

Ethical AI Validator - Compliance Report

Report Information

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Model Information

model_name: Decision Tree
config_name: aggressive
version: 1.3

Training Scenario and Hyperparameters

Scenario: DT-aggressive

Hyperparameter	Value
ccp_alpha	0.0
class_weight	None
criterion	gini
max_depth	15
max_features	None
max_leaf_nodes	None
min_impurity_decrease	0.0
min_samples_leaf	1
min_samples_split	2
min_weight_fraction_leaf	0.0
monotonic_cst	None
random_state	42
splitter	best

Audit Criteria

bias_threshold	0.3
fairness_threshold	0.7

Bias Analysis Results

Protected Attribute	Group	Bias Score
gender	female	0.198
gender	male	0.256
age_group	18-25	0.198
age_group	26-35	0.198
age_group	36-50	0.551
age_group	50+	0.138
education	bachelor	0.194
education	high_school	0.562
education	master	0.198
education	phd	0.198

Fairness Assessment Results

Protected Attribute	Fairness Score
gender	0.772
age_group	0.713
education	0.740

Hyperparameter Impact Analysis

Parameter	Value	Risk	Rationale
max_depth	15	HIGH	Deep trees can overfit biased patterns; consider lower depth.
min_samples_split	2	MEDIUM	Very small splits may fragment minority groups.
min_samples_leaf	1	MEDIUM	Tiny leaves can produce unstable decisions for small groups.
class_weight	None	LOW	No class weighting can under-serve minority groups if data is imbalanced.

Likely Contributing Factors

- 1. Low fairness score observed for 'age_group' (score=0.713).
- 2. Highest bias in education -> high_school (bias_score=0.562).
- 3. Suspected hyperparameters: max_depth=15 (HIGH) - Deep trees can overfit biased patterns; consider lower depth.; min_samples_split=2 (MEDIUM) - Very small splits may fragment minority groups.; min_samples_leaf=1 (MEDIUM) - Tiny leaves can produce unstable decisions for small groups.

Overall Compliance Summary

Overall Status	PARTIALLY COMPLIANT
Bias Issues	Yes
Fairness Issues	No
Total Issues	1
Summary	Minor issues detected. Some compliance requirements need attention.

GDPR Compliance Assessment

Requirement	Status	Notes
Data Minimization	Compliant	Audit completed successfully
Purpose Limitation	Compliant	Audit completed successfully
Transparency	Non-Compliant	Bias detected - transparency compromised
Accountability	Compliant	Audit completed successfully
Right to Explanation	Non-Compliant	Bias/fairness issues affect explainability

AI Act Compliance Assessment

Requirement	Status	Notes
Risk Assessment	Non-Compliant	Bias/fairness risks identified
Transparency Requirements	Non-Compliant	Bias affects transparency
Human Oversight	Non-Compliant	Bias/fairness issues require oversight
Accuracy Requirements	Compliant	Audit completed successfully

Documentation	Non-Compliant	Bias/fairness issues need documentation
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Recommendations

- 1: HIGH PRIORITY: Apply post-processing bias correction
- 2: Implement equalized odds post-processing
- 3: Implement comprehensive bias monitoring in production
- 4: Document all mitigation strategies implemented
- 5: Establish regular bias monitoring procedures
- 6: Provide model explanations for affected groups
- 7: Consider human oversight for high-stakes decisions