D81 Identification of an Automobile Make and Model From Digital Video - A "Cold Hit"

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After attending this presentation, attendees will learn how automobile make and model identifications from images are performed and will learn about resources available to them.

This presentation will impact the forensic science community by alerting the attendee to resources available to assist them in automobile make and model identifications from surveillance images.

Attendees will learn how image analysts determine the make and model of automobiles recorded in surveillance video, including databases and other reference materials available to them.

Surveillance cameras can provide images that are useful in investigations. In many cases, a surveillance image from a crime scene, such as a bank that was robbed, may enable investigators to identify a suspect, either because the investigators are familiar with the subject or because a member of the public recognizes the individual. At other times, images depicting a suspected getaway vehicle may be used to generate leads or help narrow the list of potential suspects. This paper will describe an instance in which the identification of a vehicle's make and model from the surveillance images led directly to the identification of a suspect who was ultimately convicted of the crime.

A bank in Coeur d'Alene, Idaho was robbed in December, 2003. Investigators had few leads besides surveillance video. Video images depicting partial views of the robber's face were not enough to allow investigators to develop a suspect. Another piece of video evidence showed a vehicle thought to be the "getaway car", but investigators could not determine the make and model. Therefore, they sent this video to the FBI Digital Evidence Laboratory's Forensic Audio, Video and Image Analysis Unit (FAVIAU) in Quantico, Virginia. The request was made to identify the make and model of the vehicle.

When a case requesting make and model is received in FAVIAU, the first step in the forensic process is to extract the best images available from the questioned video. In this case, the surveillance video consisted of an AVI file downloaded from a digital closed-circuit television system. Once still images are extracted, they are processed to enhance the visibility of detail within the images. With the enhanced images in hand, the process of identifying the make and model of the vehicle begins with the distribution of the enhanced images to other examiners and technical personnel familiar with a wide variety of vehicles, in the hope that one of them will recognize the make and model. This process invariably leads to the identification of a number of potential candidates. These candidates are then compared by the examiner against available reference materials and the list of potential candidates is further reduced, until it is determined that no further reduction in the list is possible. The process is the same as that performed in any photographic comparison – vehicles which do not share class characteristics with the questioned vehicle are eliminated.

The FAVIAU manages a reference collection called the "National Automotive Image File" (NAIF), which contains materials collected from automobile manufacturers for over thirty years. The NAIF was started in the 1970's as an adjunct to the FBI Laboratory's automotive paint chip file, which is used in hit-and-run cases. The NAIF contains brochures, photos, slides, and digital media produced by the manufacturers for sales and marketing purposes. In the late 1990's, using funds provided by the National Institute of Justice, some of these materials were incorporated into a server-based digital database called the "Digital Automotive Image System" (DAIS). In early 2007, with the support of the Technical Support Working Group (TSWG), a DVD-based version of the DAIS was produced and distributed to over 18,000 agencies in the U.S. The DAIS includes both thumbnail and high resolution images of thousands of vehicles dating to the 1980's, and it is searchable based on parameters such as make, model, number of doors, type of vehicle and size. In addition to the NAIF and DAIS, the Internet can also serve as a valuable source of information on automobiles – especially since the NAIF and DAIS often lack information on late model vehicles.

The review of the images in the Coeur d'Alene bank robbery case ultimately led an investigator to suggest that the vehicle in question was an Oldsmobile Toronado, a vehicle manufactured in the late 1980's and early 1990s. The Toronado, a version of which was also called the "Trofeo", was not included in the DAIS, so brochures depicting this vehicle were found in the NAIF and its characteristics were compared against the questioned vehicle. As with most vehicles that are in production for more than a year or two, the Toronado underwent modifications during the course of its production run. It was found that the class characteristics of the questioned vehicle, including the passenger compartment outline and the configuration of lights, were only consistent with Toronados produced between 1990 and 1992.

Investigators took this information, queried motor vehicle records for the northern 5 counties of Idaho and located approximately 20 matching vehicles. Only one of the matching vehicles was of a color matching that of the questioned vehicle. This vehicle was owned by a woman whose husband was recognized by investigators as being consistent with the bank robber. He was subsequently arrested, tried, and convicted in the robbery.

In most make and model identification examinations conducted by FAVIAU, it is not unusual for such a search of motor vehicle records to return hundreds or thousands of possible matches. This case represented the

first known instance of a “cold hit” in which the make and model identification led directly to the apprehension of the individual ultimately convicted of the crime.

Image Analysis, Automobile Identification, Digital Video

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