ITL FORENSICS PROGRAM

Forensic science provides one of the basic structural elements of the U.S. criminal justice system. It provides the methodologies for understanding crime scenes, identifying suspects, and prosecuting and convicting criminals while exonerating innocent people. The ITL Forensics program advances the measurements and standards infrastructure for forensic science through the application of computer science, mathematics, and statistics.

The program currently supports several forensic functions, including analysis of controlled substances, toxicology, latent prints, crime scene analysis, firearms and toolmarks, DNA analysis, digital and multimedia evidence, forensic image and audio biometrics, incident response, forensic odontology, and chemical weapons detection. Our focus in these areas is to establish measures of uncertainty, develop computational methods to help automate forensic analyses, and enhance the usability and interoperability of forensic systems. Our efforts result in forensic sciences that are more reliable, accurate, and scientifically validated.

Specific research areas in our program cover the forensic functions enumerated above. In the area of human identity, we are developing metrics and standards to accelerate development of technologies that analyze latent fingerprints, face images, iris images and voice. These technologies will aid forensic examiners in identifying potential suspects. We are enhancing interoperability of forensic systems through interface standards that include, in addition to the above evidence, DNA, scars, marks, tattoos and bite marks. We are also supporting the development and interoperability of operational fingerprint analysis and matching systems. In addition, we perform research in related human factors activities aimed towards reducing errors of latent fingerprint examiners through analysis of their work environment and development of new interaction paradigms for next-generation latent examination.

Our computer forensics research results in methodologies to test and verify the operation and output of automated programs that examine computers, including cell phones and other mobile devices, for evidence. We also provide a repository of known software, file profiles, and file signatures that are used by law enforcement and other investigators to determine the identity of files they recover. This repository is distributed as a NIST Standard Reference Database.

In the area of video surveillance, we are applying metrics and testing methodologies to advance technologies that automatically detect persons engaged in suspicious activities in the retail domain. We are also advancing technologies that detect events in video surveillance data, and technologies that track individuals through multiple camera views. These technologies will aid forensic examiners who analyze video.

Finally, our activities in statistical science provide uncertainty analysis for ballistic fingerprinting, for imaging technologies for incident response, and for seized drug analysis. We are also developing matching algorithms for mass spectral libraries with applications in toxicology and chemical weapons detection.

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