



B111 Mobility Empowered and Sustainable AFIS (MESA)

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After attending this presentation, participants will better understand the capabilities as well as the possibilities of off-the-shelf smartphone technology as a fingerprint-capture device in support of identity matching.

This presentation will impact the forensic science community by reporting on the development and testing of a novel approach called MESA (Mobility Empowered and Sustainable AFIS (Automated Fingerprint Identification System)) technology for using the forward camera on a conventional smartphone as a fingerprint-capture device. No additional sensors are used on the device. MESA represents a software-only solution and the use of this technology will greatly broaden the availability of fingerprint data for law enforcement, intelligence, and defense purposes.

This presentation will introduce MESA as a means of capturing useful fingerprint information through conventional smartphones. Smartphones are ubiquitous devices with very powerful sensor capabilities. The typical smartphone has an eight-megapixel camera which offers the opportunity for high-resolution photography of fingers and hands suitable for biometric identity matching. Fingerprints are truly the “human barcode” and among the best measures of human identity available. Fingerprints are similar to DNA as biometric identifiers because they can be obtained either directly from individuals or from items that individuals have touched or places they have been. An additional advantage of fingerprints is they are readily captured through well-proven techniques; however, “traditional” fingerprints represent only a portion of what the hand offers in terms of identity. Other data available takes the form of “palmprints” which is a class that includes not only the palm but also includes the second and third joints of the fingers and the finger sides and tips. Because the focus of current fingerprint-capture technology is on fingers, the palm class of prints is often ignored. In fact, most portable scanners have no palm capability — but smartphones, through their high-resolution cameras, do have the capability of capturing images from the palms as well as the fingers.

Underlying MESA is an innovative method for matching latent fingerprint fragments only a few millimeters in diameter. The method is based on the ridge-specific marker technology that employs a unique algorithm that establishes how well one fingerprint will overlay another and can be used for matching as well as comparing multiple images from the same finger to obtain the best composite result. This method is important when dealing with fingerprint photographs from smartphones since there are many factors — focus, movement, and image occlusion due to lighting — that can cause difficulty during the matching process.

The discussion will address the issue of standards as they relate to fingerprints generated from photographic images and touch on the issue of fingerprints as “big data” given the opportunity to expand collection. Finally, the presentation will showcase the power of smartphone fingerprint capture through a live demonstration of a fingerprint captured in real time and matched against a laptop-based AFIS. Through this presentation, all practitioners who work with fingerprints as an identification tool will become aware of how a widely used tool can become a critical asset in the identification process.

Fingerprint, Mobile, AFIS