result**: Chi-Square Statistic = 4031.97, p-value = 0.0



Bias Level Determination

- **Cramér's V (0.3519)**: Indicates some association; categorized as Level 3 (Moderate Bias).

- **Elift (2.0099)**: Suggests a positive bias; categorized as Level 3 (Moderate Bias).

- **Statistical Parity (0.5688)**: Reveals moderate bias; categorized as Level 3 (Moderate Bias).

- **Lipschitz (0.5688)**: Shows moderate bias; categorized as Level 3 (Moderate Bias).

- **Total Variation Distance (0.2432)**: Indicates moderate bias; categorized as Level 3 (Moderate Bias).

- **Chi-Square Test**: Strong evidence of association (p-value = 0.0), suggesting significant bias.

Recommendations for Dataset Use

- The dataset exhibits a moderate correlation bias between 'occupation' and 'income.' While this does not fully compromise the dataset's usability, it is important to consider this bias in specific applications.

- Additional scrutiny may be needed before using this data in sensitive decision-making processes, such as employment policies or income-related studies.