Evaluating Automated Finger and Palm Latent (*Marks*) Searching

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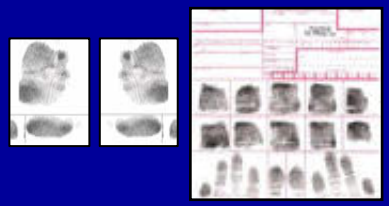
Definitions

*The term "**mark(s)**" will be used to refer to **latent** finger or palm impressions that are left at crime scenes and used for investigations.*

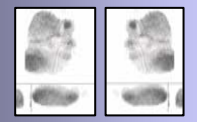
IDENT1



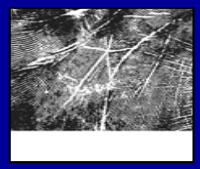
P-P

National ten print and palms collection

6.4 million people



M-P

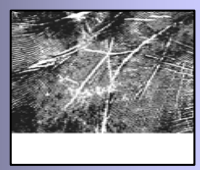


20% of adult male and 12% of adult female population

P-M

M-M

1.2 million latent sets



National Unidentified Scene of Crime marks (*Latent impressions*) collection

Serious Crimes Cache

Operational Response Unit

P = Print

M = Mark (Latent)

Performs the searches for Fingers and Palms

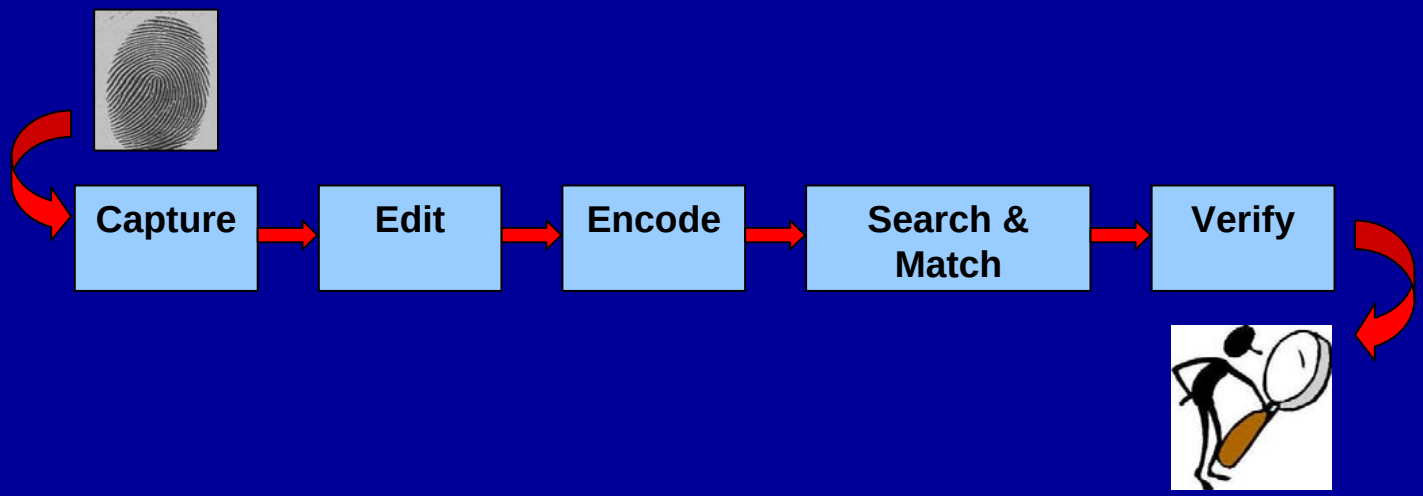
IDENT1

- **6 million** fingerprint comparisons per second
- **100,000** records of arrest processed per month
- **100,000** crime scene marks searched per month
- **4000** people per month are positively identified from searching marks left at crimes scenes on IDENT1
- Over **1200** fingerprint experts involved in marks searching across 43 bureaux in England and Wales.
- **300** hits against the palm DB within the first month of operational palm searching

Approach

‘Operational’ Evaluation:

- The process used by PITO to determine the ‘*end to end*’ search accuracy of the system during operational use



Defining Requirements

Evidence of operational benefit

- Compliance with requirements
- How many times does it find a match (*quantity*) and how well (*quality*)?

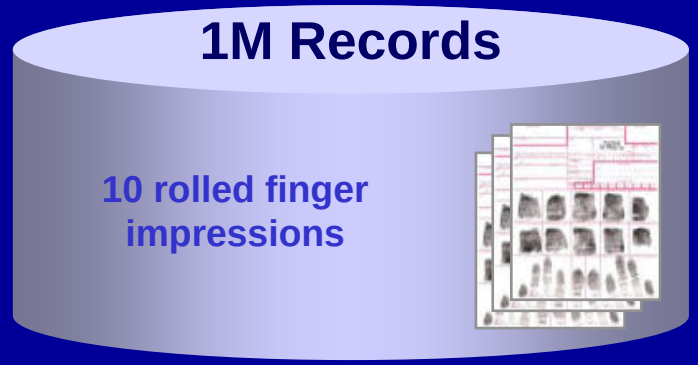
Assessing Reliability Vs Selectivity

- For print to print both are equally important
- For marks of poor quality or from serious crimes just finding the match is of significant value!

What was benchmarked?

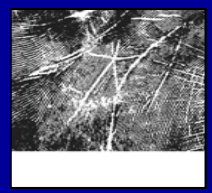
500 P-P

500 M-P (Fingers)



- Included Palms searching
- Construction of test database of marks was too complex thus P-M and M-M searches were omitted from scope

500 P-P



500 (Palm) M-P

P = Print

M = Mark (Latent)

Design Factors

The following were essential factors to consider in order to <u>maintain a level playing field</u>

- **System Independent**
  Must be able to carry out the same test on/for any proposed solution

- **Repeatable**
  Tests must be duplicated for each supplier

- **Operationally Representative**
  A fair assessment relevant to the purpose of the system

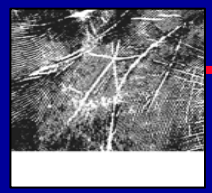
→ Differing approaches to latent searching

→ Latent processing is reliant on fingerprint expert input which is subjective and variable

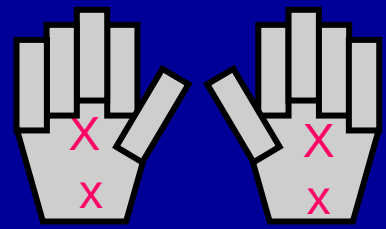
→ End to End assessment – not repeatable and reliant on fingerprint expertise

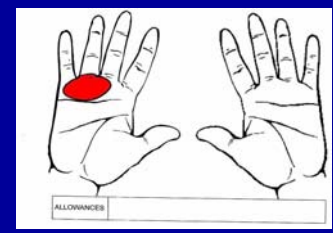
Example: Allowances

Search Specifications/ Allowances were predetermined by Fingerprint Experts who evaluated all enquiry data



RT, RF, RM, RR, RL, LT, LF, LM, LR, LL





Difficult for palms as there was no generic method of allocating a palm allowance as with fingers. Allowances had to be pre defined to prevent subjectivity.

Test Controls

- **Test Teams**
  - 10 fingerprint experts per benchmark
  - Equivalent in experience and expertise
- **Training**
  - 2 full days
- **Environment**
  - Reflective of a ‘typical’ bureau

Marks Composition

- The chosen data was randomly selected, reflecting the following criteria:
  - 16% Chemical Marks
  - 50% of remaining Marks are Lifts
  - 50% of remaining Marks are Photos

Summary/Recommendations

- **Benefits**
  - To better **assess** the **merit of** the **differing approaches** adopted in the suppliers' proposed technical solutions
  - Better understanding of **operational advantage** of system
  - To **quantify a standard** beyond which IDENT1 search accuracy should **improve** throughout its operational life.
  - To give the **Police Service** the **assurance** that the search accuracy of the IDENT1 System will meet their needs.

References

For more information about the IDENT1/ NAFIS benchmarks please see the references listed below or email **ambika.suman@pito.pnn.police.uk**

- Benchmarking the Operational Accuracy of a National Identification System", *published in SPIE Journal Proceeds of Defence and Security, 2005*
- Human Factors that affected the assessment of NAFIS", *KES Conference Proceedings, 2004*
- Biometric Consortium 2005 (BC2005) IDENT1 Evaluation Benchmarks www.bc2005.org

For more information on PITO visit **www.pito.org.uk**