

Questions About the Accuracy of Fingerprint Evidence

By Michael Cherry and Edward J. Imwinkelreid*

The combination of preexisting unresolved fingerprint issues and the widespread use of electronic imaging has brought us to a point where we can no longer assume the fingerprint evidence produced in court is accurate.

Even before the advent of the digital age, there were many nagging, unresolved questions in forensic science. For example, how much of the complete image of a crime scene latent fingerprint does the examiner need to reach a correct conclusion—95 percent, 90 percent, 80 percent? Unfortunately, there is no consensus. Moreover, again even before the arrival of digital technology, it was difficult to determine whether a photograph had been altered. The recent introduction of digital evidence has exacerbated these issues. How can you tell whether you are listening to a MP3 recording, which is an imprecise digital copy, or an original analog version? The same question arises with respect to digital versions of photographs.

This article discusses some of the troublesome issues currently surrounding fingerprint analysis. Virtually all exemplar fingerprints are now digital images, and to conserve computer resources most fingerprint repositories, such as the FBI's Integrated Automated Fingerprint Information System (IAFIS), store fingerprints as LOSSY images, which lack full detail.¹ The use of a LOSSY image calls into question any and all comparisons, since a LOSSY image is, by definition, a partial image. The FBI's false identification of Brandon Mayfield as the Madrid Bomber was based on the viewing of LOSSY partial digital images.

In addition to the problems noted above, many police departments have computer operators "touch-up" fingerprint images even before a prosecutor or fingerprint examiner is assigned to the case. They may improve contrast or they alter minutia when they attempt to electronically exclude the fingerprint from the weave of a bed sheet. Finally, most computerized fingerprint scanners are designed for fingers of average width. Narrow fingers offer fewer digitized measurements per inch. Inking and rolling a narrow finger onto paper in the traditional fash-

ion can capture the lost data and produce a different, more accurate image.

Consider the case of *People of the State of California v. Gerald F. Mason*.² Two fingerprint examiners from the Los Angeles Police Department and Sheriff's Office used image alteration software to build a thumb print by "blending" two separate partial thumb prints. The case involved a murder committed 45 years before in El Segundo, California. The police had found latent impressions on the steering wheel of a stolen vehicle involved in the case, but until the advent of computerized fingerprint technology they could not use the impression. The prints were partials. The police assumed that they belonged to the same person, but none of the prints was complete enough to permit identification.

All that changed when the technology became available. Initially, the police enlarged the partials. They then placed the enlargements on plastic transparency paper. Next, they used the transparency papers to in effect place one partial on top of the other to create a thumbprint that could be run through a database. The El Segundo Police Department lacked the technology to do so, but they persuaded the Los Angeles Sheriff's Department to enter the thumbprint into its computer and execute an Automated Fingerprint Information System (AFIS) search for matches.

The computer identified a number of potential candidates. Candidate number ten was Gerald F. Mason, a South Carolinian. Mason was the right age to have committed the murder, and he matched the physical description of the killer. The subsequent investigation uncovered other evidence incriminating Mason. Mason was eventually extradited to California where he confessed to the killing. Given the confession, the police probably got the right man.†

However, the noteworthy aspect of the case is that the fingerprint image that was compared to the AFIS database was one the El Segundo police literally manufactured.

As this example illustrates, today when the prosecution offers an image of a fingerprint or toolmark as an exhibit, the exhibit is only one of many possible versions that could be produced by the use of different equipment and settings. Different scanners, printers, screens, compressions, and settings will present such details as colors, lines, and edges differently.³ The possible multiplicity of

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† **Ed. Note:** Defense attorneys need to be aware of the existence of false confessions. Since the 1980s, a number of researchers, including Saul Kassin, PhD, Lawrence S. Wrightsman, PhD, Richard A. Leo, PhD, and Richard J. Ofshe, PhD, have been documenting and analyzing false confessions. And the Innocence Project reports that approximately 25% of the wrongful convictions overturned by DNA evidence in the United States involved false confessions. (www.innocenceproject.org/fix/False-Confessions.php.) Attorneys interested in learning more about false confessions may contact the Backup Center.

images of the same item of physical evidence raises grave concerns about the accuracy of the image that the prosecution selects to offer at trial.

Related Problems

Even if there were thorough pretrial discovery, the prosecution would still enjoy many advantages at trial. The following are some examples:

- The prosecution has the resources to “improve” an image until the exhibit suits their needs. However, the defense is not allowed to “improve” an image until the image no longer matches.
- Shockingly, sometimes even fingerprint examiners are not told that the image they are asked to analyze was “corrected” before their evaluation.
- The prosecution is allowed to review all the candidates in a database of potential matches and then select the one they want. Supposedly to protect the privacy of the other candidates, the defense is often denied the opportunity to review candidates that the prosecution expert eliminated. Often, trial judges have denied that opportunity to the defense even when the defense made it clear that they were content to have any sources’ names redacted.
- While the prosecution controls the population of the candidate search, the defense is not permitted to expand the population and search for additional candidates.

Fortunately, there is a growing appreciation of this imbalance. In an effort to level the playing field, the FBI sponsors Scientific Working Groups that attempt to develop more even-handed standards. Their Scientific Working Group on Imaging Technologies (SWGIT) drafts recommendations and guidelines for the fair use of digital image processing in the criminal justice system.

These proposals are steps in the right direction. However, they do not eliminate the problem. SWGIT is open only to active law enforcement personnel, and few of its members have a sophisticated understanding of image theory—for example, LOSSY v. LOSSLESS images. Much of the imaging group’s knowledge comes from imaging solutions vendors who, at least at a subconscious level, may be tempted to overstate their product’s capabilities and accuracy.

Harsh Reality

There are many common, comforting myths about electronic evidence. However, we must come to grips with the harsh realities: Electronic evidence lacks permanency, it can be modified, it is vulnerable to hackers, the alteration of electronic evidence is almost always visually undetectable, and our analysts need new training in its use. Further, even without the use of LOSSY compression digital images have less detail than the original impressions. Less detail means less exclusionary information.

Worldwide, there are already varying fingerprint standards. Some countries require a minimum number of points of similarity. In contrast, in other countries the examiner is permitted to find a match when the details within a small area of the latent correspond to details in the same area of the exemplar. The advent of digital technology in the courtroom necessitates that we revisit the question of a proper standard for declaring a fingerprint match and that we must also discontinue all forensic use of LOSSY compression. ☞

Endnotes

1. Images of fingerprints, scars, tattoos, crime scenes, and mug shots are often mathematically reduced in size by law enforcement agencies to conserve computer resources. The method used is called “LOSSY” compression and it produces smaller images, but some information is lost in the process. There is an alternative technique called “LOSSLESS” file compression. That method creates larger, slower files, but it does not entail any loss of detail.

2. Edward Imwinkelried & Michael Cherry, *The Myth of Fingerprints*, 27 THE CHAMPION 36 (Sep./Oct. 2003).

3. <http://abcnews.go.com/Technology/wireStory?id=4336613>. [*Ed. Note:* This issue is also discussed in *Effort made to restore photography’s credibility: Researchers developing techniques to help spot photo hoaxes*. (www.msnbc.msn.com/id/23342630/, 2/25/2008.)]

Defender News (continued from page 7)

appointed as the Allegany County Conflict Defender. Kristin F. Splain became the Monroe County Conflict Defender in June; that position had been vacant since Richard W. Youngman retired at the end of October 2008.

In St. Lawrence County, Mary E. Rain was appointed as the Public Defender. In October, after only five days as St. Lawrence County Conflict Defender, Michael Mansion, an Albany area attorney, resigned and the County is in the process of hiring a new Conflict Defender. The position had been vacant since Brian D. Pilatzke’s resignation in June. For at least part of the time the position has been vacant, assistant conflict defender Jane S. Garland has been the acting Conflict Defender.

Upon the resignation of Patrick Barber, Michael J. Mercure was appointed the interim Washington County Public Defender and will serve until the end of 2009. The County is conducting a search for a new Public Defender.

Cortland County is currently seeking a Conflict Defender after Thomas Miller resigned in September. Also in September, the Third Department heard arguments in *Goehler v Cortland County* (No. 506086), a case that challenges the legality of the County’s conflict defender office.

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