Evaluating Automated Finger and Palm Latent (Marks) Searching

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

IDENT1

National ten print and palms collection

6.4 million people

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

1.2 million latent sets

National Unidentified Scene of Crime marks (Latent impressions) collection

Operational Response Unit

Performs the searches for Fingers and Palms

P = Print
M = Mark (Latent)
• 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
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?

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

P = Print
M = Mark (Latent)
The following were essential factors to consider in order to maintain a level playing field

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

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
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
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.
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*

For more information on PITO visit [www.pito.org.uk](http://www.pito.org.uk)