Computer with a Lens….

Intelligence in cameras translates to saving time and money

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www.axis.com
Axis – continuously driving innovation

- **1996**: World’s first network camera
- **1998**: World’s first video encoder
- **1999**: World’s first network video chip
- **2004**: First MPEG-4 and Motion JPEG compression camera
- **2008**: First H.264 compression standard for network camera
- **2009**: First network cameras with HDTV, and with remote focus & zoom functions
- **2010**: First thermal network camera
- **2011**: Lightfinder technology
- **2012**: Unique high-performance WDR camera
- **2012**: AXIS Camera Companion: unique small installation solution
- **2012**: First network camera with active cooling
- **2013**: Physical Access Control
- **2015**: Zipstream technology & Sharpdome technology
- **2015**: Open standard network loudspeaker & Open IP-based door station

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Low light Technology

Extreme light sensitivity
Wide Dynamic Range: Back & Blinding Light conditions

Enables extreme level of detail in both dark and bright areas of a scene

High-end security camera with conventional WDR

Camera with WDR-Forensic Capture
Apps for security cameras?
Open Camera Application Platform

Microprocessor
Distributed intelligence strategy

> Analytics "at-the-edge"
  - Processing significant portions of video @ camera
  - Streaming event metadata and only required video

> Benefits
  - Overcome limitations of centralized intelligence
  - Reduce bandwidth and storage consumption
  - Reduce system cost and complexity
  - Design truly scalable deployments
Uses of Edge intelligence

> Classic Uses:
  – Vehicle / People counting
  – Traffic incident detection
  – License Plate Recognition
  – Queue / Dwell Management
  – Heat mapping

> Newer Use Examples:
  – Perimeter / long range detection
  – Smoke & Fire Detection
  – Explosion Detection
  – Flare Analysis
  – Facial Expression Analysis
Detection, field of view relation

Less area - More pixels

Fewer pixels

More area

Area protection – not only perimeter
Electronic Image stabilization (EIS)

Without EIS

With EIS
Bandwidth  Storage
Bitrate Reduction
Efficient Compression
Bitrate

- Low Bitrates are appreciated
- Bitrate consumption is unpredictable
- Low in static scenes
- Higher in scenes with…
  - large motion share
  - high image complexity
  - a high noise level

GOAL: How to control the bitrate and make it predictable?
Setting MBR – Maximum Bitrate

> Artificial cap for the dynamic bitrate

> Intention: Make bitrate controllable + predictable by adding an upper limit.

> Everything above the limit is compressed harder in order to lower the bitrate

> Everything below is untouched

PROBLEM: compression level is permanently adjusted even if actual bitrate is going above the limit or falls again below
Manually setting Region of interest compression (Static ROI)

- Different zones manually defined with higher compression
- Zones are static once defined
- Problem: Difficult to predict / define an irrelevant area in professionally deployed camera
  - entire image could be typically relevant
  - event may happen in a human predicted irrelevant area, which is no good.
- So, setting MBR or static ROI is not a good thing!
- Leave the intelligence to the algorithm!
Algorithm off – Bitrate:  

Algorithm high – Bitrate:
Algorithm off - Bitrate: 15442 [kbps]. Algorithm high - Bitrate: 1950 [kbps]

Large bandwidth savings due to noise reduction
in the H.265 context

MPEG-4
up to -50%
H.264
up to -70%
H.264
H.265
up to -30%
Compression Algorithm summary

- Highest impact: Static and high noise scenes
- Reduce storage & bandwidth by an avg. 50%+
- Will not add delay
- Dynamic GOP
- Does not guarantee a certain bitrate reduction nor apply limits to the bitrate
- Algorithm prevents relevant details from being destroyed