

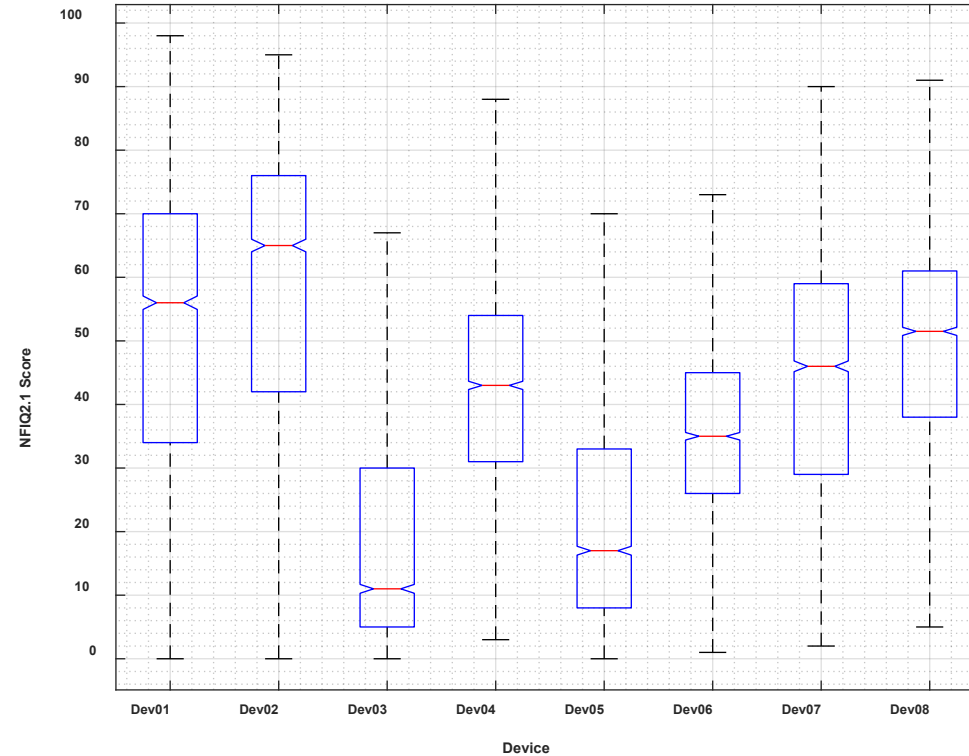
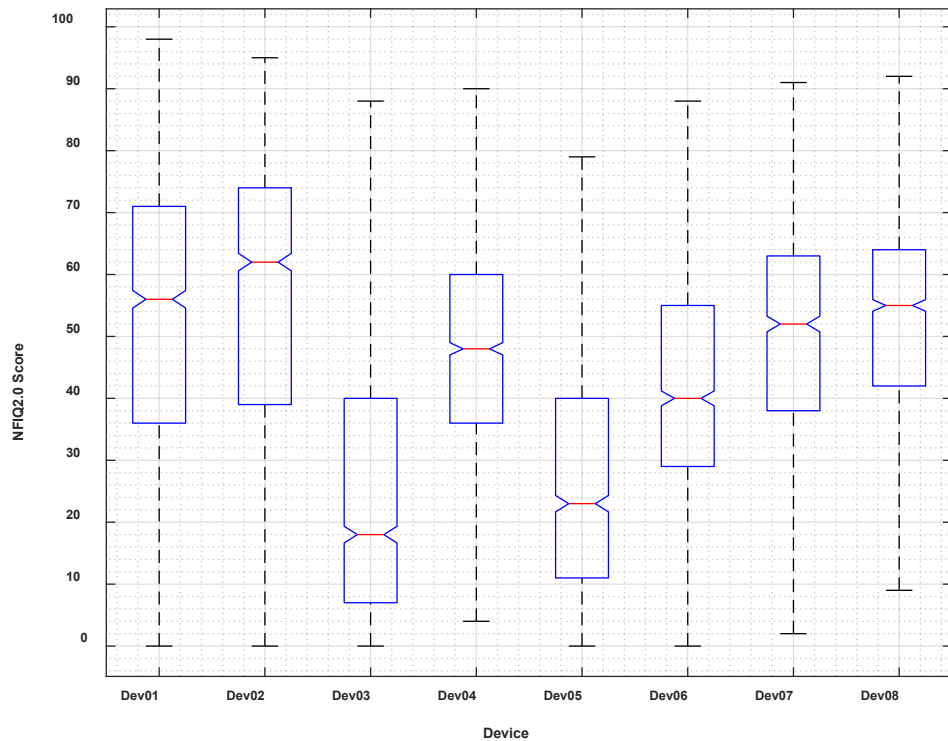
NFIQ2 on Contactless Fingerprints

Presentation to the EAB
Workshop on NFIQ2
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- Approximately 200 subjects recruited from among Federal employees of NIST
- 4-finger slaps collected from both hands using
 - FTIR “livescan” contact optical device – FBI/EBTS Appendix F certified
 - Two encounters collected from this device
 - Electro-Luminescent contact device – FBI/EBTS Appendix F certified
 - Two desktop stationary contactless devices
 - Four smartphone applications
- Contact Slaps segmented using commercial software and visually verified and edited.
- All comparisons made against first of two encounters with optical contact device.
- Results discussed in NISTIRs 8307 and 8315
 - Selected comparison metrics (NIST Special Publication 500-305)
 - Two comparison systems applied

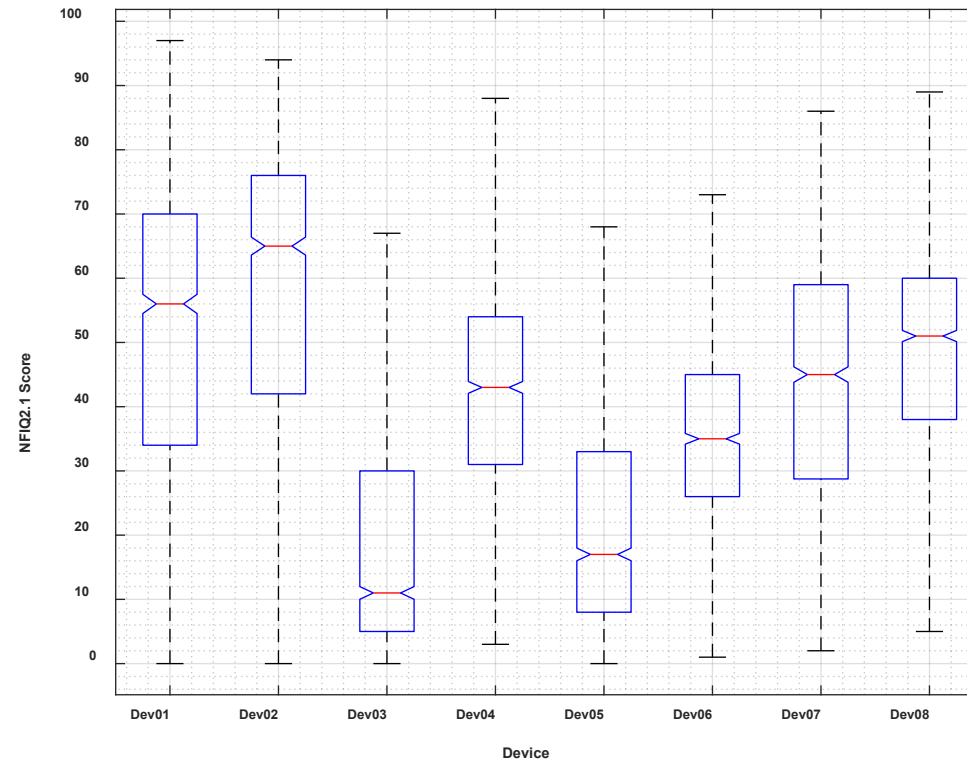
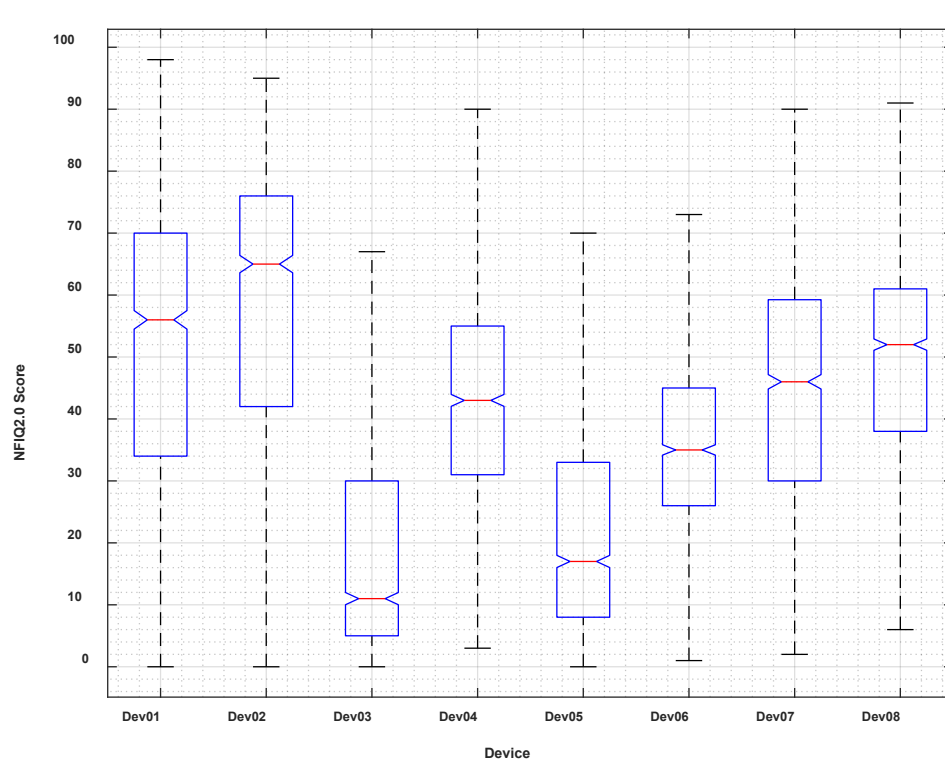
NFIQ2.0 vs. NFIQ2.1



Dev01 Contact
Dev02 Contact
Dev03 Stationary Contactless
Dev04 Stationary Contactless
Dev05 – Dev08 Smartphone

- Small changes observed between the two versions, but the trends remain
- NFIQ2.0 $N \approx 1550$ vs. NFIQ2.1 $N \approx 1427$ (strict image size req.)

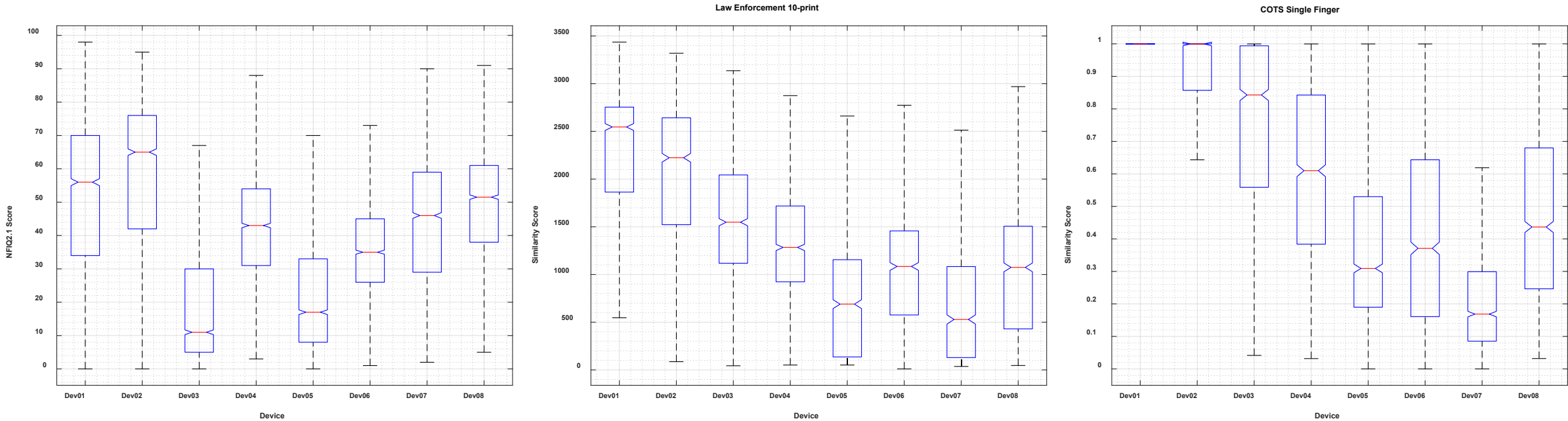
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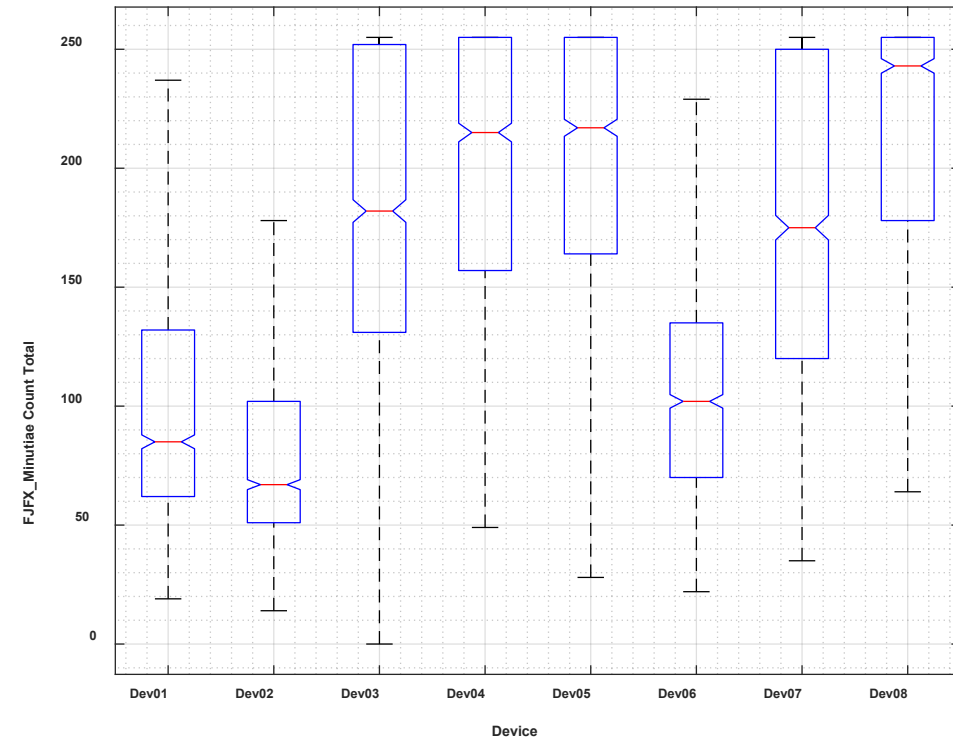
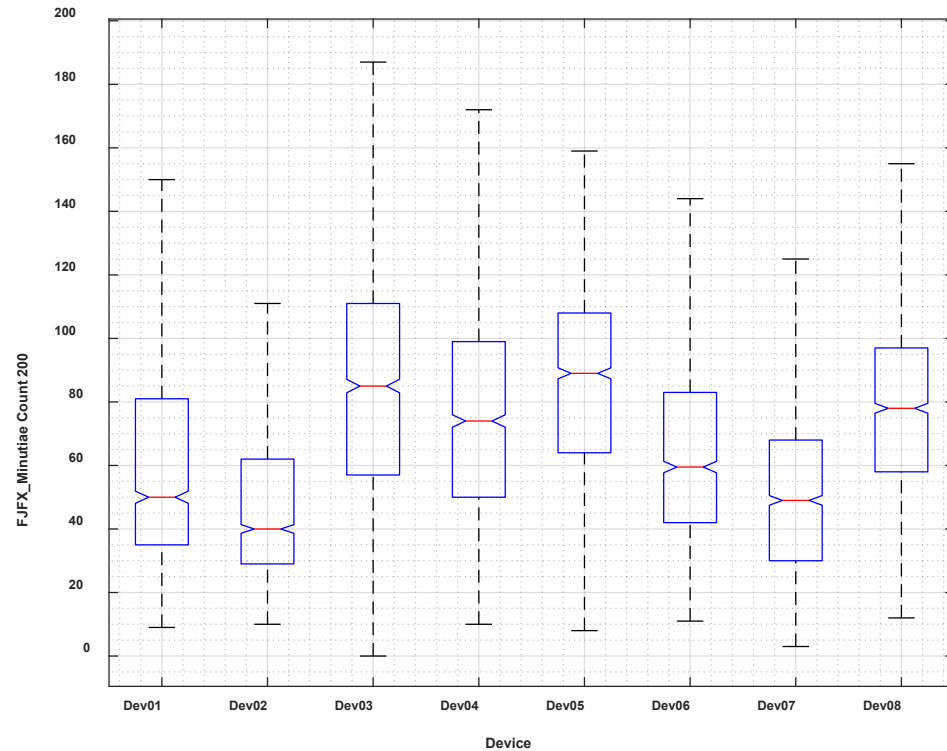
- Removing from 2.0 images that fail due to size with 2.1 brings the two plots into closer correspondence.

NFIQ2.1 vs Comparison Scores



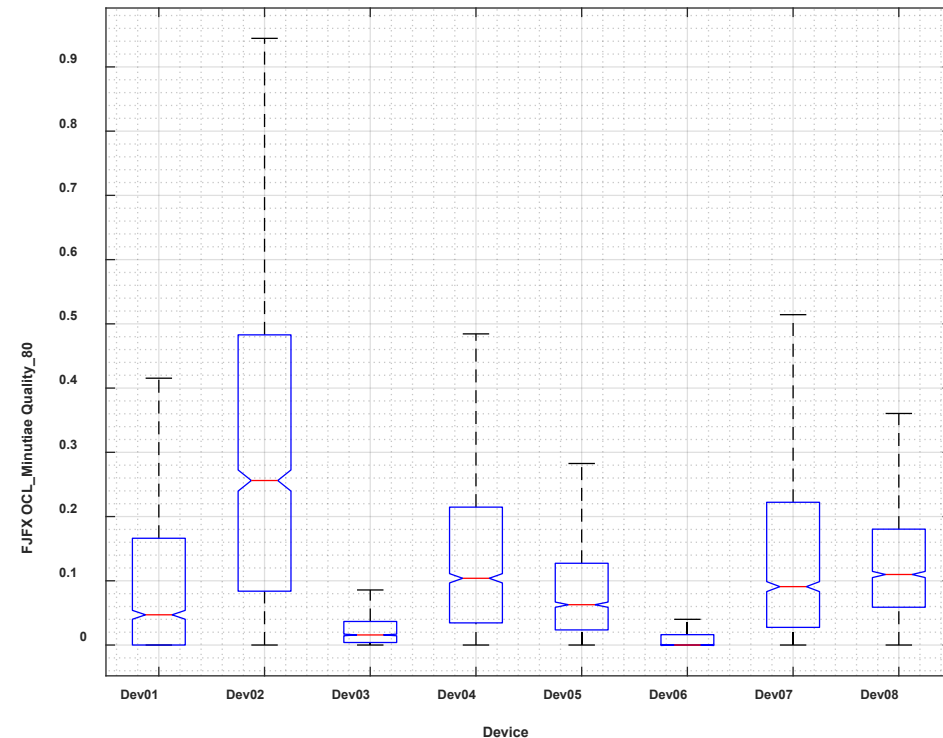
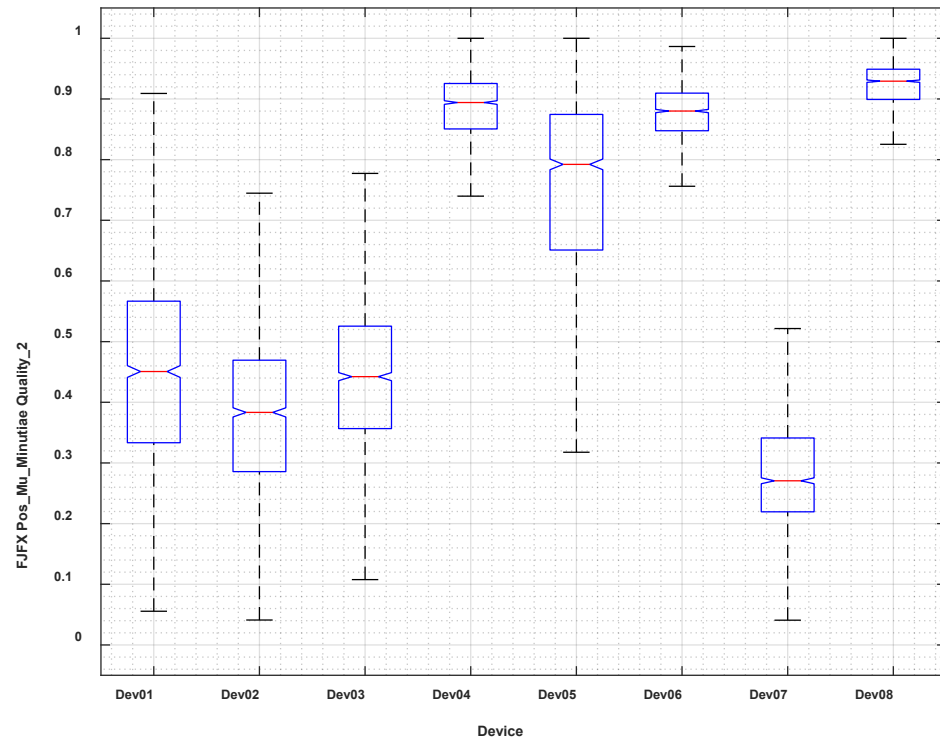
- Applied to the 2019 image sample, NFIQ2.1 correlates poorly with comparison scores of two different comparators.

Minutiae Count



- Comparison of the two counts suggests many false minutiae with contactless. (NFIQ2.1)

Minutiae Quality



It appears that the quality measure on the left is heavily weighted to contrast. Commonly we see “feature noise” – high contrast but low value. Orientation Certainty also influenced by contrast.

Possible Actions?

- Create new or alternate model retraining with contactless images.
- Overcome the current size limitation
 - Many plain impressions fail the size test with revised version
 - How much did this “bug” affect the model
 - Possibly replace FingerJet FX if difficulty with contactless persists
- Publish the NFIQ2 report

Thank you for your attention



Questions?

Publications associated with this presentation:

- NIST Special Publication 500-305
- NIST IR 8307
- NIST IR 8315