VeraSnap LiDAR Screen Detection Technology

Independent Research Validation: World-First Assessment

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Research Basis: Five Independent Research Institution Analysis

Key Finding

VeraSnap is the world's first consumer smartphone application combining dedicated LiDAR depth sensing with open-standard cryptographic provenance protocols (CPP v1.4, RFC 3161) for real-time screen capture detection.

How VeraSnap Uses LiDAR Technology

The Problem: Screen Capture Attacks (Analog Hole)

Fraudulent actors can bypass traditional image authentication by displaying fake images on high-resolution screens and photographing them with legitimate cameras. This "analog hole" vulnerability affects insurance claims, legal evidence, and journalism. VeraSnap solves this by analyzing the 3D structure of the captured scene.

LiDAR Time-of-Flight Measurement

VeraSnap leverages the LiDAR scanner built into iPhone Pro models. LiDAR (Light Detection and Ranging) emits invisible infrared laser pulses and measures the time it takes for each pulse to reflect back. This "Time-of-Flight" measurement calculates precise distances to 49,152 points (256 x 192 grid) in the scene, creating a detailed 3D depth map.

> **Detection Principle:** Real-world scenes have varied depth - people, furniture, and walls at different distances. Screens are flat surfaces where all pixels exist at essentially the same distance from the camera. VeraSnap analyzes this depth variation to distinguish real 3D scenes from flat screen displays.

Three-Factor Detection Algorithm

VeraSnap calculates a confidence score (0.0-1.0) using three weighted indicators:

Indicator	Weight	What It Measures	Screen vs Real Scene
Flatness Score	35%	Standard deviation of depth values	Low (~0.02m) vs High (~1.4m)
Depth Uniformity	35%	Range between min/max depth	Small (<0.1m) vs Large (>2m)
Edge Sharpness	30%	Dominant plane ratio in scene	High (>90%) vs Low (<50%)

Scores above 0.70 indicate likely screen capture; scores below 0.30 indicate real-world scenes. The probabilistic approach avoids false positives while catching sophisticated spoofing attempts.

Privacy-Preserving Design

VeraSnap never stores raw depth maps, which could reveal sensitive 3D information about capture locations. Instead, it stores only statistical summaries (min, max, mean, standard deviation) and a SHA-256 hash of the original depth data. This hash proves the analysis was performed on actual sensor data without retaining the data itself - a key privacy advantage over competitors that store full depth information.

Research Consensus: World-First Claims

Validated Claim	Support
First consumer smartphone app using dedicated LiDAR for screen detection	5/5
First LiDAR + RFC 3161 cryptographic timestamp integration	5/5
First open-standard (CPP v1.4) depth-based screen detection	5/5
First consumer-accessible 3D scene verification for provenance	5/5
First real-time capture-time depth classification in consumer app	5/5
First privacy-preserving depth verification (hash-only storage)	4/5

Five independent research institutions confirmed that while depth-based screen detection exists in professional cameras (Sony, $2,500+) and academic research, VeraSnap is the first consumer-accessible implementation.

Technology Comparison

Feature	VeraSnap	Sony	Serelay	Truepic
Platform	iPhone Pro	Pro cameras	Smartphone	Smartphone
Consumer Access	Free app	$2,500+	B2B only	B2B only
Depth Technology	LiDAR (ToF)	PDAF	Dual cam/AR	Software
Depth Points	49,152+	~hundreds	~9-500	N/A
Open Standard	CPP v1.4	C2PA	Proprietary	C2PA
Privacy	Hash-only	Metadata	Query-based	Metadata

Technical Specifications

Specification	Value
Sensor	Apple LiDAR Scanner (dToF)
Resolution	256 x 192 (49,152 depth points)
Operating range	0.2m - 5m
Lighting requirement	None (active IR at 940nm)
Processing latency	< 100ms (synchronized with photo capture)
Output	Confidence score (0.0 - 1.0) with classification
Data stored	Statistical summary + SHA-256 hash only
Standard compliance	CPP v1.4, RFC 3161, C2PA compatible
Supported devices	iPhone 12-16 Pro/Pro Max, iPad Pro (2020+)

Use Cases

Insurance claims (preventing photo fraud), Legal evidence (court-admissible documentation), Construction verification (remote site inspection), Journalism (citizen reporting authenticity), Identity verification (preventing screen-displayed ID fraud), Remote inspections (property/vehicle assessment).

Company Information

Company	VeritasChain Co., Ltd.
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This document summarizes findings from independent research conducted in January 2026. The research institutions operated independently and their conclusions represent their individual assessments.