

NoxVision: Intelligent CCTV Enhancement System

Technical Vision & User PreGuide

Version 1.0 | Confidential

1. Who We Are

NoxVision is a security technology team developing **plug-and-play AI solutions for existing CCTV systems**. We specialize in:

- **Enhancing** standard cameras with real-time threat detection
- **Optimizing** storage through smart video processing
- **Prioritizing** actionable alerts to reduce operator fatigue

Core Principle:

"We leverage state-of-the-art AI models as tools, enhancing them with our proprietary logic to solve specific security challenges—without building foundational models from scratch."

2. Problem Statement

Current CCTV Limitations

- **Passive Monitoring:** 80% of threats missed by human operators
- **Storage Waste:** 60% of footage is irrelevant (empty corridors, etc.)
- **Slow Response:** Average 8+ minutes to react to incidents

Industry Pain Points

- Schools: Unable to detect weapons in real-time
- Warehouses: Late fire detection causes preventable damage
- Retail: Shoplifting alerts come too late

3. Our Solution

We are building a desktop application that:

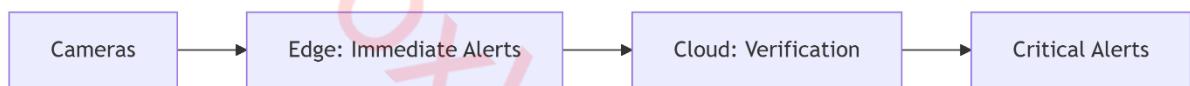
- Enhances existing CCTV systems with AI-powered threat detection
- Focuses on **real-time important alerts** (not general surveillance)
- Uses **pre-trained models with optional fine-tuning** (no from-scratch training)
- Operates in **hybrid edge-cloud mode**

How NoxVision Works

1. AI-Enhanced Detection:

- o Uses **pre-trained models** (YOLOv8, CNNs) as detection engines
- o Adds **custom logic layers** for:
 - Context-aware filtering (e.g., ignore toys in schools)
 - Multi-threat prioritization

2. Hybrid Architecture:



3. Smart Storage:

- o Retains only **motion-triggered clips**
- o Auto-purges normal footage after 48h

Storage Optimization & Reporting

A. Smart Storage Features

1. Resolution Scaling

- o User-selectable presets:

Preset	Resolution	Storage/Day (8 cams)	Use Case
Ultra HD	4K	120GB	High-security zones
Balanced	1080p	60GB	Default
Economy	720p	30GB	Long-term archives

2. Motion-Triggered Recording

- Saves storage by only recording when:
 - Motion detected **AND**
 - AI classifies as potential threat

3. Clip Length Customization

- Pre-event buffer: 5-30 sec (user adjustable)
- Post-event duration: 15-60 sec

B. Report Generation

1. Automated Reports

- **Daily Summary:**
 - Threats detected
 - Storage used/available
 - Camera health status
- **Incident Export:**
 - Select clips → Generate PDF with timestamps/thumbnails

C. Optimization Tips

1. For Maximum Savings:

- Use **720p + Motion-Only** mode (saves ~70% storage)
- Enable **Auto-Downgrade** after 7 days

2. For Forensic Readiness:

- Keep **4K + 30-day retention**
- Export critical incidents to encrypted USB

4. Threat Detection Engine

Strategic AI Implementation

Threat	Base Model	Our Enhancements
Fire/Smoke	CNN (Foggia dataset)	Added thermal pattern checks
Weapons	YOLOv8	Size filters + location-based rules
Intrusions	OpenCV Motion	Polygon zoning + time-of-day logic

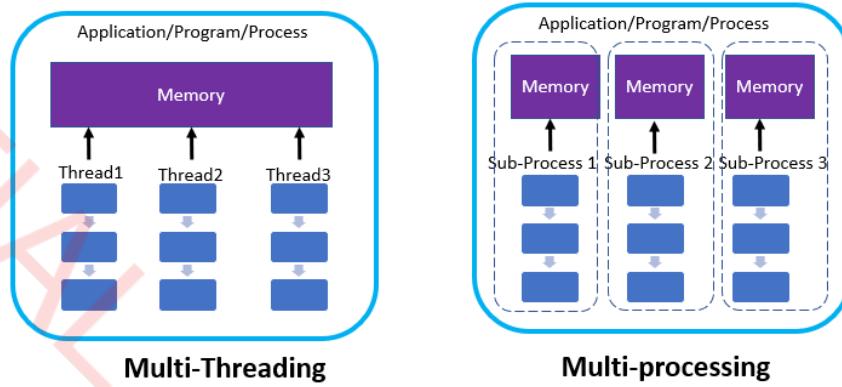
Key Note:

"We fine-tune models only when essential (e.g., fire detection for industrial environments) and focus on optimizing their output for security workflows."

5. Alert System

Multi-Threaded Processing

Edge Device Workflow:



1. Camera Threads (Parallel):

- Capture RTSP streams
- Run lightweight detection

2. Alert Thread:

Classifies threats as:

- Critical (Fire/Weapon): SMS + Siren
- Warning (Perimeter breach): Desktop popup
- Info (Motion detected): Log only

Cloud Verification:

- Double-checks edge alerts to reduce false positives
- Uses priority queues (Critical > Warning > Info)

6. Offline & Failure Handling

Redundancy Measures

- **Local Alarms:**
 - 100dB siren
- **Data Preservation:**
 - Stores 5-min pre-event footage during outages
 - Auto-syncs to cloud when online

User Responsibilities

- Monthly system tests (Tools → Diagnostics)
- Maintain backup power (UPS recommended)

7. User Guide

Installation

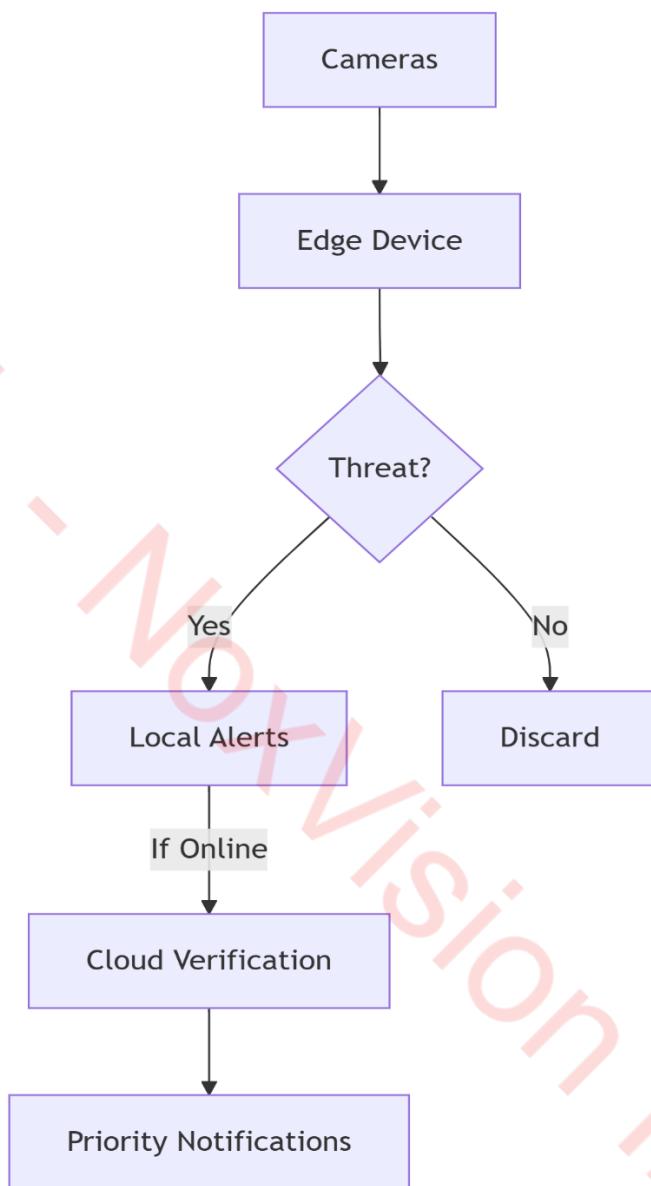
1. Download NoxVision_Setup.exe (very less installation size)
2. Auto-configure cameras (ONVIF support)
3. Calibrate detection zones

Daily Operation

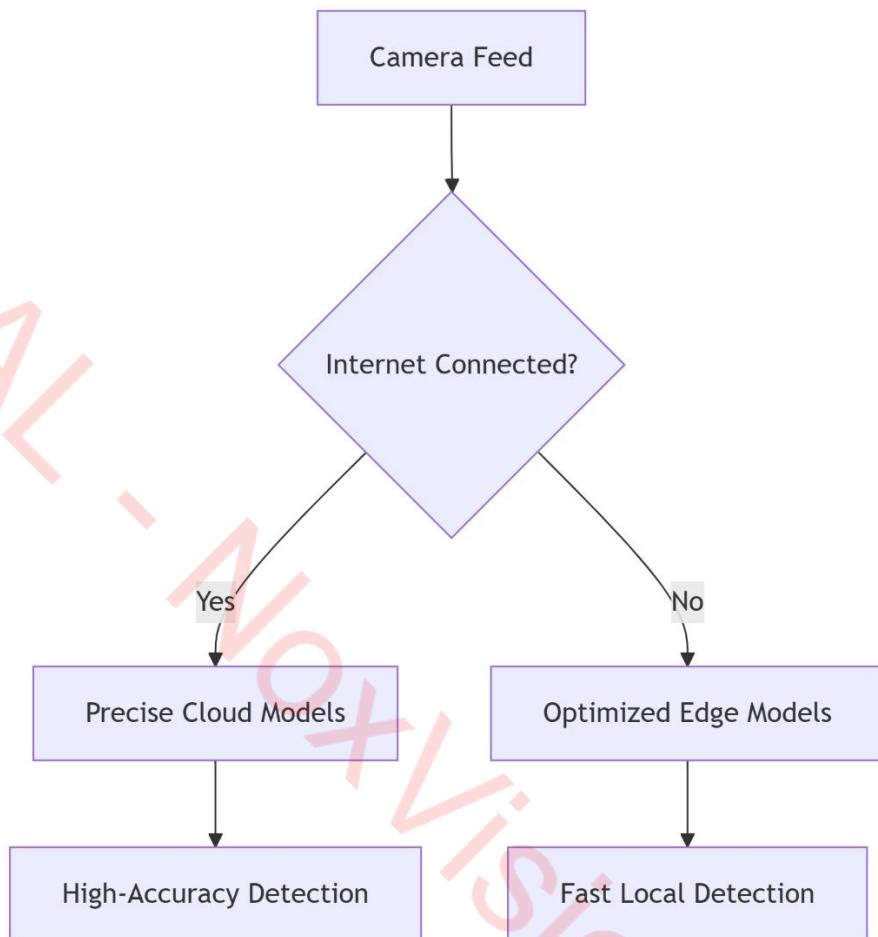
- Alert Types:

Icon	Severity	Response Required
●	Critical	Immediate action
●	Warning	Review within 1h
●	Info	Optional review

8. System Architecture



Smart Detection Routing: Edge vs. Cloud AI Architecture



- **Sync Protocol:**

1. Edge caches uncertain detections
2. Cloud re-evaluates when online
3. Updates local model weights monthly

- **Benefits Explained**

1. Offline Protection: Edge AI ensures 24/7 coverage
2. Cost Efficiency: 90% fewer cloud API calls vs. full streaming
3. Flexibility: Users prioritize speed or accuracy per camera

9. Hardware Requirements:

Role	Minimum Specs
Edge	Windows 10, 4-core CPU, 8GB RAM
Cloud	AWS EC2 (T4 GPU recommended)

10. Legal & Security

Compliance

- Data stays on-premise unless cloud alerts enabled
- GDPR-ready local storage (auto-delete after 30 days)

While localStorage can be a useful tool for client-side storage, it requires careful implementation to align with GDPR requirements. Organizations must prioritize user consent, data minimization, security, and transparency when using localStorage to store personal data.

Disclaimer

"NoxVision supplements—but does not replace—mandated safety systems like smoke detectors."