■ PRIVACY-PRESERVING BIOMETRIC AUTHENTICATION

Explainable AI (XAI) Decision Report

Report Generated:	2026-03-01 11:23:37 IST
Query User ID:	24
Number of Features:	2
Rule:	≥1 feature ≥0.99 in ≥2 templates
System:	Fully Homomorphic Encryption (FHE) Authentication
XAI Method:	Rule-Based Feature Attribution & Confidence Assessment

1. QUICK ANALYSIS

User: 24
Best Score (Average): 0.9948
Average Threshold: 0.7
Traditional Result: AUTHENTICATED ■
Templates with High Features (≥0.99): 4/10
Required Templates: 2
Rule-Based Result: AUTHENTICATED ■
Methods Agree: ■
Action: GRANT_FULL_ACCESS
Reason: Both methods confirm identity (4/2 templates meet rule)

2. DETAILED TEMPLATE ANALYSIS

Template	Avg Score	Has High Feature	High Features	Max Feature
1	0.9773	■	0	0.9854
2	0.9717	■	0	0.9824
3	0.9948	■	1	1.0000
4	0.9948	■	1	1.0000
5	0.8836	■	0	0.9073
6	0.9865	■	1	0.9926
7	0.9580	■	0	0.9748
8	0.9903	■	1	0.9931
9	0.4566	■	0	0.4986
10	0.9785	■	0	0.9850

3. RULE-BASED AUTHENTICATION ANALYSIS

Rule: At least one feature ≥ 0.99 in at least 2 templates
Templates meeting rule: 4/10

Result: SUCCESS ■

Templates with high-confidence features:
• Template 3: 1 high feature(s) - Max: 1.0000
• Template 4: 1 high feature(s) - Max: 1.0000
• Template 6: 1 high feature(s) - Max: 0.9926
• Template 8: 1 high feature(s) - Max: 0.9931

■■ **Near misses detected:**
• Template 1: best feature = 0.9854 (needs 0.0046 more)
• Template 2: best feature = 0.9824 (needs 0.0076 more)
• Template 3: best feature = 1.0000 (needs -0.0100 more)
• Template 4: best feature = 1.0000 (needs -0.0100 more)
• Template 6: best feature = 0.9926 (needs -0.0026 more)
• Template 7: best feature = 0.9748 (needs 0.0152 more)
• Template 8: best feature = 0.9931 (needs -0.0031 more)
• Template 10: best feature = 0.9850 (needs 0.0050 more)

4. TRADITIONAL THRESHOLD-BASED ANALYSIS

Best Template: 3
Best Score: 0.9948
Threshold: 0.7
Margin: +0.2948
Result: AUTHENTICATED ■
Templates above threshold: 9/10

5. FEATURE-LEVEL ANALYSIS

Feature	Score	Status
Feature 1	1.0000	HIGH CONFIDENCE ■
Feature 2	0.9897	STRONG ✓

Feature Summary:
• High confidence features (≥0.99): 1
• Strong features (≥0.7): 2
• Moderate features (0.5-0.7): 0
• Weak features (<0.5): 0

6. CONFIDENCE ASSESSMENT & RECOMMENDATIONS

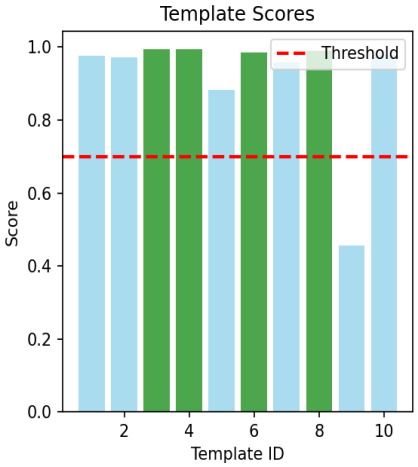
Traditional Confidence: VERY_HIGH
Rule-Based Confidence: VERY_HIGH
Methods Agree: ■ Yes

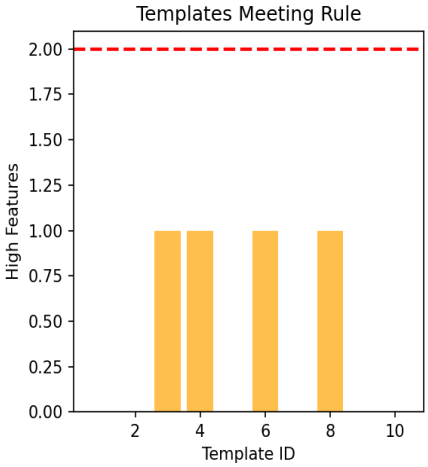
Recommended Action: GRANT_FULL_ACCESS
Reason: Both methods confirm identity (4/2 templates meet rule)

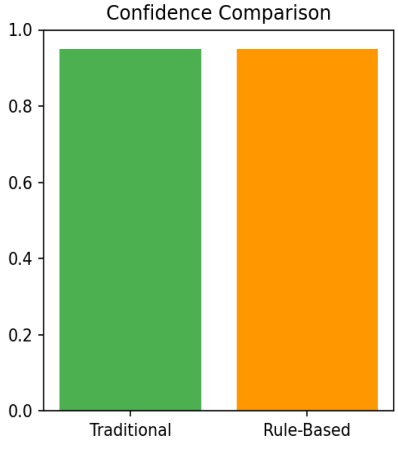
7. SECURITY INDICATORS

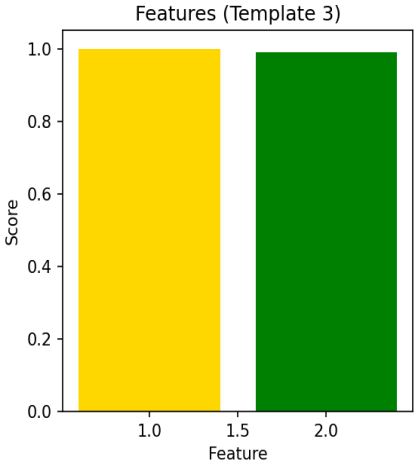
High Confidence Templates: 4
Total High Features Detected: 4
Near Misses Detected: ■■ Yes
Templates Shortfall: 0

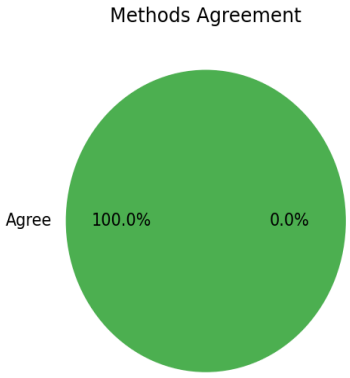
8. VISUAL ANALYSIS

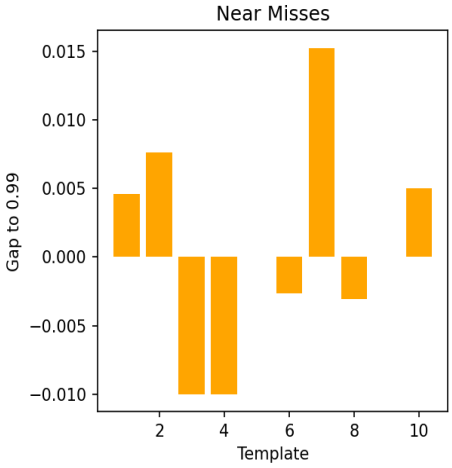












9. STRUCTURED DATA (JSON)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{
"query_user_id": "24",
"configuration": {
"num_features": 2,
"feature_threshold": 0.99,
"min_templates_required": 2,
"average_threshold": 0.7
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"authentication_rules": {
"rule_based": {
"enabled": true,
"templates_meeting_rule": 4,
"success": true,
"templates_detail": [
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"template": 3,
"high_features": [
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"count": 1,
"max_feature": 1.0,
"avg_score": 0.9948302791735171
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"template": 4,
"high_features": [
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"count": 1,
"max_feature": 1.0,
"avg_score": 0.9948302673407257
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"count": 1,
"max_feature": 0.9926278856214514,
"avg_score": 0.9864594401704644
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"high_features": [
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"count": 1,
"max_feature": 0.9930850195745448,
"avg_score": 0.9903401943081769
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