Roadmap of ELFT

Past, Present, and Future…

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Chronology

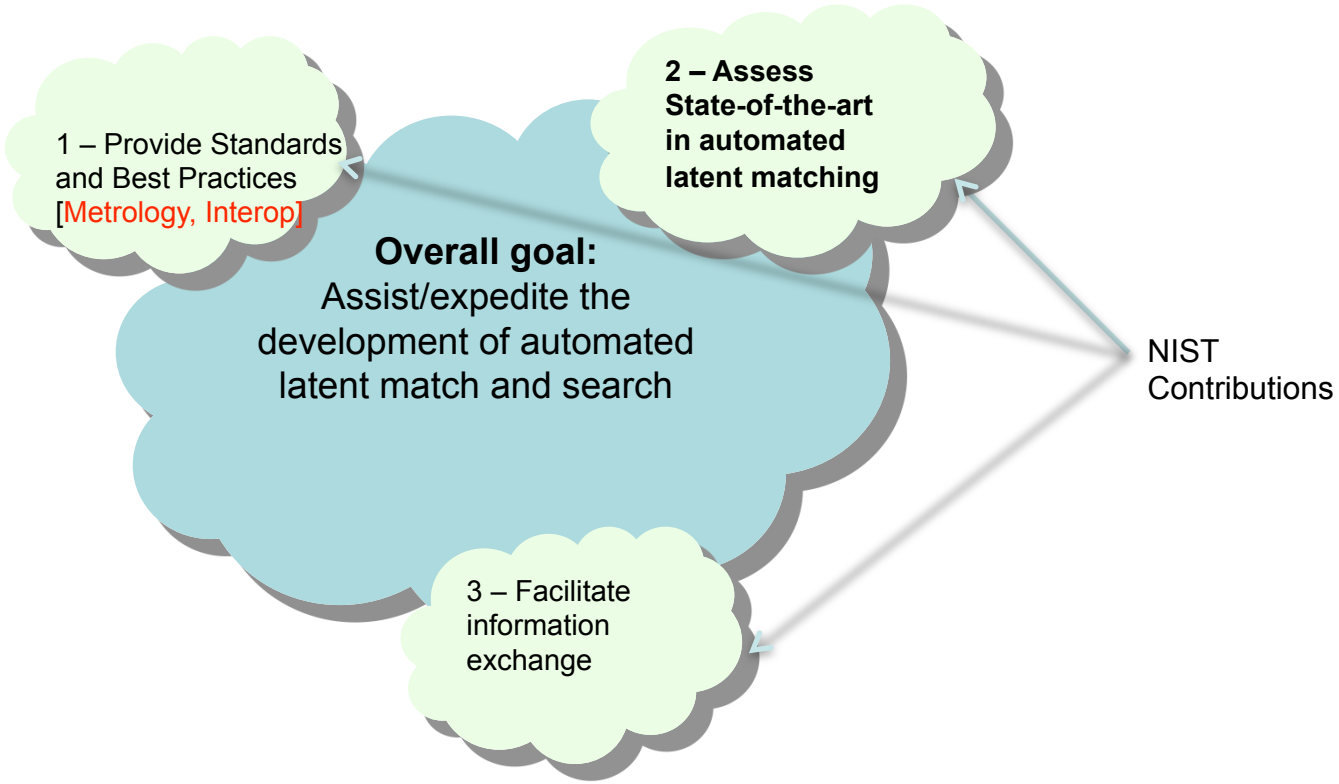
Fingerprint Community

- 1940 – FBI evaluates early automation in the form of card sorters
- 1970s – Rockwell, Autonetics Div. performs pioneering work in automated fingerprint matching (evolves to become Printrak division)
- 1975 –First automated fingerprint matcher sold (Printrak)
- 1987 – FBI Identification Division's Automated Services (IDAS) becomes operational
- 1995 – It is determined automated classification is sufficiently mature to pose low risk for IAFIS
- 1999 – IAFIS goes online
- Ongoing NGI development

NIST

- 1960s – Early work by Ray Moore and Joseph Wegstein
- 1969 – Following a two-year study, NIST determines that a minutiae-based automatic matcher is technically feasible
- 2003 –The Fingerprint Vendor Technology Evaluation (FpVTE) – first major fingerprint test conducted by NIST
- 2006 (April) – First NIST Latent Workshop
- 2006 (Nov) – ELFT07 initiated
- 2006 (Dec) –ELFT07 Concept of Operations (CONOPS) drafted
- 2007 (April) – Phase I Testing begins
- 2008 (April) –Phase II Testing begins
- 2009 (March) – Second Latent Workshop

The overall goal: to assist and expedite the development of automated latent matching and searching technology



The overall goals of ELFT are to advance automation for latent searches

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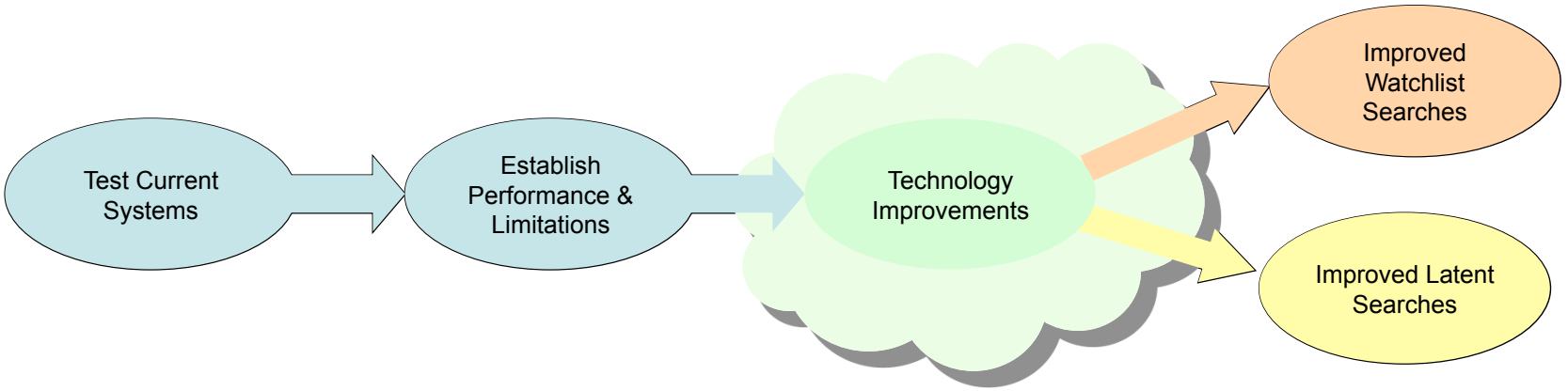


Steps that comprise a latent performance test

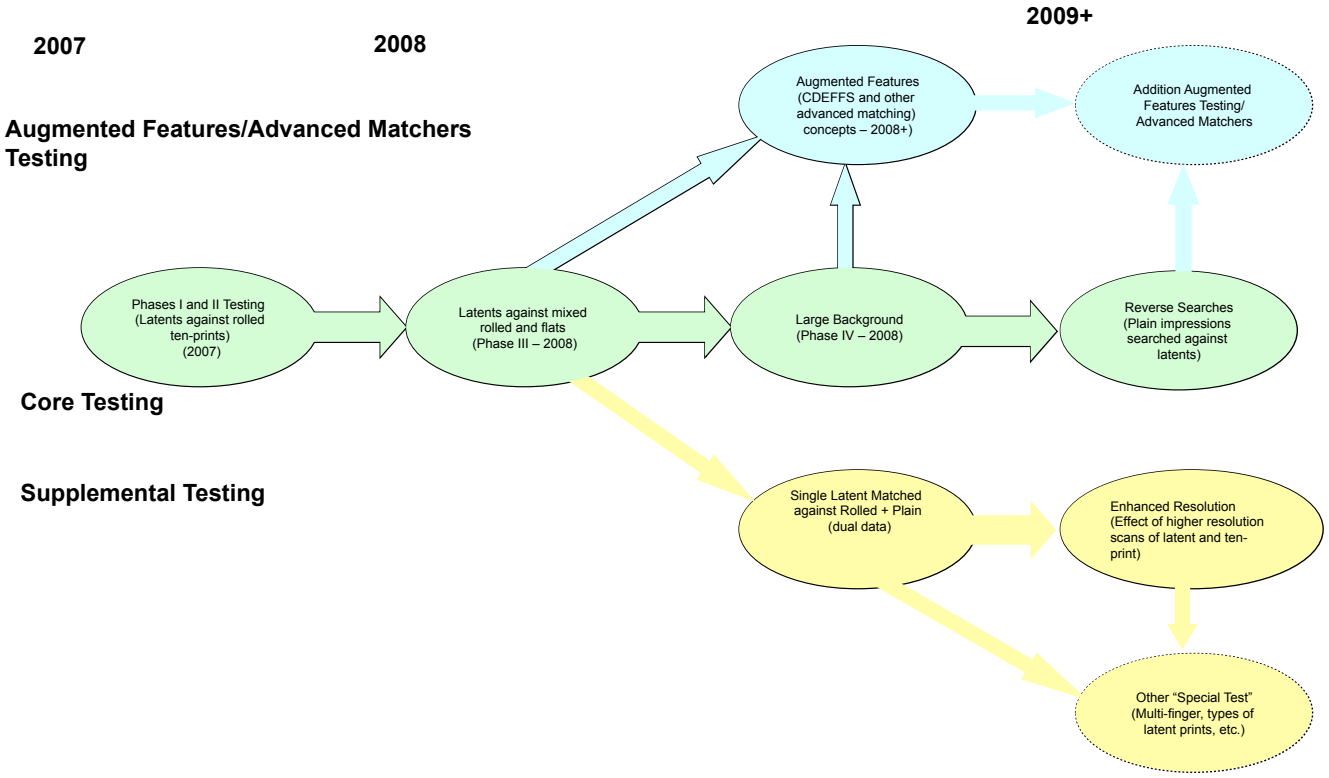
Publish
Concept of Operations
(CONOPS)
and Software API.
Create and maintain
Website.

Create/Compile
Latent Test Sets

Phases I and II Tests --Execute submitted
Software (SDK)
using NIST Computers and Test Sets.

Analyze Data.
Conduct Follow-up
Workshop.
Present results.
Discuss future
Work.

Possible directions for ELFT as originally envisioned



Automated feature extraction and matching --AFEM

- It is important to distinguish AFEM-based latent fingerprint identification from the general concept of *lights-out identification.*
- *Lights-out* identification refers to a system requiring minimal or zero human assistance in which an image is presented as input, and the output consists of a short candidate list.
- AFEM emphasizes the “front end” automated feature extraction, and does fully address the “back end” candidate list reduction
- ELFT emphasizes AFEM – but includes steps toward candidate list reduction

ELFT Phases I and II

- Series of tests initiated in 2007 (workshop '06)
  - Eleven participants (all commercial) to date
- **Phase I (2007)**
  - "proof of concept" (100 latents)
  - Public report (aggregate results, anonymous)
  - Individualized vendor reports (detailed results)
- **Phase II (2008)**
  - Operational images (800+ latents)
  - Core results to participants (March 2009)
  - Final Report (to be released)

ELFT-EFS Objectives

Evaluates:

- **Accuracy of examiner-assisted searches**
  - Effectiveness of examiner selected features (EFS)
  - Features defined by CDEFFS (proposed addendum to ANSI-NIST-ITL 1-2007)
  - Performance of image+EFS, EFS, and image (i.e. AFEM) as baseline
- **Interoperability of standardized Extended Feature Sets**
  - Repeatability of examiner markup?
  - Which features “work” across multiple matchers?

ELFT-EFS Test Plan

- Two tests announced in November 2008
- **Test I (March 2009 – Kick off workshop)**
  - "challenge problem" (take home test)
  - SD27-1000 (with "juried" EFS markup) and SD30
  - EFS supp. CDEFFS devel. (prop. mods to ANSI/NIST)
- **Test II (Spring-Summer '09)**
  - Sequestered images
  - *SDK* test executed by NIST & Noblis
  - *Includes an image-only (AFEM) test*

Future Directions

- Automatic determination of matching method (AFEM or human-assisted?)
- Latent print quality metrics
- Reverse latent searches (watch lists, UL files)
- Fully automated EFS extraction
- Fusion (latent prints, rolled and flat ten-prints)
- Latent fingerprint reference data

For More Information…

Web ➔ http://fingerprint.nist.gov/latent

Email ➔ latent@nist.gov

Thank you!

Questions?