



If it can be imagined, it is possible

SmartCatch - Intelligent Video Surveillance

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The Art of Seeing,
The Science of Knowing

Overview

- The BIG Problem
- SmartCatch
- Success Factors with Intelligent Video
- Customer Examples
- Return on Investment
- Video Capture
- Summary

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The BIG Problem



The cameras aren't being watched !



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The BIG Problem.....



Security operations costs are high



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The Crisis

- Camera Not Always On Screen
- Too Many Screens To View
- Human Limitations to Watch Cameras
- Details on Video are Often Missed
- No Solution to Watch All Cameras
- Video Data Overload
 - Too much data to view in real time
 - Time consuming to search DVR content



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Why Watch Cameras?

- Old Security
 - Record Camera Video
 - Review DVR When Events Occur
 - Catch the Criminal
- New Security
 - Too Late if the Event Already Occurred
 - People's Lives are at Stake
 - Need to Catch "signs" Leading to an Event
 - Need to Automatically Generate Alerts for Each "suspicious" Behaviour



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Origins of Video Intelligence

- Motion Detection
 - Commercially Available for many Years
 - Limited Use & Lots of False Alarms
- Object Tracking
 - Useful in Non-busy Outdoor Environments
 - Lots of False Alarms In Busy Areas
- Behaviour Recognition
 - Now Commercially Available
 - Recognises Objects & Actions

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Human Tailgating



Intrusion Detection

SmartCatch

- Every camera always monitored
- Leverages existing infrastructure
- Lowers operational costs
- Can prevent threats, before its too late
- Integrates with other sensors

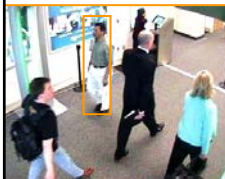
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Intelligence



- SmartCatch uses heuristic learning and so can tell the difference between
 - Human
 - Vehicle
 - Boat
 - And other objects
- This is used with behaviour recognition to differentiate between
 - Human Loitering and
 - Vehicle Loitering



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Behaviours



- Perimeter Intrusion Monitoring
 - Tracking & detection under varying weather conditions
 - Accurately classify object types
- Loitering
 - Detects people or vehicles loitering near secure or high value areas
- Stopped Vehicle
 - Detects vehicles by size that stop near sensitive areas for a prolonged period
 - Can be size sensitive
 - Highly accurate even in crowded streets



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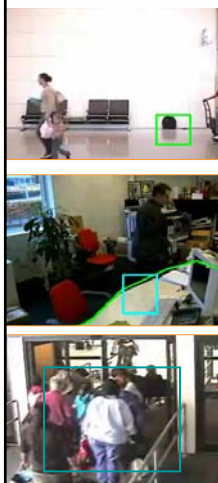
Behaviours....

- Human Tailgating
 - Designed to track unauthorized entry by tailgating at access control points
- Vehicle Tailgating
 - Detect vehicle or human tailgating after an authorized vehicle
- Exit Lane
 - Detect wrong-way directional traffic

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Behaviours.....

- Unattended Object
 - Detect objects such as packages, bags, and other objects that are left unattended for a specified period of time
- Removed Object
 - Safeguards valuables by 24x7 asset monitoring
- Crowd Detection
 - Detects crowd size and queue length to prevent overcrowding situation

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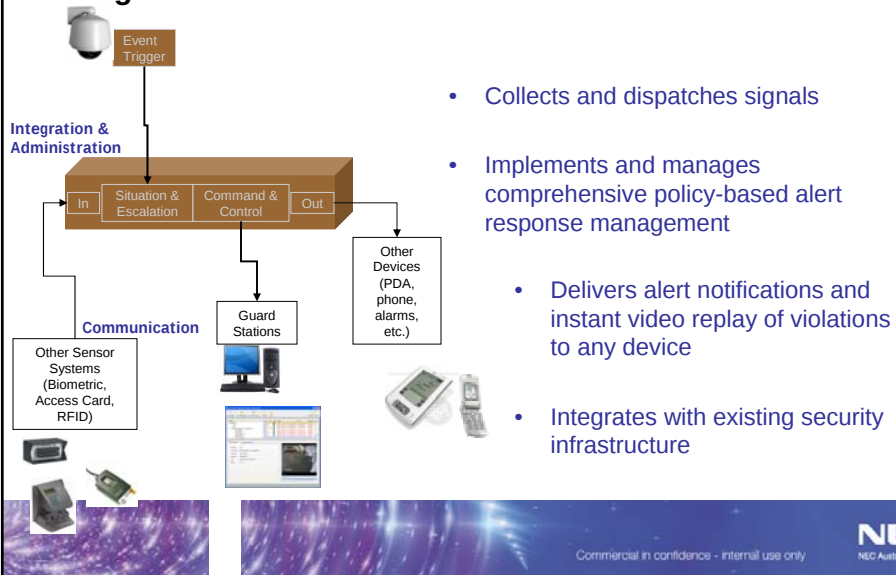
Additional Behaviours

- Turnstile Hopping
 - Detect people hopping over barriers
 - Lost revenue prevention for rail operators
- People Counting
 - Marketing statistics
 - Volume based revenues
- Number Plate Recognition
 - Forensic detection
 - Used in conjunction with vehicle loitering can reduce false positives

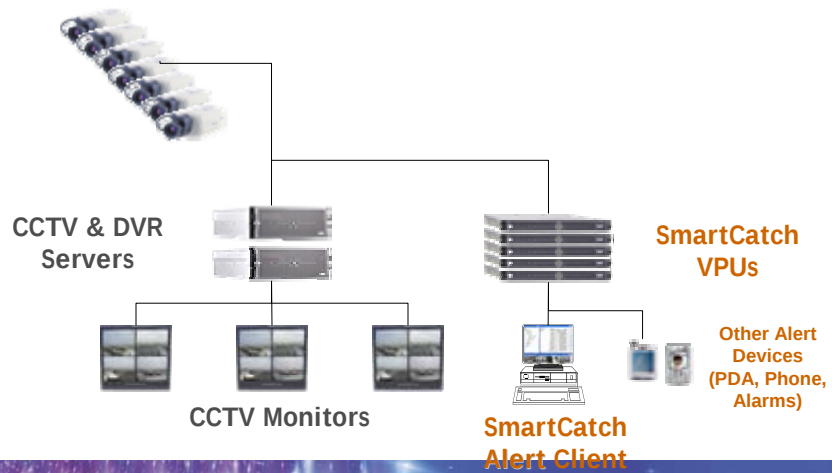
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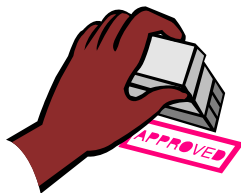
Integration, Arbitration & Administration: SmartCatch Engine



Adding Behaviours



Success Factors for Intelligent Video



1. Can it address my hardest Intelligent Video problem?
2. Accurately detect without false alarms
3. Effective in tough environmental conditions
4. Tracking of objects despite occlusions
5. Integrates with existing systems & sensors

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1. Can it address my hardest problem?

- Why Important?
 - Don't want multiple IV systems!
- Common "hard" problems:
- Access control
 - Integration, complex movements
- Perimeter
 - Accuracy in all conditions
- Unattended objects
 - In all environmental conditions

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Independent tests of SmartCatch

Human Tailgating
through access
controlled doors.
Nearly 400 tests on
secured doors

Exit Lane
100 exit lane tests
under crowded
conditions.

Overall Results:
Accuracy: 97.9%
False (positive) Alarm
rate: 2.1%



- Ladder or
person?
- Person
coming out
(TG) or going
in (not TG)?

SmartCatch
knows



- Alarm on a
Tour Group?

SmartCatch
knows



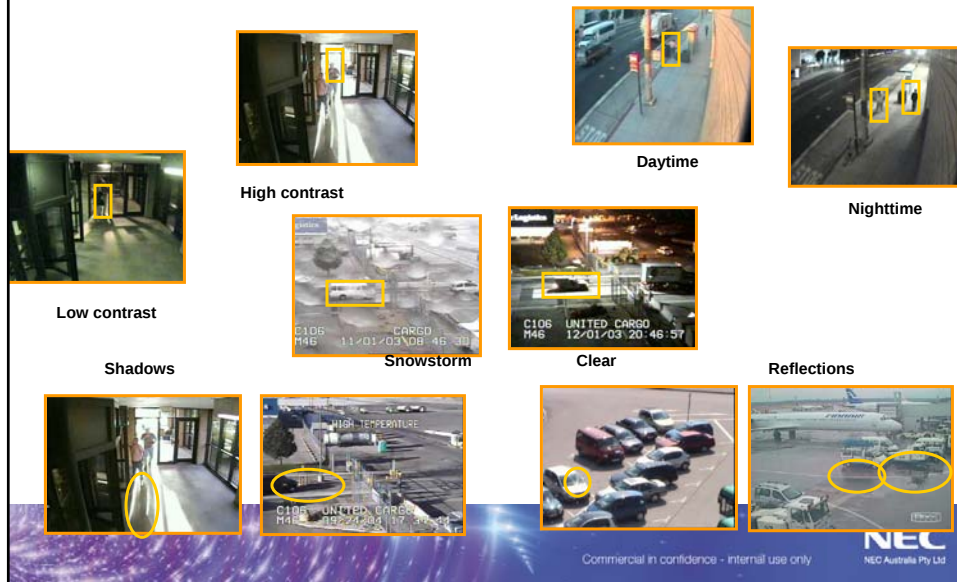
- One person or
two?

SmartCatch
knows

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3. Effective in tough environmental conditions



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4. Tracking of objects despite occlusions

- Why Important?
 - Necessary for accuracy: loitering, unattended objects, stopped vehicles and perimeter tracking
- SmartCatch includes predictive algorithms
 - Based on trajectory *and*
 - Based on appearance



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5. Integrates with existing systems and sensors

"What is critical for taking security to the next level is aggregating information from various sources within the single network that provides total situational awareness..."

David M Stone,
rear admiral, Navy
(Ret), former
assistant secretary
of homeland security
for the
Transportation
Security
Administration.



- Perimeter:
 - Radar, Thermal, IR, GPS, PTZ
- Access Control
 - Entry/Exit control, Biometrics
- Public Areas
 - Chem/bio sensors
- SOC integration
 - Displays, Alerts

San Francisco International

"With SmartCatch, we can monitor specific, high security access doors to ensure compliance with access control procedures and take corrective action, whether it's immediately or at an appropriate later time."

Paul Foster, Aviation
Security Manager at
SFO.

- TSA-funded project to evaluate SmartCatch
 - 10 months of testing, nearly 800 separate tests, 7 behaviors
 - Overall accuracy: 97.9%
 - False detections: 2.1% (False Positives)
- SmartCatch found to be:
 - "comprehensive, accurate and advanced"
 - "SmartCatch can help to prevent security breaches, threats or suspicious activity occurrences, and human or property damage or loss while lowering the cost of security management."

Helsinki (Finavia) Airport

"After running SmartCatch for one month, we detected a much larger number of violations than we predicted. Now we had a video clip of each violation, a picture of each vehicle, and the necessary data to effectively implement operation changes that were long overdue. As a result our overall operation cost is going down."

Jyri Vikstrom, Head
of Corporate
Security



Vehicles in this area
are allowed if a plane
is present ...



... But will create an
alert if one isn't.

- Problem
 - Service vehicles present hazard
 - Less than 5% detection rate
 - Fines & potential for lawsuits
- Alternatives
 - Hire more guards
 - Get more insurance
 - Find a technology solution
- Solution = Use SmartCatch to:
 - Detect
 - Alert
 - Record

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Access control at Data Center



Human Tailgating



Vehicle Tailgating

- Problem
 - Need to secure corporate assets, data and personnel
- Alternatives
 - Hire more guards
 - Install more physical security
 - Intelligent Video Solution
- Solution
 - SmartCatch integrated to access control system
 - True access control – improved security
 - Cost efficient solution

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Airports

Exit
Lanes

Perimeter



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Critical Infrastructures



Perimeter
Levels 1 and 2



Vehicle Access Control

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Enterprise Facilities

Access
Doors



Barrier or
Turnstile
Hopping



Unattended
Objects



Loitering



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Transportation

Platform
Jumping



Unattended
Objects



Crowd
Detection



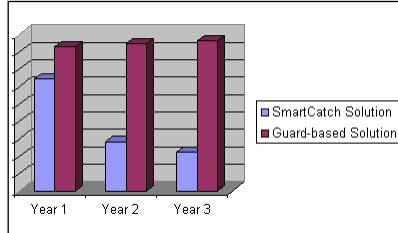
Tunnel
Intrusion



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Return on Investment



"If one officer can efficiently monitor five entrances instead of five officers monitoring those same entrances, then the long-term savings is immediately evident.

When the cameras are tied to access control systems and emergency communication systems, it can be just like having an efficient security officer at each access point..."

Richard D. Maurer,
Vice Chairman of the ASIS Physical
Security Committee

- Security and safety improved
- Existing infrastructure more efficient
- Lower operational costs
- Reduces theft & shrinkage
- Addresses compliance issues

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Clips – Exit Lane



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Clips – Human Tailgating



Clips - Loitering



Perimeter Intrusion



SmartCatch can recognise boats too



Humans too

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Removed Object



How often has this happened at your place of work
SmartCatch works 24/7

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Stopped Vehicle



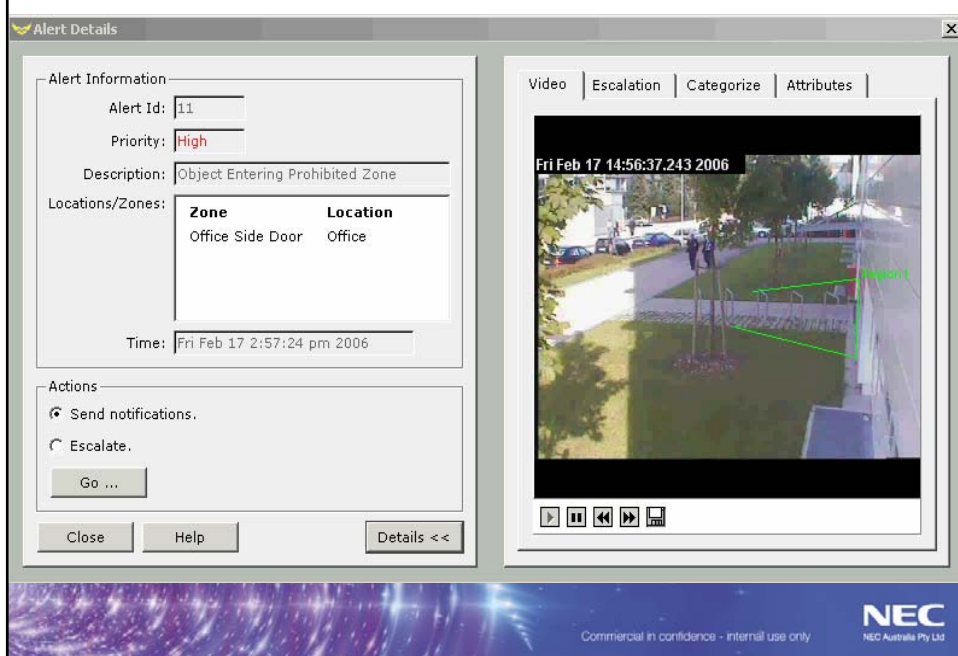
Unattended Object



Vehicle Tailgating



Alerts



Alert

Alert Details

Alert Information

Alert Id:
Priority: High
Description: Unattended Object Detected

Locations/Zones:

Zone	Location
Office Lobby	Office

Actions

Video | Escalation | Categorize | Attributes |

Fri Feb 17 14:51:06.390 2006

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Alert

Alert Details

Alert Information

Alert Id:
Priority: High
Description: Unattended Object Detected

Locations/Zones:

Zone	Location
Office Front	Office

Actions

☒ Send notifications.

Video | Escalation | Categorize | Attributes |

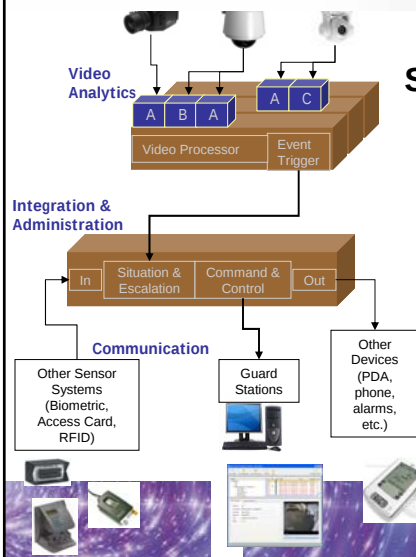
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SmartCatch, in a nutshell

- Most advanced algorithms for behavior recognition
 - NEC Labs origin
 - 7 patents pending
 - Macro and micro behaviors
 - Designed for configurability
- Complete integration and arbitration layer
 - Implements complex security policy
 - Records, replays and distributes video events

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Sample Customers

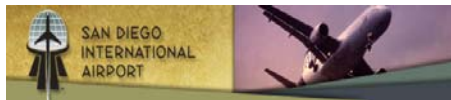


San Francisco International Airport



Transportation
Security
Administration

NEC



Raytheon



Jewish Community Center of San Francisco

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SmartCatch Capabilities

- Very High Accuracy – Reduced False Alarms
- Real-time Alerts & Instant Video Replay
- Live Camera Views Showing Objecting Tracking
- Includes An Alert Distribution Capabilities
- Integrates With Other Security Solutions
- Runs With Existing Analog & IP Cameras
- Archives Video Clips Of Violations For Forensic Search And Playback



Conclusion

- Behaviors – Much more than movement
- Video Intelligence – Alerting before an event occurs
- Alert Management – Getting alert video to first responders
- Accuracy – Rare False Alarms

SmartCatch – Recognise, Analyse, & Alert



