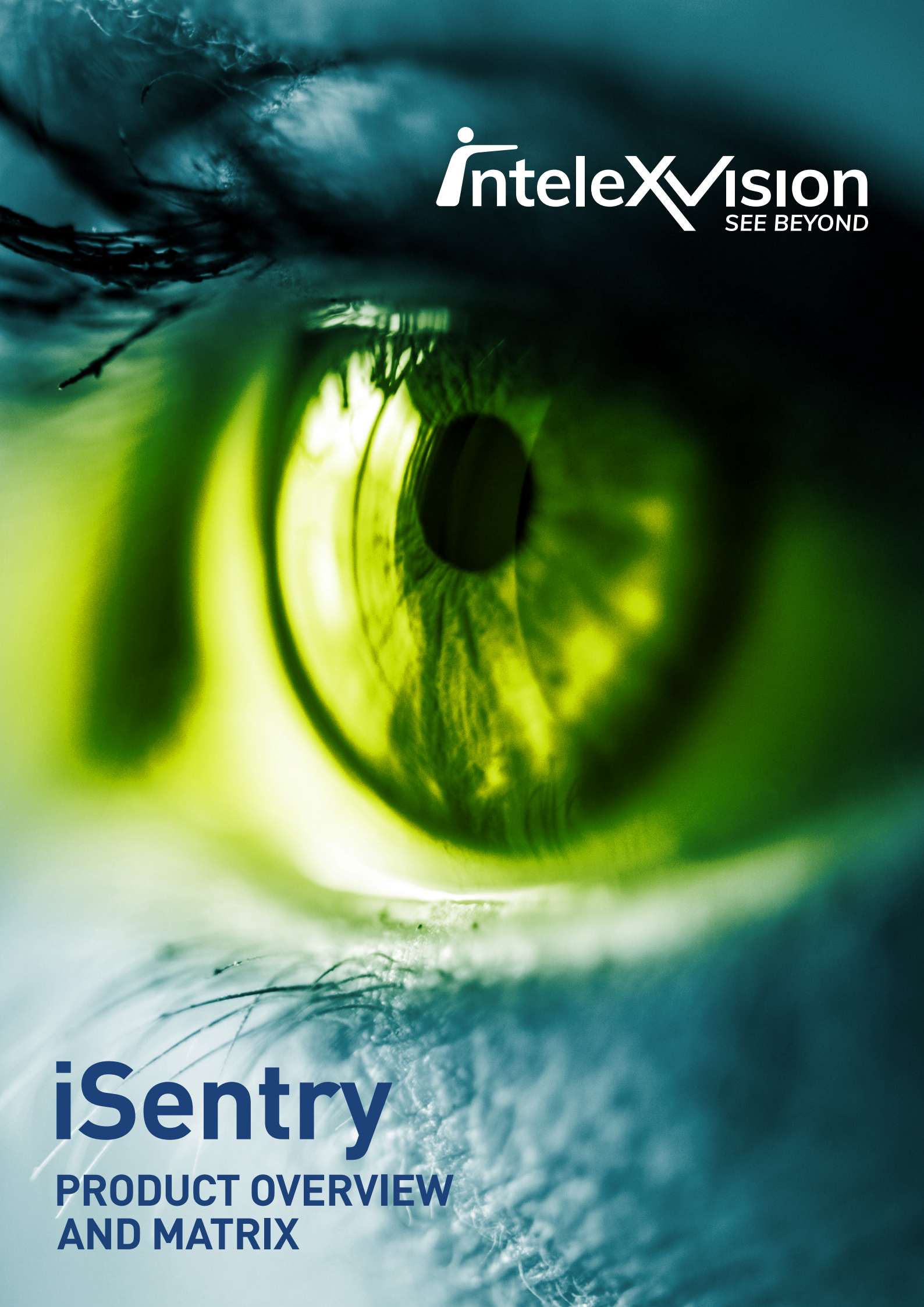


iSentry

PRODUCT OVERVIEW AND MATRIX

Empowering Human Capability Through Real-Time Behavioural Insights

iSentry is a video analytics platform focused on effective, real-time management of video arriving at a video monitoring centre. iSentry can help to realise tangible returns on existing CCTV surveillance infrastructure normally only used for forensic analysis of past incidents, where iSentry provides real-time analysis and response.

CORE CAPABILITIES

UNIQUE ANALYTICS

CORE ANALYTICS

Self -Learning Unusual Behaviour

This is the most important algorithm of iSentry. Detection of Unusual Behavior is driven by a self-leraning unsupervised artificial intelligence platform. Learning is based on pixel analysis and allows the system to learn how objects normally move in a scene; after establishing a norm, the system will create an alert on any deviations. This allows the system to reduce by 95% to 98% the amount of video to be analysed by a CCTV operator. A single Unusual Behavior license often replaces 5-10 licenses based on Rules Based algorithms.

Threat Ranking and Extraction (TREX)

TREX is underpinned by a dynamic AI based learning process, creating the ability to acquire and track items of interest while ignoring environmental factors inherent to real world cameras like varied light conditions and even camera noise.

DeFence

DeFence is able to detect and track very fast moving, as well as very small objects. This is a vital solution, for example, for detecting objects thrown over fences or walls, such as bombs, cell phones, etc. It is also used to eliminate infrared beam detectors along walls or fences, since it is able to detect intrusions on narrow strips, even of only a few centimeters.

Left Object Detection

Left Object Detection will create an alert when an object enters a scene and remains stationary for more than a predefined amount of time. Additionally, the reverse of this feature: if an object is removed from a scene, the system will also create an alert.

Video Tripwire (indoor)

For sterile environments or specific areas of a video scene, iSentry has easy-to-use, multi-directional video tripwires to alert on all moving objects within the specified area that cross that line.

RELIABLE INFORMATION

DATA ENRICHMENT

Applying more than a dozen Deep Learning neural networks, iSentry can enrich the video analysis with detailed information on the alerts generated by the underlying core analytics. The Deep Learning engine is able to recognise multiple classes of objects, even with difficult camera angles and greater distances. Current networks are constantly improved and new specialised networks developed such as fire detection, compliance detection of face-masks or personal protective equipment and human posture analysis.

VIRTUAL OPERATION

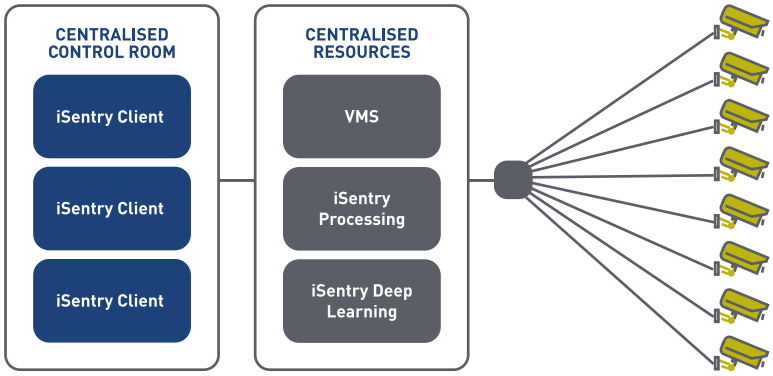
AUTOMATION

The iSentry logic engine plays the role of a video surveillance operator and as such can decide for itself whether an alert should be identified as an alarm or be ignored. This decision is based on factors such as the number and combination of object types that trigger the alert, the time of day and object size, or even the likelihood of accurate classification. Typically, up to 80% of alerts can be handled by the system without the need for human intervention. The inherent risk of automation is largely mitigated by the underlying engine design, where rules are applied only when their results are highly certain. Key to the iSentry philosophy, is that any alert that fails automation will be placed in front of an operator for further investigation and decision.

Flexible Architectures

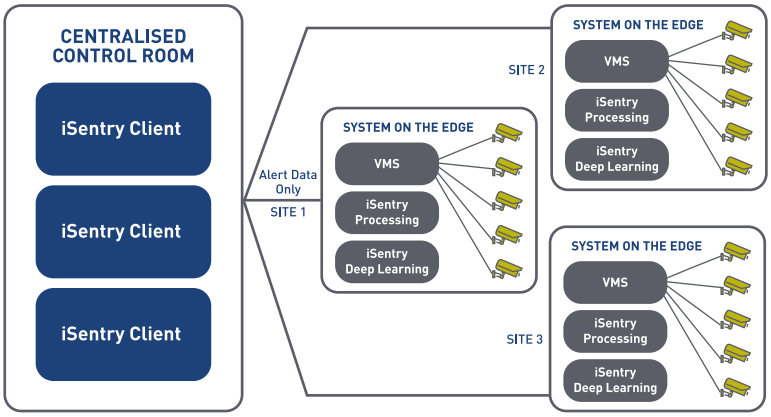
CENTRALISED ARCHITECTURE

This is the most commonly used architecture in general. The iSentry centralised architecture has the advantage of relatively low complexity and can take advantage of economies of scale, but in the case of a network containing many cameras, it could require significant bandwidth to allow centralisation of all the video in a single central location.



DISTRIBUTED ARCHITECTURE

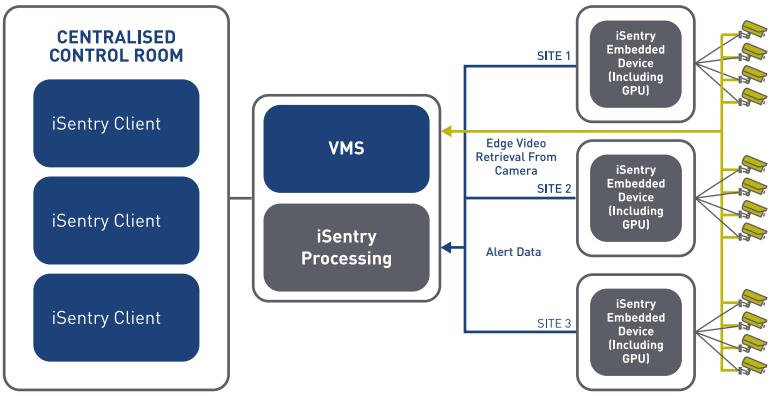
This architecture is suitable where a central control room is required with a number of small and large distributed sites, which need monitoring. This architecture is not limited in terms of camera number and the entire processing requirement is handled on site. This allows for fully autonomous sites, each with the capacity for their own control room, if needed, with records and data stored on site. Only the alert data is transmitted to the central control room and therefore bandwidth usage is limited to just the alert and video data for each alert.



COMPLETE EDGE ARCHITECTURE

Micro embedded device with GPU

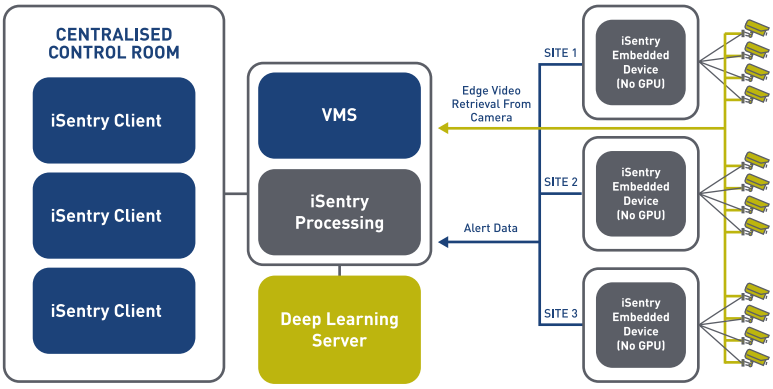
This architecture takes advantage of a central VMS with distributed processing while limiting the bandwidth required to stream live video. In this architecture, all iSentry processing is done on the embedded edge device (such as an NVIDIA Jetson nano), including the Deep Learning, importing live video from the cameras and then sending only alert data and alert video to the control room central location.



PARTIAL EDGE ARCHITECTURE

Micro embedded device without GPU

This architecture differs from the full edge architecture in that only the first processing layer of the iSentry is managed on the edge device (such as a Raspberry Pi) and the subsequent Deep Learning and Rules Engine processing layers are managed centrally. The advantages of this architecture are that Deep Learning processing can be a fully shared resource in the Control Center and that a wider range of embedded devices is supported.



Integration Options

The iSentry core system is also available in an API form, which can be integrated into VMS and PSIM platforms.

INTEGRATED SYSTEMS

The system is responsible for the display and distribution of alerts (with associated data) originating from the iSentry systems

3rd party VMS, PSIM or similar platforms

Fully enriched alert data, including video frames and decisions where applicable.

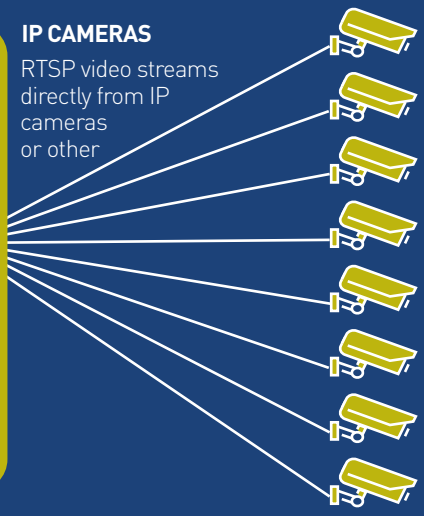
HOST HARDWARE

iSentry Docker Solution

1. **Decoding video**
2. **Processing video with core AI and producing alerts**
3. **Enriched alerts using Deep Learning AI**
4. **Decision making with the Rules Engine**

IP CAMERAS

RTSP video streams directly from IP cameras or other



Highlighted Features

Hardware Efficiency and Flexibility

iSentry has been designed to provide an extremely fast and efficient basic level of video analysis. Very close to real-time analysis and full-motion video alerting. Key improvements have been made to the use of Open VINO for integrated Deep Learning, and to the introduction of hardware acceleration, incorporating suitable HD graphics or dedicated GPU decoding hardware to supplement CPU processing. This results in the ability to manage tens to hundreds of video analytics channels on a single workstation or enterprise server.

Logic and Rules Engine

The iSentry logic & rules engine enables the creation of highly complex and targeted rules, enabling the automatic handling of highly complex real life scenarios, allowing highly accurate results. This allows to effectively reduce by 95% -98% the alerts that arrive to a video surveillance operator.

Specialised Loiter and Abandoned Object Detection

Sentry Advanced Loitering Detection is a "tailor-made" detection tool for this type of application. With specified parameters such as waiting time and object size, together with iSentry's Deep Learning and logic engine, it enables specific alerts of unusual situations. The algorithm of abandoned objects makes it possible to detect, for example, materials on take-off runways or abandonment of waste material in prohibited locations.

Business Intelligence and Forensic Search

iSentry also includes, at no additional cost, a rich Business Intelligence tool, which is available "out of the box" for any customer. The information generated by this tool is very valuable in terms of operator performance KPIs as well as system and camera performance and operation. The data warehouse behind this functionality allows our customers to use a range of custom BI tools, should the need arise. In addition, iSentry has a forensic analysis engine, which allows you the search for specific objects that have produced alerts or alarms within a scene, allowing quick verification of all history of alerts by object class and time frame.

Deployment Options

Both centralised and Edge based architectures are supported by the iSentry system. With flexibility in mind, many of the iSentry system components can be virtualised, combined, or be stand-alone, allowing for resource sharing and optimisation of processing and data flow, when needed and possible.

Deep Learning

The iSentry Deep Learning engine has been specifically optimised for CCTV angles and has optimised learn sets for acute and oblique angles. The Deep Learning engine will accurately identify a multitude of object classes, and include specialised detection modules for hard-hats, helmets, facial extraction, facemask compliance, fire or smoke detection, amongst others.

The iSentry Process

STEP 1: VIDEO DECODING AND ANALYSIS

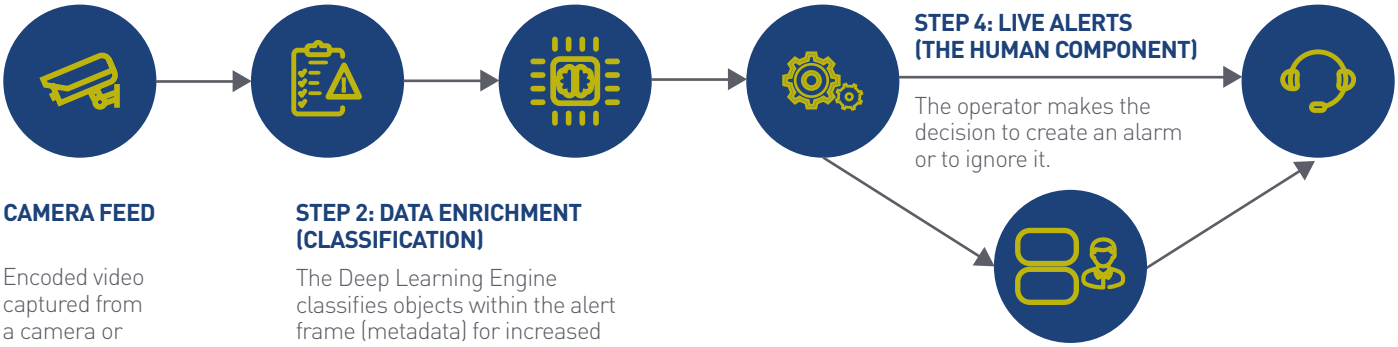
Alerts are created by analysing live video with iSentry's core algorithms (triggers), which are Unusual Behavior and TREX. This allows the reduction of operator viewing time to less than 5% of all the video that is produced.

STEP 3: AUTOMATION

A rules engine then processes the alert with full contextualisation and can discard it or automatically trigger an action such as calling emergency services. Should the rules decide that the alert needs further verification, it sends it to Step 4 below.

STEP 5: ALARMS

Alarms are generated automatically by the rules engine or by the operator.



STEP 4: LIVE ALERTS (THE HUMAN COMPONENT)

The operator makes the decision to create an alarm or to ignore it.

CAMERA FEED

Encoded video captured from a camera or camera network.

STEP 2: DATA ENRICHMENT (CLASSIFICATION)

The Deep Learning Engine classifies objects within the alert frame (metadata) for increased context of the situation.

1 iSentry efficiently decodes multiple video streams which are then analysed by one or more of the analytics based on Artificial Intelligence, resulting in an "alert", which will then start the iSentry process.

2 A certain number of detected frames, extracted from the alert video, are analysed by the GPU-based Deep Learning server. This process maximises processing efficiency and gives the system a much greater understanding of the alert.

3 Due to the greater understanding, from step 2, the system will automatically dismiss many alerts or raise some to an alarm, many of these with a high level of certainty.

4 Alerts that are not automatically elevated to alarm in step 3 are presented to the operator as a list of current alerts, each containing classified images and a +/- 5-10 second video clip. The operator then decides whether an alert is important (escalating to alarm) or not, thus eliminating most false positives.

5 Once an alarm is generated either automatically by step 3 or by the human in step 4 the iSentry process is now complete. All data associated with the alarm including video, classifications, metadata and operator input, is included with the alarm to be processed.

Health & Safety Ready

Human Posture Analysis

- Standing, walking, sitting, lying and falling down

Personal Protection Equipment Compliance

- Detection of ear defenders, hard hats, high visibility jackets, eye protection glasses or face shields

Face Mask Compliance

- Face mask being worn and being worn correctly
- Density and occupancy control

Product Matrix

Modules	iSentry Core	Unsupervised Self learning Unusual Behaviour	TREX SUITE TREX Standard	TREX Premium	TREX Elite	Comments	Additional Information
Abnormal Behaviour of Objects		●				See specific unusual behaviour document for detail use of case applications	
Motion analysis							
AI Environmental Filter	●	●	●	●	●	Ability to detect and track true targets while eliminating environmental interferences	Can be applied to multiple specific uses cases including parking irregularities, safe, door and cash register being left open, fly tipping and many others
Advanced Left Object or Missing Object	●	●	●	●	●	Stationary object detected, classified and actioned into alarm and alert per zone in FoV. Size and time of objects (stationary or removed) are configurable	
Advanced Trip Wire Analytics	●	●	●	●	●	Directional cross line alerting with multiple object classifications (cars, people, trucks etc.) and actioned into alarm and alert via Customised rule engine including numbers of objects	
Intrusion Detection - Perimeter and Area Detection							
Impending Threat Warning	●	●	●	●	●	Target approaching critical areas	Performance warranted only on compliance with configuration best practice and specified thresholds for FoV, object size, resolution and angle
Intrusion Detection Short Range	●	●	●	●	●	High accuracy and low latency acquisition 0-70 meters	
Intrusion Detection Medium Range	●	●	●	●	●	High accuracy up to 250 meters	
Intrusion Detection Long Range	●	●	●	●	●	Multi-kilometer capability	
Run Analytics on PTZ Cameras	●	●	●	●	●	Target detection on patrolling (visible/thermal) PTZ cameras. Detection suppressed during camera movement	Refer to specified document for compliant PTZ control elements and supported models
Go to Preset with PTZ Slave	●	●	●	●	●	VMS or PSIM dependent	(See hardware specification document)
Mapping and Configuration Interface	●	●	●	●	●	Online and offline availability	
DeFence High Speed Intrusion Detection	●	●	●	●	●	Increased hardware requirement and high frame rate required	
Classification							
Object Classification and Verification	●	●	●	●	●	100+ objects (eg. humans, vehicles, animals, laptop etc.) can be classified. We do not collect biometric data	Only warranted on compliant camera positioning
Smoke and Fire Classification	●	●	●	●	●	Performance warranted only on compliance with configuration best practice and specified thresholds for FoV, object size, resolution, angle and pixel density (Refer to specific documentation)	
Other Special Classification Functions							
Object Counting (Entry/Exit)	●	●	●	●	●	Multi-camera based	
Object Counting Area Occupancy (Camera)	◐	●	●	●	●	Single-camera based	
Density Monitoring and Reporting (Area)	●	●	●	●	●	Multi-camera based with object classification and reporting	Only functional if People Counting is selected
Mask Compliancy	●	●	●	●	●		Target approaching critical areas with configurable time to engagement metric
Social Distancing and Group analysis	◐	●	●	●	●	Only warranted on compliant camera positioning, distance, resolution and pixel density	
Group and Crowd Detection	●	●	●	●	●		
Programmable Loitering Detection	●	●	●	●	●		
PPE Compliance and Reporting	◐	●	●	●	●		
Cash Detection	●	●	●	●	●		
Heat Maps	●	●	●	●	●		
Rules Engine							
Processing with Limited configurations	●	●	●	●	●	Pre-configured rules, to be applied per scene region	
Processing with Unlimited configurations	○	●	●	●	●	Unlimited, customised rules, to be applied per scene region	
Other Functions							
BI Reporting	●	●	●	●	●	KPI reporting on alert history (per camera, per site etc.) and on operator efficiency	
Forensic Search in Alerts	●	●	●	●	●	Allows to search for classified objects within pre-existing alert data per camera	
Group and Crowd Detection	●	●	●	●	●	See specific technical document	
Facial Blurring for GDPR and Anonymity	◐	●	●	●	●		
Sound Analysis	◐	●	●	●	●	Utilises on camera microphone and audio capability	
Recording Alert Clips	●	●	●	●	●	Allowing to review pre and post alert video clips	
Face Recognition	◑	◑	◑	◑	◑		
License Plate Recognition	◑	◑	◑	◑	◑		

● Available ◐ Select only one ○ Not available ◑ Subject to an additional and independent license

InteleXVision