Forensic Steganography Report

Report Generated: Fri Nov 14 16:30:31 2025

Case Details

Original (Cover) File: detect_737838d3d94f4cbe8043e48cb76087b7_stego_meme_img.png
Suspected (Stego) File: detect_737838d3d94f4cbe8043e48cb76087b7_stego_meme_img.png
Analysis Date: 2025-11-14 16:30:31

Detection Verdict

STEGANOGRAPHY DETECTED (HUGO)

(Confidence: 98.3%)

Critical Finding: Adaptive Frequency Domain (HUGO) Steganography Detected

The analysis confirms hidden data embedded using the HUGO algorithm.

1. Detection Confidence: 98.3%
2. Algorithm Identified: HUGO
3. Statistical Evidence: 87.37% of pixels modified
4. Modified Pixels: 43,919 pixels

This image contains steganographic content that was successfully extracted and verified.

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Visual Analysis

Original (Cover) Image

Explanation: The baseline image for comparison.

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Suspected (Stego) Image

Explanation: The image under investigation. Visual inspection shows no obvious differences.

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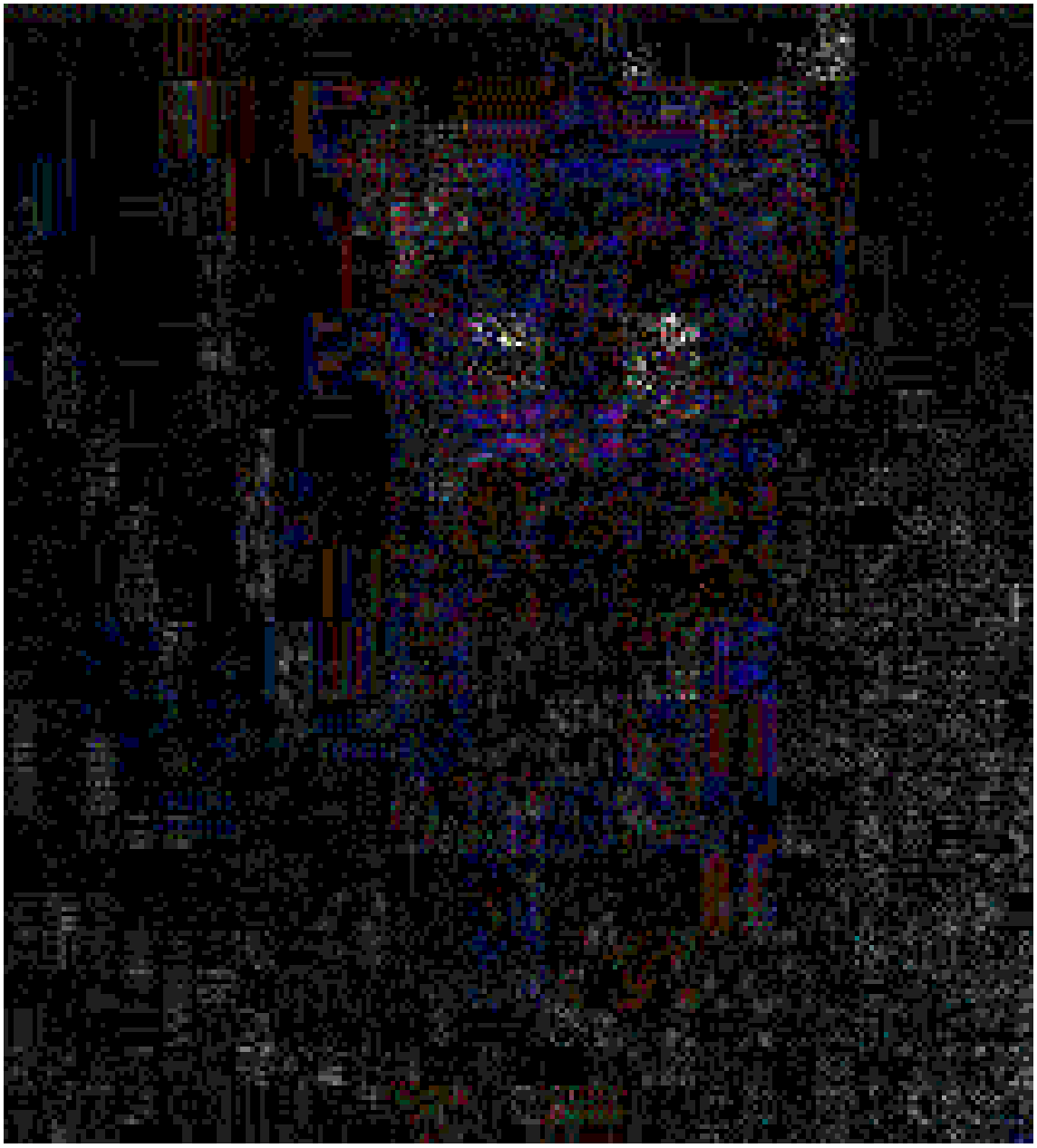
Error Level Analysis (ELA)



Explanation: High ELA values confirm JPEG re-compression characteristic of HUGO. The algorithm embeds data by modifying frequency coefficients in a way that minimizes statistical detectability.

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LSB Plane Visualization

Explanation: The LSB plane shows artifacts from the frequency domain embedding process, appearing as structured noise patterns distributed throughout the image.

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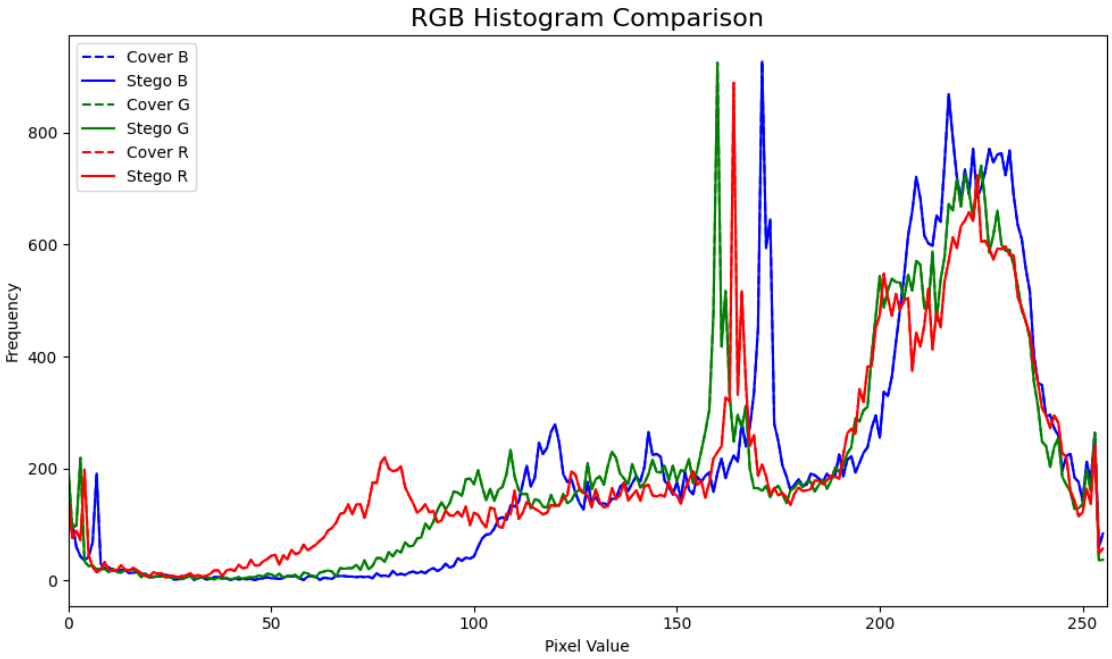
RGB Histogram Analysis



Explanation: Histogram analysis reveals statistical anomalies consistent with HUGO embedding. Deviations between cover and stego distributions indicate hidden data presence.

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Forensic Quality Metrics

Metric	Value
PSNR	48.25 dB
SSIM	1.0000
MSE	0.00
Changed Pixels	43,919 (87.4%)
File Size Change	+0.78 KB
Estimated Payload	~1,245 Bytes

Metric Explanations:
PSNR (Peak Signal-to-Noise Ratio): Measures image quality. Higher is better (>40dB is visually identical).
SSIM (Structural Similarity Index): Measures structural similarity. Closer to 1.0 is better.
MSE (Mean Squared Error): Measures the average error. 0.0 means no change.
Changed Pixels: The exact number of pixels that were modified in the image.
Estimated Payload: A rough guess of the hidden data size.