

Restoring Clarity in Medical Device Video with AI-Enabled Computer Vision Technology

Overview

Video-enabled medical devices are critical for minimally invasive procedures, diagnostic workflows, and AI-assisted surgery. Devices such as endoscopes, laparoscopes, and intraoperative imaging systems depend on accurate, high-quality video to inform life-critical decisions. However, in real-world clinical settings, video signals are often degraded by lighting conditions, motion, glare, fluids, or equipment limitations.

ProHawk AI solves this by restoring visual fidelity at pixel-by-pixel—in real time—before the video stream is processed by medical AI, viewed by clinicians, or stored for analysis. It enables medical devices to function with unmatched clarity and reliability, regardless of environment.

Key Challenges

Medical devices that generate video—like endoscopes, laparoscopes, and surgical cameras—often operate in difficult environments. Low light, glare from surgical lights, fluid fogging, and reflections off tissue surfaces can distort the video feed, making it harder for clinicians to interpret visuals accurately in real time. In minimally invasive procedures, reduced visibility can slow actions and impact precision.

Motion blur from tool movement or patient motion further degrades clarity, complicating both human interpretation and AI performance. Standard enhancement filters often fail to adapt to changing conditions or preserve original visual data. For systems that rely on real-time video—whether for robotic control, AI diagnostics, or surgeon guidance—these visual issues directly reduce reliability and performance.

Key Benefits and Outcomes

ProHawk AI is uniquely engineered for real-time video restoration, not enhancement—restoring the original visual fidelity of each frame rather than artificially modifying it. Unlike conventional filters or post-processing tools that alter contrast or brightness after the fact, ProHawk AI operates at the pixel level in real time, ensuring that every frame maintains its integrity for downstream visualization, AI inference, and clinical analysis.

- **Pixel-Level Restoration Before AI or Display**

Maintains original video context while eliminating visual distortion caused by environmental conditions.

- **Real-Time Processing for Live Procedures**

Ideal for use in the OR, ER, or outpatient environments where latency must be minimal.

- **Enables High-Precision Surgery**

Improves visibility of fine structures and boundaries during robotic-assisted or image-guided procedures.

- **Boosts AI and Computer Vision Accuracy**

Restores  high-quality input for diagnostic models, motion tracking, or anomaly detection.

- **Reduces Human and Machine Error**

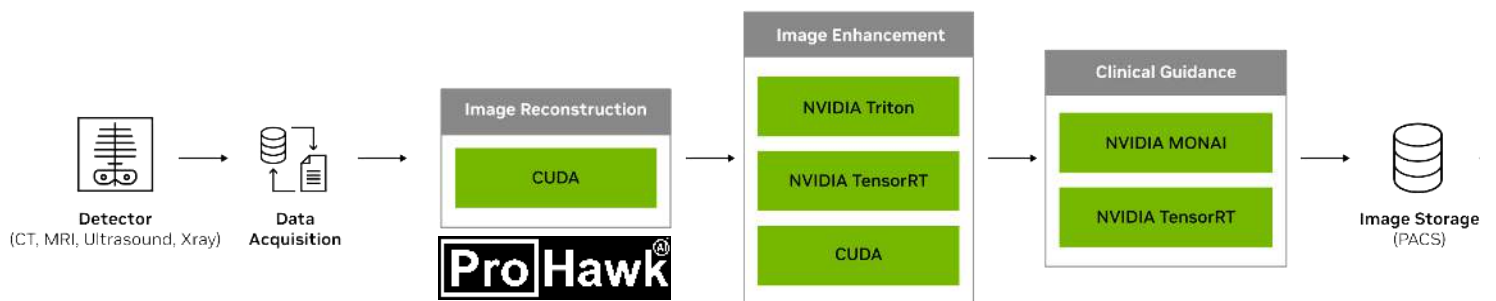
Clearer video reduces misinterpretations by both clinicians and automated systems.

Accelerated Computing for Medical Video Innovation

The ProHawk Vision GXF Operator is purpose-built for integration into NVIDIA Clara workflows, enabling real-time video restoration within advanced healthcare imaging pipelines. Leveraging ProHawk AI's patented pixel-by-pixel restoration algorithms and NVIDIA's CUDA-based accelerated computing platform, the operator delivers ultra-low latency performance essential for surgical robotics, endoscopic procedures, and diagnostic video systems. This GPU-accelerated processing ensures that even degraded or visually compromised video frames are restored before any AI inference, clinical visualization, or archiving takes place.



By running within the NVIDIA Clara framework, the ProHawk Vision GXF Operator helps developers and device manufacturers deploy scalable, AI-powered imaging workflows—from the edge to the cloud. The operator boosts throughput and maintains clarity across high-resolution, high-frame-rate video feeds. The result is cleaner input for computer vision models, improved safety for clinicians and patients, and a higher standard of performance across medical video ecosystems.



ProHawk AI is protected by four U.S. patents focused on real-time image and video restoration under any condition. Its technology is validated and field-proven across industries where visual clarity is mission-critical—and now it's enabling a new standard in medical imaging fidelity. Validated through deployments and benchmark testing on standard GPU accelerated systems, ProHawk AI has demonstrated robust performance improvements as a foundational component in the Dell AI Factory with NVIDIA, in both NVIDIA's Metropolis Lab and Dell's Validation Lab:

- >300% Improved Object Detection & Tracking
- >30X Faster Video Stream Restoration
- 3-4X Clarity for Degraded Images
- <3 Milliseconds Latency

