

# Fairfluence Report

The dataset used to create this report:  
<https://huggingface.co/datasets/scikit-learn/adult-census-income>

## Dataset Summary

| Metric               | Value        |
|----------------------|--------------|
| Number of Columns    | 15           |
| Number of Records    | 32561        |
| Total Cells          | 488415       |
| Missing Cells        | 0            |
| Missing Percentage   | 0.00%        |
| Duplicate Records    | 24           |
| Duplicate Percentage | 0.07%        |
| Memory Usage         | 18070.45 KB  |
| Average Record Size  | 568.29 Bytes |

## Column Type Summary

| Column Type         | Count |
|---------------------|-------|
| Categorical Columns | 10    |
| Numeric Columns     | 5     |
| Text Columns        | 0     |

## Alerts

| Level | Message                                       |
|-------|---|
| Info  | Column "age" has no missing values            |
| Info  | Column "workclass" has no missing values      |
| Info  | Column "fnlwgt" has no missing values         |
| Info  | Column "education" has no missing values      |
| Info  | Column "education.num" has no missing values  |
| Info  | Column "marital.status" has no missing values |
| Info  | Column "occupation" has no missing values     |
| Info  | Column "relationship" has no missing values   |
| Info  | Column "race" has no missing values           |
| Info  | Column "sex" has no missing values            |
| Info  | Column "capital.gain" has no missing values   |
| Info  | Column "capital.loss" has no missing values   |
| Info  | Column "hours.per.week" has no missing values |
| Info  | Column "native.country" has no missing values |

|      |                                       |
|------|---------------------------------------|
| Info | Column "income" has no missing values |
|------|---------------------------------------|

Quality Results

F1 Score Report

| F1 Score (Original) | F1 Score (Statistic) | F1 Score (Influence) |
|---------------------|----------------------|----------------------|
| 0.8741              | 0.8765               | 0.8742               |

Outlier Summary

| Influence Outliers (Count) | Influence Outliers (%) | Mahalanobis Outliers (Count) | Mahalanobis Outliers (%) | Overlap (Count) |
|----------------------------|------------------------|------------------------------|--------------------------|-----------------|
| 486                        | 1.4926                 | 2031                         | 6.2375                   | 33              |

Fairness Results

Top Patterns

| Pattern Column 1 | Pattern Value 1       | Support | Responsibility | Interestingness |
|------------------|-----------------------|---------|----------------|-----------------|
| income           | >50K                  | 0.2408  | 103.8288       | 431.1388        |
| occupation       | Adm-clerical          | 0.1155  | 10.0685        | 87.1887         |
| workclass        | Self-emp-not-inc      | 0.078   | 5.2508         | 67.31           |
| occupation       | Exec-managerial       | 0.1245  | 3.7934         | 30.4597         |
| fnlwgt           | (18826.999, 140854.0] | 0.3333  | 7.4394         | 22.3225         |

Fairness (No Influence)

| Sensitive Feature | DPD    | DPD Fair | EOD    | EOD Fair | PPV Diff | PPV Fair |
|-------------------|--------|----------|--------|----------|----------|----------|
| age               | 0.5    | No       | 1.0    | No       | 0.6667   | No       |
| marital.status    | 0.3707 | No       | 0.7778 | No       | 0.2636   | No       |
| occupation        | 0.5182 | No       | 0.8095 | No       | 0.2824   | No       |
| race              | 0.2427 | No       | 0.6607 | No       | 0.0833   | Yes      |
| sex               | 0.1663 | No       | 0.0644 | Yes      | 0.116    | No       |
| native.country    | 0.5238 | No       | 1.0    | No       | 0.5      | No       |

Fairness (With Influence)

| Influence Group | Positive Group   | Mean (Positive) | Mean (Other) | Mean Difference | Influence Fair | Cohen Fair |
|-----------------|------------------|-----------------|--------------|-----------------|----------------|------------|
| income          | >50K             | -0.00001278     | 0.00000402   | -0.00001680     | No             | No         |
| occupation      | Adm-clerical     | -0.00000258     | 0.00000030   | -0.00000289     | No             | Yes        |
| workclass       | Self-emp-not-inc | -0.00000200     | 0.00000014   | -0.00000213     | No             | Yes        |

|            |                       |             |            |             |    |     |
|------------|-----------------------|-------------|------------|-------------|----|-----|
| occupation | Exec-managerial       | -0.00000090 | 0.00000009 | -0.00000100 | No | Yes |
| fnlwgt     | (18826.999, 140854.0] | -0.00000067 | 0.00000029 | -0.00000096 | No | Yes |