OBJECTIVE: A software development kit (SDK) for mobile devices (iOS and Android) able to collect, process and match fingerprints from subjects (up-close and standoff) using stock rear camera. The SDK should provide (1) offline and online collection, processing and matching; (2) synchronization over disadvantaged, low-bandwidth connection when connected; and (3) online and offline matching against legacy (500 ppi), next-generation high-resolution (1000+ ppi) and minutiae-based fingerprints; and (4) advanced presentation attack detection (PAD) mechanisms. The SDK should support a wide range of import and export formats for interoperability with legacy and next-generation multi-biometric systems including support for probabilistic 1-to-many matches for partial latent collected prints from exploited sites. The SDK should be benchmarked for all conversions high resolution-to-legacy, legacy-to-high resolution and minutiae formats using NIST SP 500-305 and subsequent non-Appendix F matching methods. Finally, the SDK will pioneer a universal, open-source biometric envelope standard format to promote maximum interoperability and avoid future vendor-lock.

DESCRIPTION: Current mobile devices (phones & tablets) support specialized graphics processors and high resolution imaging cameras at low cost, but lack sophisticated biometric processing capabilities that would allow for efficient collection, processing and matching of fingerprint images at the edge. Future devices will get even more powerful in their capabilities but will lack software capabilities to exploit fingerprint image data unless software development kits (SDKs) are developed for watchlist 1-to-many matching in disconnected mode; fingerprints collected during operations; at-a-distance fingerprint image collection; backward-compatibility to legacy formats (ink and touch-based collected prints); and partial print processing and matching from site exploitation latent prints.

PHASE I: An operational, version 1.0 SDK and interoperability study to characterize the compatibility of high-resolution images with existing legacy ink & touch-based fingerprint databases based on NIST SP500-305 benchmark metrics (including PAD levels). Such an SDK will be released open source with plugin vendor drivers for biometric processing and matching engines but support version 1.0 of the interoperable biometric envelop format standard.

PHASE II: An operational, version 2.0 SDK with support for collection, processing and 1-to-many matching of latent fingerprints (including partial prints). The version 2.0 SDK will improve interoperability between legacy and next-generation (1000+ ppi and minutiae) formats, introduce new APIs for pluggable engines and re-benchmark matching (both 1-to-1 and 1-to-many) according to NIST SP 500-305 testing procedures (or subsequent NIST update editions).

PHASE III DUAL-USE APPLICATIONS: A robust globally recognized fingerprint collection, processing and matching “backbone” (or “bus”) released as open source with pluggable extensions provided by vendors that provides interoperability between legacy and next-generation (1000+ ppi and minutiae) formats.

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KEYWORDS: biometrics, fingerprint, contactless, mobile, smartphone, standoff,