# AgilityVideo

## SmartCatch™ | Perimeter Intrusion
### with Loitering Monitoring
### Technical Specification

Vidient SmartCatch is an accurate and effective solution for detecting perimeter intrusion in sensitive areas. Using existing CCTV infrastructure, SmartCatch software monitors, identifies and tracks objects for security policy violations and enables quick response through real-time alerts and instant video replays. At the core of SmartCatch is a set of advanced video algorithms capable of performing complex behavioral analysis, tracking multiple objects and simultaneously identifying security threats in even the most complex environments.

## DESCRIPTION

SmartCatch Perimeter Intrusion is able to detect, track and classify humans, vehicles or objects entering designated controlled areas within the field of view. SmartCatch ignores trees, reflections and debris and is effective in conditions of varying illumination, shadows and in inclement weather. SmartCatch uses object classification to provide effective perimeter protection with a low false alarm rate. Object classification insures that uninteresting objects are ignored while generating alarms on real threats. Accurate object classification also enables the use of SmartCatch in situations where the need is to identify specific object types is critical. For example, for roadway



intrusion detection, an alert can be generated from human intrusions, but not those by vehicles. The system supports the definition of multiple regions of interest (ROI) within a single camera view. Each ROI can be configured to alert for specific types of objects (human, vehicle, other) and different types of motion. Types of motion include entering, leaving, appearing, disappearing, loitering and moving in a specific directional motion. Each type of object and motion can generate a unique alert type allowing security personnel to immediately recognize the violation.

This behavior utilizes the SmartCatch learning engine, a patent-pending capability, which uses artificial intelligence to automatically filter out unnecessary alarms while maintaining the detection rate. To operate, the self-learning feature only requires that users indicate whether alarms are true or false positive. After a sufficient sample of alerts are classified as true or false, a filter is created that suppresses future false alerts while still detecting violations from other intrusions. With the learning engine, system accuracy improves over time, providing even greater protection while reducing the distractions caused by false and nuisance alarms.

The behavior handles shadows and other environmental conditions too, like poor weather, wind, and other environmental motions not related to object tracking. Additionally, camera vibration is a common problem for surveillance cameras. The perimeter monitoring behavior can adjust for minor camera vivration using a camera motion estimation and motion compensation technique.

## SUMMARY

- Classifies objects as human, vehicle or other.
- Tracks humans, vehicles and other objects moving through the field of view.
- Supports resolutions from 1CIF to megapixel.  Greater processing capacity is required for higher resolutions.
- Video size to classify objects can begin at 3x5 pixels for human and 2x2 pixels for vehicle. Accuracy will improve with more pixel data.  Desired size is 5x13 for human and 13x5 for vehicle.
- Learning engine for automatic false and nuisance alarm reduction
- Day and night time operation (with illumination or thermal cameras).
- Compensation for slowly varying illumination
- Tracking sustained despite infrequent occlusions.
- Exports GPS coordinates in real-time based on scene calibration.
- Exports size and speed data in real-time.
- PTZ camera handoff for fast identification
- Detection methods include
  - Entering
  - Leaving
  - Appearing
  - Disappearing
  - Directional Motion
  - Loitering
- Supports multiple regions of interest, each with different object and motion methods.
- Operates on industry-standard Windows servers
- Adapts to minor camera vibration

## REQUIREMENTS

The following are requirements for deploying the perimeter behavior.

- Camera height – For a typical perimeter protection application, cameras should be placed as high as possible while limiting camera shake.  The minimum height is 12 feet.
- Detection Range – The detection range is determined by the number of pixels required for classification, the camera field of view and the computation resolution (usually 1 CIF).  As examples with a stabilized camera, using the minimum and desired pixel sizes shown above, the distance in feet for classification of humans and vehicles is estimated as follows:

| Camera FOV (degrees) | Human | | Vehicle | |
|---|---|---|---|---|
| | Classification possible | Reliable classification | Classification possible | Reliable classification |
| 15 | 1000 | 600 | 3000 | 500 |
| 30 | 500 | 300 | 1500 | 230 |
| 45 | 325 | 190 | 1000 | 150 |
| 60 | 225 | 140 | 700 | 100 |

- Tracking time – For reliable tracking, SmartCatch requires 3 seconds of unobstructed viewing time of the object.
- Frame rate – Minimum of 10 frames per second.
- Processing requirements – The compute requirements vary by scene crowdedness and pixel resolution.  As a baseline, for a typical perimeter scene with analytics computation at 1CIF, approximately 20-30 perimeter intrusion detections can be run on a server with two Intel Xeon E5-2620 six-core processors.