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Contactless Fingerprint Capture and Data Interchange Best Practice Recommendation

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1. Introduction

In 2019 NIST orchestrated an investigation of contactless fingerprint capture technologies. This investigation included devices from multiple vendors using both mobile and stationary configurations¹. This investigation commenced with a data collection effort using these devices under controlled conditions. The investigation yielded findings documented in several studies including a thorough examination of fundamental characteristics of friction ridge imagery as collected by these devices [NISTIR 8307] as well as their impact on existing friction ridge matcher technologies [IR8307, IR8315] relative to existing contact based technologies.

Findings in [IR8307, IR8315] demonstrated a fundamental difference between images collected by contactless devices and their legacy contact-collected images that can impact matcher throughput, accuracy and forensic usability of these images thus underscoring the need to establish a way to clearly separate these new contactless images from legacy images. This Best Practices Recommendation (BPR) is based on the greater investigative effort undertaken by NIST and introduces an informative pathway that allows for the integration of contactless captured friction ridge imagery into systems for stakeholders that choose to support them, while preserving the integrity and separation of the legacy friction ridge infrastructure.

While this BPR allows for the ingestion and processing of such images, a certification process for the forensic quality of these contactless images (such as FBI's Appendix F Certification [APF]) is not yet in place, and the target audience for this guidance are stakeholders that wish to integrate these devices for piloting and test purposes right now. Acceptance of this informative BPR shall not be construed as the acceptance of contactless imagery by other stakeholders unless explicitly agreed to by all parties involved in the processing pathway.

It should be noted that this BPR is being developed with the intention of eventual amendment to the ANSI/NIST standard to formalize it as a normative guidance once the community of interest gauge the technology (including back-end components) sufficiently mature for acceptance.

This document does not directly specify the capabilities or performance of the data repository, matching system or other components in the operational use-case. Those requirements are driven by operational needs of the use-case.

2. Background

In 2004, the Fast Capture Initiative (FCI) was launched as a collaborative effort across multiple agencies within the U.S. Department of Justice to develop prototypes capable of collecting ten rolled-equivalent fingerprint impressions in 15 seconds or less. U.S. Government funded several prototypes which were produced with varying degrees of operational readiness, each with particular strengths. Since the FCI, technologies have emerged that are able to meet the requirement of fast capture speed. The devices that emerged as a result of this effort and were able to meet this speed requirement were predominantly contactless in nature. While the paramount goal of FCI was to capture fingerprints quickly, the emergence of contactless fingerprint capture seemed to be a welcomed side-effect as it emerged in the various prototype devices from the perspective of potentially limiting pathogen spread.

Contact-based capture devices have certain intrinsic challenges that may be addressed by contactless capture devices. Anecdotal evidence suggests that:

¹ The terms “contactless fingerprint capture” and “contactless devices” apply to capture devices and imagery captured by these devices that may be stationary (fixed in-place, such as sitting on a desktop) or mobile (hand held or otherwise not tethered) devices. Additionally, a capture device physically attached to a computer located in a vehicle that acquires fingerprints in a contactless fashion is also considered a mobile contactless capture device for the scope of this document.

