

# EVIDENCE TECHNOLOGY MAGAZINE

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## Forensic Video in the Courtroom

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# The question you need to answer: Can video evidence be trusted?



Written by Grant Fredericks

*Sergeant Bill Torley with the Michigan State Police's Forensic Video Unit insisted that his agency purchase the most advanced forensic video analysis systems available. Keeping up with the constantly changing digital-video environment is key to successfully and accurately interpreting and authenticating video evidence.*

**T**HE SCIENCE of forensic video analysis is not what it used to be. The recent migration from analog video to digital video recording (DVR) systems changed the foundation of recording technology and the way video evidence is processed. The switch from analog to digital has also brought a dramatic change to the way the courts look at video evidence.

In an analog-video world, the courts often viewed video evidence as the “silent witness” that simply spoke for itself. Jurors were frequently instructed to just trust their eyes. However, in today’s CCTV market—where no standards exist for image reliability, and where video evidence is often produced by DVR systems that are mostly mass-produced in developing countries—video can no longer be accepted at face value, nor can it be expected to accurately represent what it purports to show. In this digital world, compression, motion prediction, and enhancement technology may inadvertently change and alter the events captured by the camera.

In short: A picture may still be worth a thousand words, but the lay interpretation of that picture may be nothing more than fiction.

Interpretation of video evidence is at the heart of a video analyst’s work. In a digital-video industry void of standards, the ability to interpret video evidence accurately is dependent on the analyst’s understanding of compression. Video compression is the process of reducing the amount of data that represents the visual information. The first casualties of compression are image accuracy and detail. If the level of compression is so great that the video images no longer accurately represent what they purport to show, then the video can no longer be relied upon as a faithful reproduction of the event. But who is the judge for image accuracy?

Any investigator or prosecutor who hopes to use video in court must first ask the question of “authentication” when determining the admissibility of that video evidence. Yet, image accuracy is rarely considered, even when that evidence is crucial to

support a criminal charge, or when that evidence is presented at trial.

DVR images are often taken at face value, and, although complicated scientific technology is employed to produce the evidence, video images themselves are not normally thought to be scientific sources. At a crime scene, there is no question that accepted scientific processes dictate the collection of many different kinds of evidence, such as blood, fibers, and impressions. But video evidence is given a lower scientific priority by most agencies. In fact, first responders, who often have no video training, are relegated to the task of acquiring video evidence. The result is that the best evidence is often not collected, or due to the complicated nature of DVR technology, important evidence is accidentally deleted, altered or left undetected altogether.

“Law-enforcement agencies in the United States are losing valuable video evidence daily because of poor practices, inadequate training and lack of equipment,” said Alan Salmon, special investigator with the

Oklahoma Bureau of Investigation. Salmon is a Certified Forensic Video Analyst and president of the Law Enforcement and Emergency Services Video Association (LEVA), a non-profit organization established to teach police how to properly recover, analyze, and interpret video evidence. "I often receive video evidence from serious cases, such as homicides, robberies, and rapes, where the wrong process was used to collect the video from the computer. As a result, we have lost image quality and valuable evidence."

Salmon is among a growing number of police video experts who have received advanced training and certification in the science of video analysis. Jan Garvin, vice president of training for LEVA, said the organization receives requests from law-enforcement agencies throughout the world seeking LEVA Certification for their video analysts.

"It is shocking to think about the number of cameras that monitor cities around the world, and to know that LEVA is the only resource to offer formal training in the science of forensic video analysis," said Garvin. He added that the organization's courses often provide the only foundation for video analysis for many law-enforcement experts who testify regarding video evidence. Garvin and Salmon share a concern that many agencies simply instruct their investigators—who lack adequate training—to play the video in court with the hope that the judge or jury will see the evidence from the prosecution's perspective.

"It is becoming a concern for the courts," said Jonathan Hak, a prosecutor with Alberta Justice in Canada who specializes in video-evidence related trials. "In some cases, innocent people are being charged, and sometimes convicted, based on video evidence that should not have been presented without competent expert analysis. Because we are now dealing with digital video, which may or may not be accurate, it is not good enough anymore to simply play the video and expect the trier of fact to be able to adequately interpret the meaning of the evidence."

Hak cited the 2007 case of Claudia Muro, a Florida nanny who was accused of assaulting a baby under her care. She was recorded by a residential digital-video security system and appeared to be shaking the baby violently. Although there was no evidence that the child was injured, the video looked so clear and convincing, according to the prosecutor, that there was no need to have the video examined by an expert. However, under pressure, and immediately before the scheduled trial, the prosecutor hired a former FBI video analyst who reported that the state had misinterpreted the time-lapsed video. The appearance of "violent shaking" was an artifact (an error) of time-lapsed recording systems. There was no provable assault, and Muro was released after spending two years in prison.

British Solicitor Peter Hughman stated that in his country, limited access to training and a lack of adequate forensic video analysis equipment has led, in some cases, to the gross misinterpretation of video evidence by the courts. He warns that US courts will likely suffer the same injustices experienced by courts in the United Kingdom until qualified video interpretation becomes a prerequisite for the admissibility of video evidence.

"It is staggering that in a country

that is considered by everyone to have the most video surveillance per citizen of any country in the world, the UK continually puts innocent people in jail—often based solely on the video evidence that was left to speak for itself at trial," said Hughman.

Just last year, Hughman convinced the Crown Prosecution Service in the United Kingdom that a Portuguese man, convicted of murder and serving a life sentence in England, was actually innocent. The same video that was originally used to convict the man was later used to prove him innocent. The difference was that prior to trial, the investigator rejected a recommendation by a video expert to perform a specific analysis function.

"This is the state of our industry today," said John Kennedy, a British video analyst with Key Forensic Services who first recommended that the police take the extra step in the UK homicide case involving the Portuguese man. "Investigators lack the understanding that we are dealing with complicated video technology that might not be accurate on its face."

Kennedy blames the lack of understanding of video technology for the reluctance by many police agencies to adequately train video

## How image processing can be successful in court:



*Sometimes, all that stands between a conviction and allowing a criminal to go free are a few frames of poorly lit, grainy surveillance video. Four years following a homicide, investigators had exhausted all leads in an effort to positively identify the killer. Investigators asked the author to examine video from an ATM camera, which showed a person—whose face was hidden by shadow—using the victim's debit card to make a withdrawal. After processing the image, the author was able to produce an image that showed the person's face much more clearly. The face matched photographs of the investigation's primary suspect. As a result of this image processing, Antoine Wilson was charged and eventually convicted of first-degree murder.*



experts, and he complains that too many people claim video expertise when they really have none.

"Many people are shooting wedding videos on the weekend and then selling their services as forensic video analysts on Monday morning. They have no formal training and innocent people are going to prison," said Kennedy.

He credits LEVA training for raising the standards in the UK for video analysis, but since most of the LEVA training is offered in the United States, British police forces must travel to LEVA's training lab in Indianapolis, Indiana if they want to receive formal instruction.

"LEVA's Digital Multimedia Evidence Processing Lab, housed at the University of Indianapolis, is the best equipped forensic-video training facility in the world," said Dr. Tom Christenberry, the director of strategic operations for the university and a retired supervisory special agent with the FBI. Christenberry said the lab's international reputation for establish-

## The interpretation of video evidence is at the heart of a video analyst's work. The ability to interpret video evidence accurately requires understanding of compression.

ing its hands-on curriculum on scientific methodology and the accurate interpretation of video evidence draws video analysts from not just the US, Canada, and the UK, but from as far away as Asia, including the Middle East.

"Law-enforcement video specialists from throughout the world come to these classes and the most common feedback we get from them is that they did not realize they had been processing video incorrectly for so many years. We are very happy to be so positively impacting this developing science," said Christenberry,

"but it is a real concern to know that we are only seeing those analysts whose agencies support this level of training."

Among those agencies that value advanced forensic video analysis training is the Michigan State Police (MSP), which has sought to ensure that its analysts receive specialized certification in the science.

"All of our forensic video analysts have obtained certification from LEVA," said Sergeant Bill Torley of the MSP's Forensic Video Unit. Torley, a long-time LEVA member, has also made certain that his agency keeps up to date with the latest analysis technology. "We have invested wisely in enhancement equipment over the years," said Torley, who insisted that without the right equipment, police cannot adequately present digital-video evidence to the courts. "Just this year we purchased three of the most advanced forensic video analysis systems available to law enforcement," he added.

The MSP now has five complete Ocean Systems dTective packages, three with the Avid Nitris digital acceleration hardware. "We wanted an easy-to-use, yet powerful system that has proven to be reliable, durable, and is also one that is used by most other agencies around the country that do video analysis," said Torley.

One factor for their confidence in their video analysis tools is that both LEVA and the Department of Homeland Security's CEDAP (Commercial Equipment Direct Assistance Program) have standardized on the Ocean Systems' technology. "It is particularly helpful to know that when we obtain training in this science," said Torley, "all of the forensic-video training organizations are using the same technology that we use."

But it is not just training standardization that is helping to improve the quality of expert testimony, said Torley, who credits the proliferation of the Ocean Systems equipment with an interoperable approach to video analysis. "We can now more effectively share images and intelligence with other agencies, because



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# FORENSIC VIDEO



The Digital Multimedia Evidence Processing Lab at the University of Indianapolis gives instructors for the Law Enforcement and Emergency Services Video Association (LEVA) a state-of-the-art facility for training law-enforcement professionals how to properly recover, analyze, and interpret video evidence.

they are also using the same tools that we use.”

Kennedy agrees that equipment standardization is critical to his agency’s ability to deliver quality analysis to UK police departments, but Kennedy has taken interoperability to a new level. Not only can he instantly deliver finished-work products to any police force that has the Ocean Systems package, but he participates in peer reviewing other analysts’ work from as far away as the United States.

“Peer review is hugely important to forensic video analysts,” said Kennedy, “and since so many organizations and police forces are using the same analysis systems, we can now link our video evidence securely to other certified video experts for a complete peer review of any forensic process.”

Kennedy conducts a number of forensic-video examinations, including enhancements, reverse projection, height measurement, and photographic/video comparison. “Only recently have police agencies and video analysts been able to dynamically share visual evidence to ensure they are getting it right before they go to

court. But we have a long way to go,” he said.

Last month, Kennedy helped organize the very first photographic/video-comparison course ever offered in England. “Video-comparison evidence has been used in British courts for years, but last month’s class was the first time training in this area has been offered over here,” he said.

Kennedy acknowledged that video analysts from the US and Canada are generally better prepared in the science of forensic video analysis, and he credits their skills to the availability of LEVA training.

Daniel Goldstein, of the London Metropolitan Police Service, said that he had not previously been exposed to the scientific foundation or methodology for video comparison analysis until taking the LEVA training.

“Video evidence is just not challenged very often in British courts, and that is dangerous,” said Goldstein, who projects that the increased educational opportunities in the UK will eventually force positive changes in the courts as standards

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improve. "I think that we are going to see more challenges as the frailties of some people's evidence are exposed."

Back in North America, Hak asserted that the accurate interpretation of video by qualified experts is the only way that the courts can be confident in the reliability of video evidence. "It is my experience that the meaning of digital-video evidence is not usually obvious to the trier of fact; it normally requires narration, a

running commentary of the significance of each of the images," he said.

Narrative evidence is usually a contentious issue at trial, but Hak—who is publishing a research paper on the admissibility of video evidence—said courts have recognized the complicated nature of digital video and there is an increasing list of cases where judges have ruled in favor of the narration of video evidence. "Police-video specialists who conduct their work without the right

tools and with limited access to training are often ill-equipped to testify accurately about what the video is showing," he said.

The current debate regarding scientific evidence, prompted by the recent National Academy of Science (NAS) publication, *Strengthening Forensic Science in the United States: A Path Forward*, focuses concern on forensic applications in wide use and acceptance, despite the apparent lack of mandatory standards, certification, and accreditation. The NAS Report, which has garnered significant interest by the American Bar Association, has been used by defense attorneys as a blueprint for challenging the admissibility of almost all scientific evidence, including video.

"As we begin to see a well-orchestrated national campaign by the defense bar to challenge forensic evidence, it is increasingly important that police agencies get it right," said Garvin. He warned that law-enforcement agencies that fail to provide the right equipment and training for their video analysts will only increase the number of defendants who will demand that the courts consider the question: "Can video evidence really be trusted"? ○○○

#### For more information:

To learn more about training and certification programs available from the Law Enforcement and Emergency Services Video Association (LEVA) go to: [www.LEVA.org](http://www.LEVA.org)

#### About the Author

Grant Fredericks is a former police officer with the Vancouver Police Department in Canada and head of the agency's Forensic Video Unit. He is an instructor of Forensic Video Analysis at the FBI National Academy. He testifies as an expert in Forensic Video Analysis in courts throughout North America. Grant's company, Forensic Video Solutions, provides video analysis services for police agencies in the United States, Canada, and United Kingdom. You can learn more or contact him by going to the Forensic Video Solutions website:

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