Supplementary Material S1: Algorithm Implementation Details (Expanded)

1. Feature Extraction Formulas

Entropy: $H = -\Sigma\, p(i) \log2\, p(i)$
Edge Density: ED = (Number of edge pixels) / (Total pixels)
Texture Variance: $\sigma^2 = (1/N)\, \Sigma\, (xi - \mu)^2$
Spatial Frequency: $SF = sqrt(RF^2 + CF^2)$

2. ML Model Parameters

Model	Key Parameters
SVM	RBF kernel, C=10, γ=0.1
Random Forest	100 trees, max depth=20
Logistic Regression	L2 regularization
CNN	3 conv layers, ReLU, Adam

3. Encryption Configuration

AES-256-GCM is used with PBKDF2 key derivation. Highly sensitive blocks receive double encryption, medium blocks single encryption.