



White Paper

Intelligent Video

Intelligent Video (IV)

Why is it an important development and how to best explore the opportunities presented by IV?

TABLE OF CONTENTS

1. What is intelligent video?	3
2. Why is it an important development?	3
3. What is Axis doing about it	4
4. How can software developers explore the opportunities presented by IV?	4
5. What applications are end users likely to see first?	5
6. What are the advantages of building IV capability into network "edge devices" themselves?	5
Conclusion	5

1. What is intelligent video?

Intelligent Video has become a much talked about phrase for the Network Video & CCTV worlds over the last two years. Much of the talk has come from Digital Video Recorder (DVR) vendors who have built intelligent video functionality into their devices to give them a new lease of life. But what is intelligent video and how can you tell the pretenders from the real Intelligent Video or 'IV' players?

Intelligent Video is about turning raw video data into actionable information and intelligence through analysis. Provision of this intelligence in surveillance (and other) video systems will support more informed, and therefore higher quality, user decision-making.

Intelligent Video is a natural extension of what Axis offers already in its network video devices. Building motion detection functionality into our network video products several years ago meant that users of our cameras only had to collect and store images when a moving object enters an area of interest. Video management software can then be used to save 'security events', essentially periods of movement, for later analysis. The job of finding key video data is made that much easier.

2. Why is it an important development?

There are two key reasons why we see Intelligent Video as being a key development. The first is that it provides scope for network video infrastructure to be used for a whole host of new applications and enables existing security systems to be made even more accurate and effective.

It is conceivable that surveillance systems deployed to trigger on motion could go further using IV functionality known variously as 'Tripwire' or 'D-fence' to demarcate a specific area within a field of view. Intelligent Video systems can configure surveillance systems so they only collect video data when specific parameters exist and when anomalies to normal movements (say employees moving directly to their cars at the end of the working day between 4.30 and 5.30pm) are detected.

The point is that systems can be set up to deliver far more targeted and specific information with IV. This means that in the future there will be far less reliance on manned guarding to spot developments which may have a security implication. Several studies have proved that hit and miss nature of reliance on human intervention to spot change in a surrounding environment. And the challenge becomes larger as systems expand. Enterprise customers today tend to just gather more video and analyse less of it without the intervention of intelligent video systems to filter out irrelevant material and alert operators to important and relevant scene changes.

Going further than this, by configuring IV systems to specific parameters, it is also possible to get near instant alerts when pre-set parameters have been breached. These enable systems to help operators to work proactively. Timely alerts wherever they are (perhaps received on their mobile phone or PDA) will enable them to investigate further and ideally head off a full scale security event.

3. What is Axis doing about it?

Firstly, Axis has committed to mount an additional chip on the printed circuit boards within its devices. This Digital Signal Processing (DSP) chip (from Texas Instruments) is dedicated to processing data associated with IV applications embedded into its devices. Axis' own chips - ETRAX and ARTPEC - continue as normal collecting, compressing and delivering high quality images for monitoring and analysis. Essentially this means that Axis is determined that the performance and quality of output of its devices will not be compromised by the introduction of demanding IV applications.

Axis has gone further to commit to build a platform for IV applications. This platform will be made up of a series of economically-priced modules which will offer basic functionality which our ADPs (Application Development Partners) can build more complex systems onto.

Axis is making it as easy as possible for ADPs by not only providing basic IV modules including 'people counting' and 'D-fence' but also creating the facility to easily download applications on top of our IV solution. Axis is providing a freely available open Application Programming Interface called AXIS VAPIX™ to this end. The intention is to make it as easy as possible for our ADPs and other IV software developers that want to become ADPs and the systems integrator community to access and embed Intelligent Video into complete video applications.

4. How can software developers and integrators explore the opportunities presented by IV?

Axis has already launched the AXIS 242S IV which is a one port video server with the DSP chip built in. This enables software developers to offer IV functionality to those using analog-based systems.

Axis is providing ADPs with its open API AXIS VAPIX for easy downloading of their applications. Software Developer Kits can also be downloaded from the Axis ADP partner web site. Essentially we aim to provide the glue between our devices and the ADP community's software so that pilot systems can be built and the benefits of IV applications explored as quickly and easily as possible.

Axis aims to stimulate the numbers of software firms building IV applications because ultimately it sees IV as yet another compelling reason to wider use of network video systems.

5. What applications are end users likely to see first?

The first IV applications that are likely to find favour with end users are people counting applications. Traditionally people counting is being used in the retail sector to count numbers of visitors to a store. These applications can be integrated with more sophisticated retail applications to study the success of a point of sale display or end of aisle sales offer in terms of 'dwell time' for example.

Network video systems can therefore continue to be deployed for multiple purposes: for **business intelligence** purposes helping retailers to increase sales and profitability through analysis of customer behaviour; **for improving the customer experience** through analysis of queuing times and observing reaction of waiting customers, helping support decisions to open new tills as queue times reach levels where they begin to detract from the customer experience. Network cameras can also be deployed to **reduce shrinkage** from till theft and spot incorrect change by triggering cameras to record on high frame rates during the periods that tills are open for example.

Another area where IV applications are likely to gain early traction are in road traffic monitoring and analysis. It is possible to perceive more widespread deployment of congestion charging by road management authorities tasked with keeping roads free from traffic jams and time tabling road repairs so as to cause minimum disruption to road users.

6. What are the advantages of building IV capability into the network 'edge devices' themselves?

Some companies that are building systems for central monitoring stations and alarm receiving centres argue that Intelligent Video systems need to be built into management solutions at the point where the actual video analysis is going to go on. Axis takes a different view. We believe there is real merit from pushing intelligence to the edge device itself – making the analysis possible directly at the camera level.

Take the example of a license plate recognition system again: it would make far more sense for a camera to be able to gather number plate images, turn them into data (a string of letters and numbers), cross check these with a driving license authority's database and then transmit only the anomalies for further analysis, than simply transmitting all video data of cars going through a point on a road.

Costs of running that system would be considerably reduced as the bandwidth, network and storage resources required would be reduced significantly. In short application developers will find it much easier to build a case for rapid return in investment through use of existing network and surveillance infrastructure by building IV functionality into edge devices including video servers and network cameras.

Conclusion

Intelligent Video will undoubtedly fuel deployment of network video technology over CCTV and hybrid technologies. Leading industry analyst IMS Research recently revised their estimate for growth of the network camera market upwards to CAGR 53 per cent (exceeding US\$1 billion by 2009) partly, as they see it, because "*network cameras will have embedded video content analysis capability to detect various behaviours or events.*" (Source: IMS Research News – Security & ID Newsletter March 2006).

IMS Research, in line with our thinking, predicts the first products with embedded IV capability will hit the market within the next 12 months. The IV market, in our view, is set to experience rapid growth in 2008.

The same update valued the IV market or, as IMS Research prefers to call it the 'Video Content Analysis Software' market, at US\$67.7 million in 2004, growing at 65.5 per cent CAGR for the next five year so that by 2009 it will be worth US\$839.2 million.

IV definitely offers a host of new reasons to use network video devices and also responds to end user desires to get more from existing network video infrastructure providing business intelligence which can be used to improve the effectiveness of organisations.