AFIS Project

High Level Plan

AFIS Accuracy Benchmark Test Plan
Oklahoma State Bureau of Investigation
Public Safety Business Segment

Project Notes:

Plan to perform accuracy bench mark test to validate biometric search accuracy of a potential fingerprint based identification system.

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EXECUTIVE SUMMARY

The Oklahoma State Bureau of Investigation (OSBI) provides the repository of criminal history data for the state. The criminal history data is supported by a Finger print based Identification System (AFIS) to provide the positive identification of criminals for processing and storing criminal and civilian data on the state's repository. Furthermore, the AFIS system supports criminal cases by providing latent print search capability to solve crimes against a high quality finger and palm print data. At this time the State is looking to upgrade/replace this current 2nd generation AFIS with a much robust and more accurate technology to provide the services outlined above.

This test plan is to guide the vendor's who will be participating in the responses to the RFP for the replacement/upgrade of the AFIS system to prepare and perform the accuracy benchmark tests as outlined in the RFP. The test will be conducted jointly with the selected vendors and the OSBI technical project staff.

The final determination and decision on assigning points and selection is entirely up to the Oklahoma Stet Bureau of investigation regarding this test. The test results will significantly impact the overall score of the RFP proposal review and evaluation.

PROJECT SCOPE

The scope of this benchmark effort is limited to the following controlled tests:

1. Ten Print Search Accuracy (**TPSA**) Tests.
2. Latent Print Search Accuracy (**LPSA**) Tests.
3. Palm Latent Print Search Accuracy (**PLSA**) Tests.
4. Two Finger Search Accuracy (**TFSA**) Tests.
5. Ten Print Reverse Search Accuracy (**TPRSA**) Tests

Candidate System Test Environment Setup:

The selected vendor shall be required to setup the test environment and disclose the configuration and preparation plan to the OSBI technical team. The main just of the test is to test the accuracy of the biometric search algorithm when challenged with the production type biometric samples that are prepared by the OSBI technical team.

The OSBI current AFIS database is NIST-ITL-2000 compliant database stored in Oracle 10G environment where the fingerprint images are stored as BLOB in the oracle database.

The size and content of the benchmark database is set to the following conditions:

1. The selected vendors are expected to perform full export of the 2 million OSBI 10 print database.

2. Optionally the OSBI may elect to use one million 10 print records from the OSBI database selected via randomizer that is approved by OSBI technical team.

3. The benchmark database shall be designed to be representative of the OSBI database size and quality.

The composition of the sample test deck will as follows:

1. 1000 10 print person to person search with known candidates of varying image quality to test 10 print forward search accuracy.

2. 2000 10 print person to person search with no candidate in the database to test for false hits.

3. 500 10 print person to latent searches with 20% of the prints having known latent print matches in the latent print database for reverse search accuracy tests.

Test System Hardware & Software set up:

1. Vendors shall provide adequate storage and compute to sufficiently conduct the test.

2. Vendors shall declare the versions of the matching algorithm that has been in production for at least 2 years in similar environment like the OSBI's state public safety business.

3. The test system once configured and loaded with the algorithm that is bid for this project, it has to be verified with the state technical team and both vendors that are selected to be the top candidates for the benchmark test.

4. The vendors is expected to prepare all necessary programing and scripting needed to extract and transfer the test database from the OSBI's production environment on to staging storage. Once extracted, the same test data shall be loaded by each vendor to their test system in the presence OSBI and the second vendor personnel to maintain transparency of the test.

5. The loaded and configured test system shall be secured by the OSBI personnel and locked in a test area until the tests are conducted.

6. During the testing, it is encouraged that both vendor personnel to be on site but not required. However, the vendor whose algorithm is being tested is required to be present during the test.

7. Test schedules will be provided 2 weeks in advance to each candidate, vendors who are not present for their scheduled tests shall be disqualified and their benchmark scores will not be considered during the final evaluation.

ACCUIRACY PARAMETERS & REQUIREMENTS

10 Print search conditions:

The 10 print test shall be conducted on the exported database of the OSBI's full ten print database. Optionally the OSBI may select to use minimum of a million 10 print records to be exported from the OSBI database using a suitable randomizer to select the records. The search will be conducted on "lights out" basis using 10 rolled prints plus slaps for each 10 print record. Full automated minutia plots with expert matching and automated QC performance with no operator intervention is required during the test.

1. The 10 print database shall have the quality of data that is equivalent to the OSBI AFIS.

2. The 10 print database shall be inclusive of the 1000 select search candidate cards that are prepared by OSBI.

3. The 10 print search when conducted the known candidates shall be presented at rank #1 99.9% of the time.

4. The 10 print acquisition false reject rate of 0.01% is acceptable.

5. The 10 print search when conducted shall average less than .1% misses.

6. The 10 print search when conducted using the 2000 cards test deck, shall average less than .01% of false hits.

Note: "Lights out" is defined for the purposes of the ten print forward and reverse search tests such that; no ten print examiner shall be involved in the test, the algorithm is expected to automatically process the ten print images captured and conduct the matching. Furthermore, the algorithm will rank the search result and shall present it in the order prescribed in the test to get the maximum score.

Finger Latent Print search conditions:

The latent print test will be conducted in lights out and in expert mode setup. Lights out is defined as the system will identify the minutia plot from an area identified to be of interest by the latent print examiner. Expert mode is defined where a latent print examiner makes the call of the minutia placement, this may include the core and delta where appropriate using best practice methods. Gender will not be used as filter.

1. Finger latent print searches conducted using "lights out" scenario that will contain 100 latent images with minutia counts above 7, the test latent images will have a known 10 print match in the database. After the search is completed a match shall be presented ranked in the top 5, 82% of the time.

2. Finger latent print searches conducted using "Expert" scenario that will contain 100 latent images with minutia counts above 7, the test latent images will have a known 10 print match in the database. Expert latent print examiner will process the latent print for searching. After the search is completed a match shall be presented ranked in the top 5, 90% of the time.

3. 10 print reverse searches matching known latent images with minutia counts of minimum 7, using "lights out" scenario, after the search is conducted a match shall be presented ranked in the top 5, 75% of the time.

4. Finger latent print false hit rate shall not be more than 1%.

Palm Latent Print search conditions:

1. Palm latent print searches with latent images that have more than 7 minutia identified shall be tested using fully automated "lights out" search but have known palm print in the database to match, shall be presented on the top 5, 80% of the time and in the top 10, 87% of the time.

2. Palm latent print searches will contain latent images with minutia count of 7 but have known print in the database to match shall be presented on the top 10, 80% of the time.

3. Palm latent false hit rate shall be not be greater than 1%.

Note: "Lights out" is defined for the purposes of the latent palm and latent print test such that; the latent print examiner shall select an area of interest by drawing a polygon and submit the test to the algorithm to automatically process the latent and conduct the matching. Furthermore, the algorithm will rank the search result and shall present it in the order prescribed in the test to get the maximum score.

SEARCH DECK PREPARATION

The OSBI team will select a test deck for all of the tests identified above and will present them to the selected vendors for inspection prior to the test. Any discrepancies or duplicated errors will be corrected prior to the test being conducted. The same test deck will applied to all the tests as appropriately determined. The following is the composition of the test deck.

10 print test Deck:

1. 1000 ten print cards will be selected with a match embedded in the main test database. These cards will be selected randomly.

2. 2000 ten print cards will be selected with no match in the main test database. The quality of these test cards will vary to be representative of the 10 print cards the OSBI gets from the submitting agencies.

3. 500 ten print cards will be processed with the intention to match 100 latent prints in the database for reverse search accuracy tests.

Latent Print test deck:

1. 100 Finger latent prints of varied quality will be prepared to be used in the various finger latent print and ten print reverse searches. A matrix will be prepared to account for the known characteristics of the finger latent prints and the ten print candidates chosen for reverse search testing.

2. 50 Palm latent print images of varied quality will be prepared to be used in the various palm latent search tests. A matrix will be prepared to account for the known characteristics of the palm latent prints and the palm print candidates chosen for the palm latent print search testing.

TEST RESULTS TABULATION			
ITEM	TEST TYPE	RESULT	COMMENTS
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BUDGET

To be included in the AFIS procurement as mandatory requirement, for cost containment in the benefit of time the benchmark tests will only be conducted with the top 2 candidates that qualified for the test.

PEOPLE

While majority of the test specification and preparation will be developed and implemented by vendors, this will involve State ten print examiners, Latent print specialist staff and technology staff to conduct the tests and evaluate the test results. These benchmark tests are designed to be meticulous and time consuming but are necessary tool to adequately evaluate this technology such that the best algorithm is selected not to compromise the value of AFIS and its use in support of criminal justice services.

GAP ANALYSIS

This section documents/Identifies any known logistical or otherwise gaps that need to be considered that may have impact the benchmark test administration or accommodations/modifications that are allowed in the test. However, no accommodations shall be allowed that compromise the merits of the test.

Issue	Resolution

CONTACT INFORMATION (OMES, OSBI, VENDOR)

OMES/OSBI CONTACTS		
Name	**Title**	**Contact Information**

OUTSIDE Vendor		
Name	**Title**	**Contact Information**

EXECUTION SIGNOFF

SIGNATURES OF REVIEWERS OMES/VENDOR/OSBI			
Name	**Title**	**Signature**	**Date**

APPENDIX B – GLOSSARY

Item	Description
AFIS	Automated Fingerprint based Identification System
OCPD	Oklahoma City Police Department
OCSO	Oklahoma County Sheriff's Office
TOT	Type of Transaction
TCN	Transaction Control Number
NIST	National Institute of Standards and Technology
Type-1	NIST record type that defines transactional characteristics in the NIST standard for exchange of fingerprint data
Type-2	NIST record type that specifies State defined descriptor data as part of the NIST standard for exchange of fingerprint data
CJIS	Criminal Justice Information Systems