



Intelligence Engines

Enabling intelligent video solutions.



Providing a platform for the development of an endless range of highly automated, intelligent, visually enabled IT products and solutions for complex operational environments.

INTELLIGENCE ENGINES

The Intelligence Engines produce an automatic, accurate and dynamic analysis of object and people activity in an area. When integrated within a visually enabled IT solution they can help an organisation to more efficiently manage a facility and significantly enhance security by automating common surveillance tasks.

Using adaptive background/foreground image separation capabilities, the Intelligence Engines detect 'interesting' events utilising a variety of functional modes such as activity detection, object tracking, abnormal behaviour detection and face detection. The system then uses pre-configured settings to choose how and where to deliver the information. This enables both real-time and recorded video to be analysed, stored, viewed and acted upon with a high-level of context.

The Intelligence Engines are at the core of all Clarity Visual Intelligence products and provide the platform for the development of an endless range of highly automated, intelligent, visually enabled IT products and solutions for complex operational environments.

These products and solutions require standard IT hardware and fully utilise the existing hardware, software and system investments made by an organisation, which are harnessed and transformed in their operational effectiveness.

- Automatic, accurate and dynamic analysis of object and people activity.
- Real-time video processing.
- Ability to learn and cope with changes reducing false alarms in varying light and background conditions.
- Robust – once configured, will work continuously with no changes required.
- Runs on standard PC hardware and integrates easily with existing IT infrastructures.
- Personnel or other systems can be notified of detected events when they happen.
- Enables efficient image storage and transmission.

At the core of each Intelligence Engine is the ability to segment the foreground, or important content of an image, from the background. From this segmentation objects are then identified and tracked, allowing the creation of high-level information about object behaviour in relation to preset conditions. The addition and removal of objects in the scene can also be detected.

Increased Productivity and Privacy

The ability to identify events and activity and obtain semantic information from a scene provides the user with information that is useful while removing the need to directly observe the images. This can increase productivity while also increasing privacy. Information could include the counting of people or vehicles, or the storage of face images for retrieval by the relevant authorities in the case of an emergency.

Efficient Data Storage and Transmission

The ability to understand what the camera sees and segment the foreground from the background enables different elements of processed images to have differing levels of importance and to be stored or transmitted across a network at different resolutions and compression rates. This provides opportunities for significant cost savings and increases in network and storage efficiency.

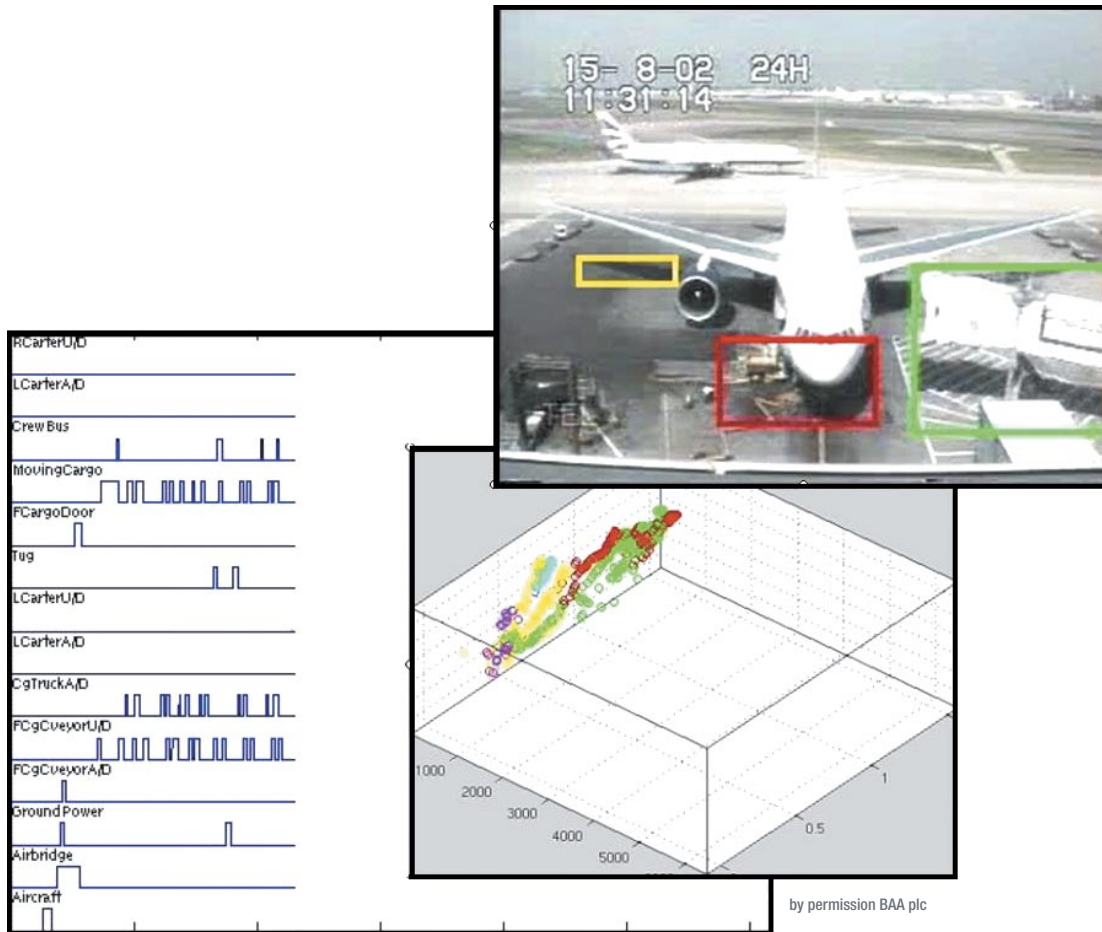
The Intelligence Engines enable systems to capitalise on the storage and bandwidth efficiencies by allowing the user to transmit and store important parts of images at very high resolution and less important parts at a lower resolution – unlike most systems that achieve transmission and storage efficiency generally by reducing the entire image quality.

Efficient Data Retrieval

Each Intelligence Engine enables video clips to be annotated with meaningful information (such as time, events detected, location) enabling a database of video clips to be queried based on events or other high-level information.

Event Notification

The Intelligence Engines can notify personnel or other systems of meaningful events when they happen, enabling the automatic activation of alarms or activity such as recording or transmission of images.



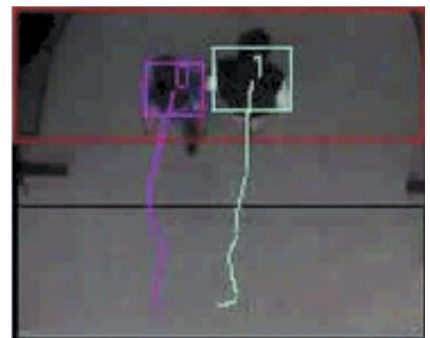
Products and solutions for complex operational environments.



1. Foreground separation from background.



2. Segmentation of the moving objects.



3. Tracking direction and counting.

The following provides an overview of each category of Intelligence Engines.

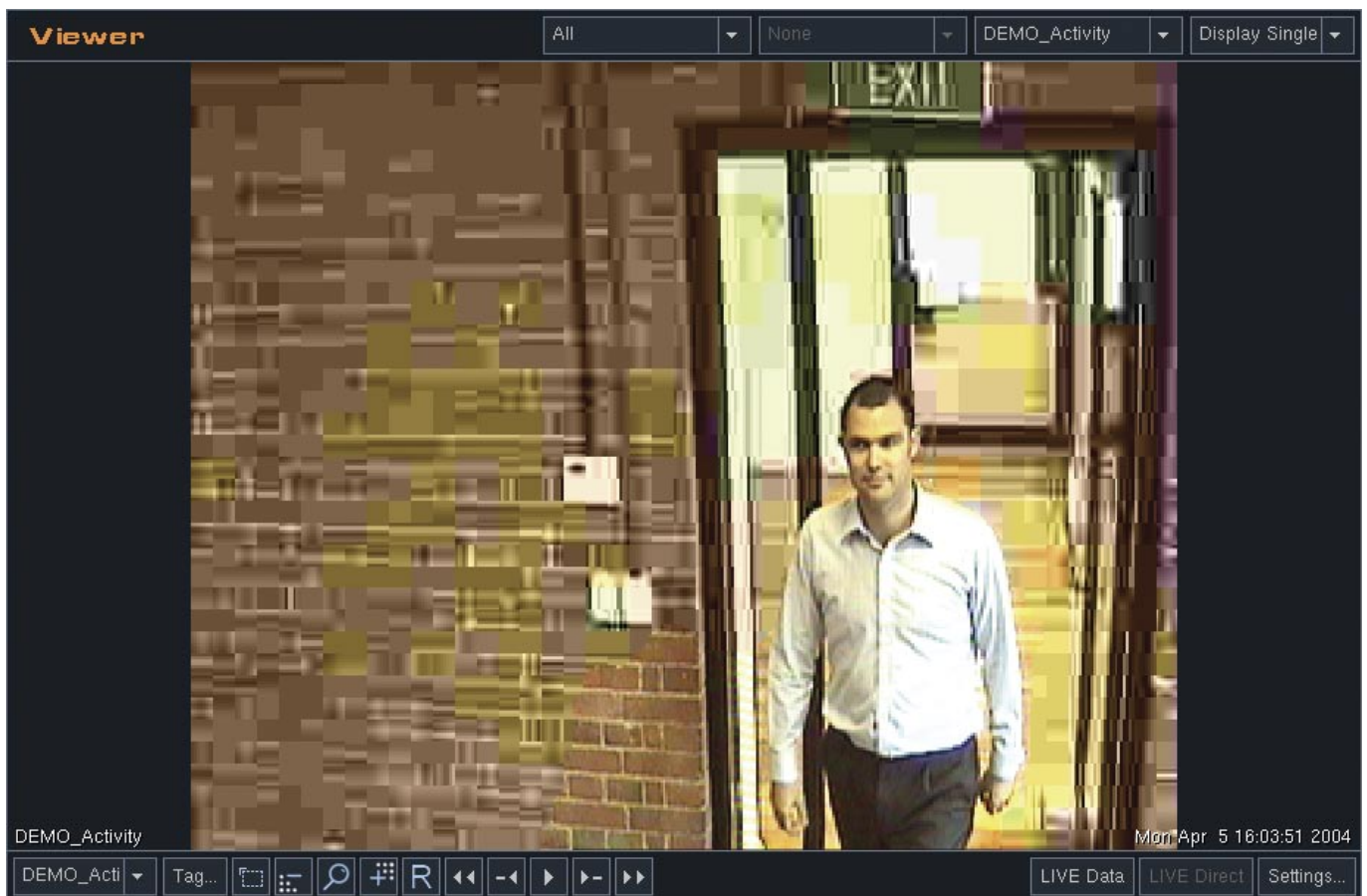
1. Motion Detection

Motion detection involves the analysis of video to detect movement within a scene. Many existing motion detection solutions apply a desensitisation to their products to avoid false alarms in difficult environments. This approach reduces the potential benefits to customers. Clarity Visual Intelligence's approach has been to apply the most advanced science available to ensure the system learns what is normal and avoid false alarms.

The Motion Detection Intelligence Engines cope with changes in light and regular environmental conditions, continually learning and coping with these changes over time. This significantly reduces false alarms in varying light and background conditions. Such changes involve lighting variations as the weather changes, reflections, continual movement of trees and water, shadows cast by people and objects, and camera flashes.

The Motion Detection Intelligence Engines have been engineered to solve a wide range of security and asset management problems, such as employee theft, asset management, access control, fraud and occupational health and safety issues.

- Identify motion associated with objects of specific size or shape.
- Any number of user-defined regions can be created.
- Significantly lowers false alarm rates.
- Can trigger video recording, alarms or other user-defined actions when a region is breached.
- Adapts to changes in lighting and regular environmental conditions, indoors and outdoors.
- Optimised storage by storing the foreground at a different resolution to the background.



Optimised storage by storing the foreground at a different resolution to the background.

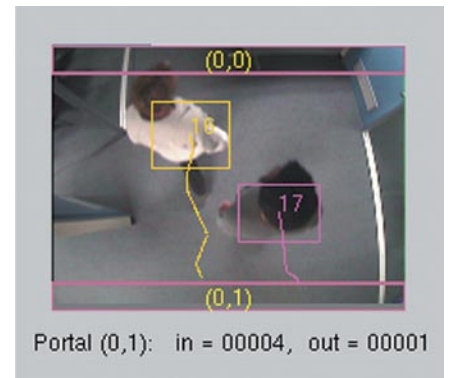
2. Counting

The Counting Intelligence Engines unobtrusively provide counting statistics on objects such as people or vehicles moving between user-defined areas of an image. The count data can then be analysed to provide accurate and timely information in a number of scenarios including shopping & town centres, theme parks, casinos, exhibition centres, galleries, museums, public transport environments and sporting complexes.

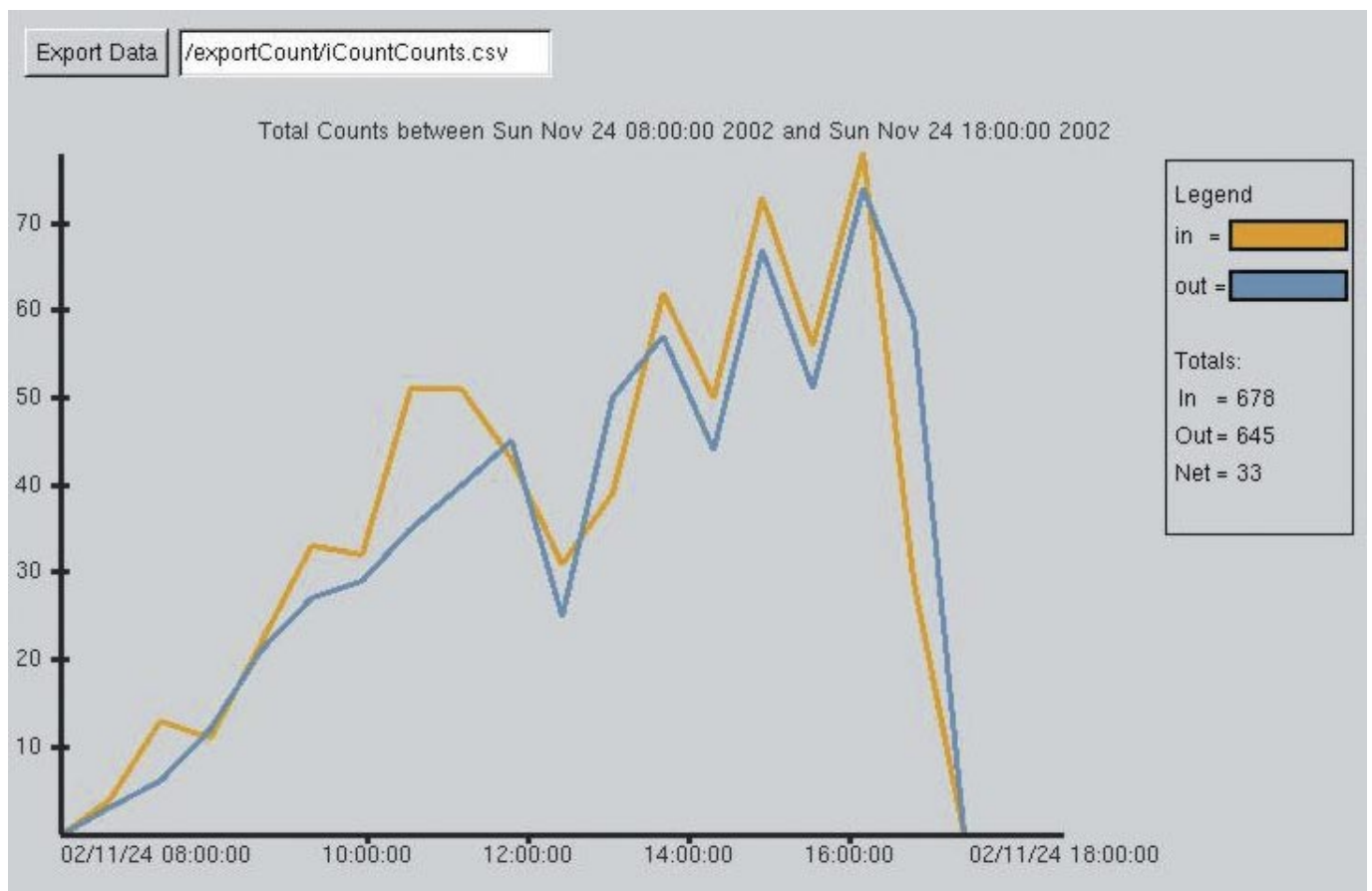
- Provides accurate bi-directional and multiple entrance counting.
- Can be deployed in remote environments.
- Provides a high-level of accuracy not available with other tools such as RF or IR beam counters.
- Accurately counts in difficult environments. ie. wide entrances, irregular shaped areas and convoluted entrances.
- Specifically designed to manage high traffic flow areas.

This enables organisations to analyse, forecast and effectively manage the following elements:

- Pedestrian flow and patterns.
- Staffing levels and timing.
- Conversion rates.
- Rental support.
- Safety and facility management.
- Energy management.
- Marketing and promotion strategies.



Counting People.



Counting Statistics.

3. Abnormal Behaviour

The Abnormal Behaviour Intelligence Engines identify objects and track their movements enabling the detection of specific behaviours that are of interest. These interesting behaviours can be defined as 'abnormal'. For example, in a car park, cars and people are constantly coming and going. These activities are of little interest to a security guard. However a person who loiters around cars, or moves from car to car and pauses is an alarm condition.

- Can be configured to detect many behaviours at different thresholds.
- Ideal for prioritising surveillance information for security personnel.

The following are some of the standard abnormal behaviours that can be detected.

Running/Speeding

A person or an object exceeding a user defined speed. For example, a person running in a shopping centre or a car speeding in a car park.

Upstreaming

A person or an object moving in a different direction to expected or to the average movement in a scene. For example, a person entering through an exit, or an object falling from a shelf.

Stationary Object

A person or an object that has been moving but has stopped for more than a predefined period of time. For example, a car parked too long in a car park, or a package left in an airport.



Vehicle counting and stationary vehicle detection and warning alarm.



Upstreaming - detection of an object falling from a building.

4. Face Detection

The Face Detection Intelligence Engine works by automatically identifying faces in a scene from different viewing conditions. This capability enables action to be taken directly in relation to the detected faces.

Face detection is highly accurate with an extremely low false alarm rate. It can be used for image and video indexing and retrieval, creating a visual database of detected faces and number plates from a stream of video, which is valuable for security and operational purposes. For example, record a 'face history' of people entering premises.

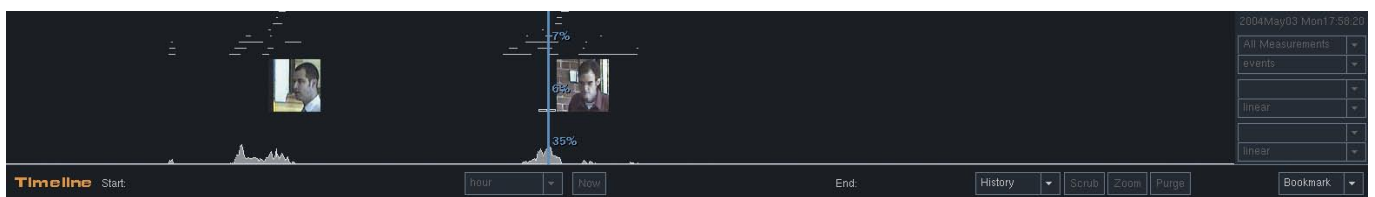
Detected faces are dynamically tracked through a scene enabling the creation of a visual record of their movement.

Detection and segmentation also enables the storage of the faces at the highest resolution possible, while storing everything else at low resolution.

- High detection rates and low false alarm rates.
- Ability to create a visual database of faces.
- Ability to store areas of an image such as faces at high resolution while storing background at low resolution.
- Manage access control.



Detection of faces and viewing and storage at higher resolution than background.



Unique faces detected, tracked and displayed in a timeline.

Further information

For further information about Clarity Visual Intelligence Engines or other Clarity Visual Intelligence products and solutions please visit www.clarityvi.com
Clarity Visual Intelligence is a technology of the Safehouse Group - www.safehousegroup.com

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