

IronYun AI NVR with Deep Learning Analytics

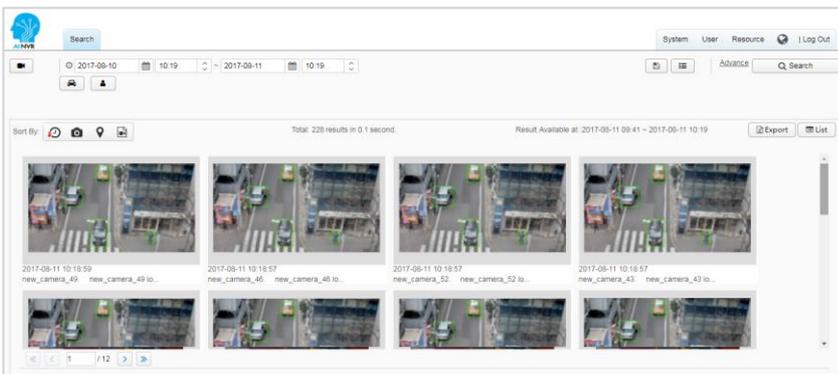
Object Search and Detection for Video Surveillance & Smart City Applications

Artificial intelligence, known as machine learning or cognitive computing, has become highly popular and rapidly advancing in recent years. The rise of deep neural network technology has dramatically revolutionized many industries, such as healthcare, retail marketing and education. Compared to legacy computer vision algorithms, AI systems can be continuously trained and improved with better and larger data sets. At the forefront of AI video analytics, IronYun deep learning solutions can achieve 98% accuracy for certain tasks, including intrusion detection and face recognition.

Customer Pain Points solved by IronYun AI NVR

Video surveillance users today are swamped with huge amount of surveillance video files that require hours of manual effort to identify objects or persons of interest. The main customer pain points in the video surveillance industry that IronYun AI NVR addresses are:

1. Lack of a tool to perform object and person search in recorded video files from multiple sources, e.g. smart phones, YouTube, surveillance cameras, etc.
2. Lack of a fast, real-time search for 100+ types of objects and person attributes.
3. Accidental elimination or overlooking key video events or evidence due to human error.
4. High false alarm rates due to inability to distinguish different object types in legacy sensor-based systems
5. Lack of an all-in-one solution that can support video search, face recognition, intrusion detection, license plate recognition and real-time alert with high accuracy



Benefits to Customer

- **All-in-One Solution:** multiple functions in one complete system, including video search, intrusion detection, face recognition, LPR, weapon detection, fire detection, etc.
- **Trained, Not Programmed.** AI NVR deep learning video analytics is not based on computer programming. Instead, it is trained based on Artificial Intelligence neural networks, significantly reducing time and cost.
- **Significantly increase productivity and time savings** compared to use of manual inspection and visual identification.
- **Easy to use,** Google-like search syntax and intuitive result display. User-friendly interface with UI pulldown, selection to search.
- **Provide instant playback video** on a detected object by integrating NVR or VMS playback function.
- **Use High-Performance GPU** (Graphics Processor Unit) for increased speed.
- **Integrate with existing NVR/VMS.** AI NVR obtains files from the DVR/NVR and performs AI-based object detection and recognition from multiple NVR.
- **Support existing cameras.** Works with any standard based ONVIF and IP cameras.

IronYun AI NVR Video Search is the Industry's First Artificial Intelligence Solution with a Simple and Easy User Interface

AI NVR has built-in artificial intelligence software and hardware video analytics capability for fast, efficient detection, recognition, and search of video objects in multiple video streams, NVR or DVR storage devices. IronYun eliminates the need to manually inspect hours of video for objects or persons of interest and enables the user to locate the needle in the haystack of terabytes of video data. The user experience is intuitive and based on an easy-to-use Google-like natural-language interface. Search engine keywords include many types of vehicles (car, bus, motorbike, bicycle), people, faces, and colors.



AI NVR with Private-Cloud Video Operating System

The AI NVR appliance (software + hardware) is designed for plug-and-play with many of the industry's leading NVR systems, such as Milestone and Genetec, and all ONVIF IP-based cameras to ensure quick and easy deployment.

Depending on customers' need, AI NVR can be operated on premise for complete privacy protection, or customers can apply a private cloud software platform for enterprise, government and many small- and medium-sized businesses (SMBs) in terms of video surveillance applications.

"AI and GPUs will transform the video surveillance industry," said Deepu Talla, vice president and general manager of the NVIDIA Tegra business unit. "Companies such as IronYun are able to process and intelligently analyze massive amounts of data through deep learning on NVIDIA GPUs."

Simple Configuration and Management

IronYun AI NVR VSA (Video Search Appliance) is intended to be used with existing DVRs or NVRs. The VSA connects to the cameras via IP address and RTSP streams and to the standard DVR/NVR via LAN Ethernet cables. The VSA obtains the video files from the cameras and DVR/NVR and performs AI-based object detection and recognition. The extracted image meta data are stored in the VSA for fast retrieval and viewing.

Secured, On-Premise Private Cloud AI NVR Service Architecture



Key Functions

AI FastSearch for object and color detection and search in videos

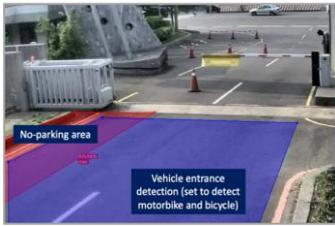


- Instant object search in videos (obtain results in less than 1 second): vehicles, people, animals, objects (cell phone, knife, bag, etc.)
- Advanced Search by type, color, and quantity
- Thumbnail search result view and export to Excel
- Instant playback video of recorded event: 10- or 20-second clip when object/person of interest is detected

Weapon detection: detect handguns and rifles by shape to prevent shooting incidents

Fire & smoke detection: detect fire and/or smoke within 4 seconds of its appearance indoors or outdoors.

AI Intrusion Detection



- Support intrusion detection based on object type, colors, quantities, and time frame
- Support multiple ROIs of any shape for different types of objects in the same frame
- Support different sensitivity levels to distinguish between loitering and/or simple intrusion
- High performance in daytime, nighttime, indoors and outdoors
- Decrease false alarms by orders of magnitude

AI Face Search & Face Recognition

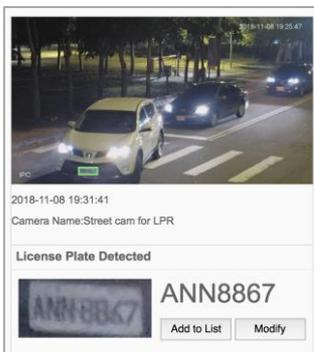


- Auto face detection from IP cameras or user-uploaded videos/images
- Simultaneous detection of multiple faces in one photo/video
- Enable quick search for missing person across multiple cameras
- Comply with privacy laws by not saving/requiring any ID info

Face Recognition:

- Compare an input face with the pre-configured face database and display similarity levels (Face Recognition)
- Support multiple black lists / white lists
- Enable 1:1 and 1:N face matching
- Alert and log when a pre-registered face is recognized
- Provide 10-second playback clip of the event when the identified face appears

AI License Plate Recognition



- Can capture and read license plate images at a slight angle (~20 degrees, not completely facing cameras)
- Automatically match detected license plates with saved lists
- Enable partial license plate search, i.e., the user can enter any characters in license plates to search for potential matches in the database
- Enable vehicle search based on type, e.g., query "car(yellow)" to search for a yellow car, in addition to searching based on license plate number
- Enable the system administrator to add multiple black/whitelists
- Support the license plate formats of **100+ countries**

Alerts

- Alert based on object type, color, quantity
- Alert based on face recognition for faces in any/no lists
- Alert based on license plate of vehicle in any/no lists
- Flexible time windows for alerts in any days of the week, e.g., alert when there are more than 6 people in the area between 6 pm – 6 am on Monday-Friday.
- Select follow-up action when certain events are detected, e.g., send emails to security staff, close the gate (via VMS connection)

**Administration & System
Management**

- Camera Management
 - User Management & Access Control
 - Resource Pool Management for Live Stream and Videos
 - Job Dashboard to Monitor and Control Analytical Jobs
 - Provide AI NVR System Configuration
 - Hardware system information
 - Exportable configuration file
 - Factory reset with pre-stored configuration files (system, network and application)
 - Time zone and NTP server configuration
 - Network storage: Configurable volume threshold policy and retention period
 - System performance monitoring: CPU, memory, disk, network and application process
 - SMTP Notification Configuration
 - System log and Application log monitoring
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AI NVR Specifications

The AI NVR software is deployed in a complete hardware package to optimize performance and ease of use. AI NVR has several architectures for small business deployment of fewer than 30 cameras to large-scale city-wide systems with thousands of cameras. The VSA-1xx series are stand-alone, all-in-one appliances that are ideal for small-scale video infrastructures. The VSA-5xx series are rack-mounted versions for data-center-scale systems. Similarly, the LPT-1xx and LPT-5xx are for small- and large-scale LPR deployments, respectively.

Note: The LPR function can be combined with other functions in the same VSAs if desired, or used in a separate appliance for ease of camera settings (camera for license plate recognition should be placed at a different angle compared to those for common video surveillance).

	VSA-1xx (SMB/Home)		VSA-5xx (Enterprise)		
Model Series	VSA-110	VSA-130	VSA-510	VSA-530	VSA-550
Number of ID Channels (Cameras) supported	Up to 16 channels	Up to 32 channels	Up to 32 channels	Up to 64 channels	Up to 128 channels
Form Factor	Mini-PC	Mini-PC	2U	2U	2U
CPU	Intel Core i5 Series CPU	Intel Core i7 Series / Xeon E3 CPU	Intel Xeon E5 CPU	Dual Intel Xeon E5 CPU	Dual Intel Xeon E5 CPU
AI - GPU	Nvidia GTX series GPU (Enhancement edition)	Nvidia GTX series GPU (Enhancement edition)	Nvidia GPU series (Enhancement edition)	Nvidia GPU series (Enhancement edition)	Dual Nvidia GPU series or Tesla Series GPU
Memory	8GB RAM	16GB RAM	32GB RAM	64GB RAM	128GB RAM
Network	Dual Gigabit Ethernet	Dual Gigabit Ports	Dual Gigabit Ethernet	Dual Gigabit Ports	Dual Gigabit Ports
System HDD	128GB SSD	128GB SSD	Two 128GB SSD (RAID1)	Two 128GB SSD (RAID1)	Two 128GB SSD (RAID1)
AI Storage	One cold swappable 3.5" SATA disk tray (Support 1,2,4,6,8,10TB HDD)	One cold swappable 3.5" SATA disk tray (Support 1,2,4,6,8,10TB HDD)	10 3.5" hot swappable SATA disk bays (Support 1,2,4,6,8TB HDD on RAID 0,1,5,6)	10 3.5" hot swappable SATA disk bays (Support 1,2,4,6,8TB HDD on RAID 0,1,5,6)	10 3.5" hot swappable SATA disk bays (Support 1,2,4,6,8TB HDD on RAID 0,1,5,6)
Stackable	Yes	Yes	Yes	Yes	Yes
Rack Mount	No	No	Yes	Yes	Yes

(*) The maximum number of channels supported depends on the AI functions used. For example, VSA-110 can support up to 16 channels of AI FastSearch (AI Video Search), or 4 channels of AI Fast Search + 1 channel of AI Intrusion Detection + 1 channel of AI Face Recognition + 1 channel of LPR. For more details, please email sales@ironyun.com

	LPR-1xx (SMB/Home)		LPR-5xx (Enterprise)	
Model Series	LPR-110	LPR-130	LPR-510	LPR-530
Number of Channels (Cameras) supported	Up to 4 channels	Up to 8 channels	Up to 8 channels	Up to 16 channels
Form Factor	Mini-PC	Mini-PC	1U	1U

CPU	Intel Core i5 Series CPU	Intel Core i7 Series / Xeon E3 CPU	Intel Xeon E5 CPU	Dual Intel Xeon E5 CPU
AI - GPU	Nvidia GTX series GPU	Nvidia GTX series GPU	Nvidia GPU series	Nvidia GPU series
Memory	8GB RAM	16GB RAM	32GB RAM	64GB RAM
Network	Dual Gigabit Ethernet	Dual Gigabit Ethernet	Dual Gigabit Ethernet	Dual Gigabit Ethernet
System HDD	128GB SSD	128GB SSD	Two 128GB SSD (RAID1)	Two 128GB SSD (RAID1)
AI Storage	One cold swappable 3.5" SATA disk tray (Support 1,2,4,6,8,10TB HDD)	One cold swappable 3.5" SATA disk tray (Support 1,2,4,6,8,10TB HDD)	Two 3.5" hot swappable SATA disk bays (Support 1,2,4,6,8TB HDD on RAID 0,1)	Two 3.5" hot swappable SATA disk bays (Support 1,2,4,6,8TB HDD on RAID 0,1)
Stackable	Yes	Yes	Yes	Yes
Rack Mount	No	No	Yes	Yes

About IronYun

IronYun is a global leader in cloud computing and big data solutions providers. IronYun is a leading vendor for cloud enabled video management and intelligent monitoring solutions for the security and surveillance markets. Our products have been successfully deployed by many government and enterprise customers. Providing high reliability and running 24/7/365. IronYun has world-wide offices in USA, Japan, Taiwan, Korea, Thailand, Singapore, and several countries in the Middle East. For sales and customer support, please contact: sales@IronYun.com