

Participant Results

Proprietary Fingerprint Template Evaluation II (PFT-II)

Participant 4B — Beijing Hisign Technology Co., Ltd.

Image Group

Information Access Division

Information Technology Laboratory



Contents

| | | |
|---|----------------------|----|
| 1 | 1K Sample Evaluation | 3 |
| 2 | Full Evaluation | 5 |
| 3 | Original PFT Dataset | 13 |

List of Figures

| | | |
|---|---|----|
| 1 | 1K Sample Evaluation – Template Size Distribution | 3 |
| 2 | 1K Sample Evaluation – Enrollment and Comparison Timing | 4 |
| 3 | Full Evaluation – DET for POEBVA, DHS2, AZLA, and combined from R Index, L Index, and R/L Index | 5 |
| 4 | Full Evaluation – DET for all finger positions from AZLA | 6 |
| 5 | Full Evaluation – EERs and FTEs | 7 |
| 6 | Full Evaluation – FMR@FNMR = (0.002, 0.005) and 95% Confidence Intervals | 8 |
| 7 | Full Evaluation – FNMR@FMR = 0.0001 and 95% Confidence Intervals | 9 |
| 8 | Original PFT Dataset – DET | 13 |

List of Tables

| | | |
|----|---|----|
| 1 | Sample Dataset — Template Size Distribution | 3 |
| 2 | Enrollment Times (sec) | 4 |
| 3 | Comparison Times (sec) | 4 |
| 4 | EER and FTE — Dataset AZLA | 10 |
| 5 | EER and FTE — Dataset DHS2 | 10 |
| 6 | EER and FTE — Dataset POEBVA | 10 |
| 7 | Details for FNMR@FMR = 0.0001 and FMR@FNMR = (0.002, 0.005) — Dataset AZLA | 11 |
| 8 | Details for FNMR@FMR = 0.0001 and FMR@FNMR = (0.002, 0.005) — Dataset DHS2 | 12 |
| 9 | Details for FNMR@FMR = 0.0001 and FMR@FNMR = (0.002, 0.005) — Dataset POEBVA | 12 |
| 10 | Details for EER, FNMR@FMR = 0.0001, and FMR@FNMR = 0.005 — Original PFT Dataset | 13 |

1 1K Sample Evaluation

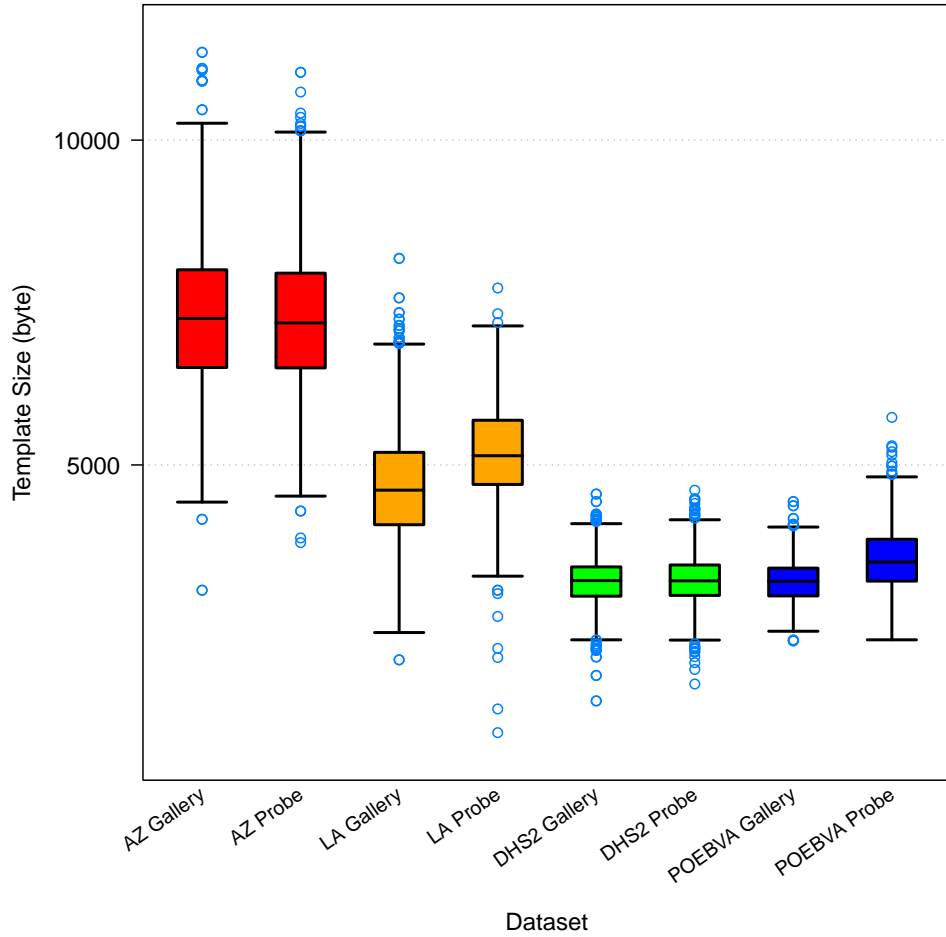


Figure 1: 1K Sample Evaluation – Template Size Distribution

| | AZ | | LA | | DHS2 | | POEBVA | |
|-------------------|---------|---------|----------|---------|---------|---------|---------|---------|
| | Gallery | Probe | Gallery | Probe | Gallery | Probe | Gallery | Probe |
| <i>Dimensions</i> | 800x800 | 800x800 | 412x1000 | 400x776 | 368x368 | 368x368 | 500x500 | 368x368 |
| <i>Maximum</i> | 11352 | 11044 | 8180 | 7724 | 4552 | 4612 | 4436 | 5732 |
| 75% | 8004 | 7952 | 5194 | 5688 | 3430 | 3460 | 3412 | 3856 |
| <i>Median</i> | 7254 | 7186 | 4612 | 5142 | 3220 | 3216 | 3208 | 3506 |
| 25% | 6500 | 6494 | 4080 | 4700 | 2980 | 2992 | 2984 | 3212 |
| <i>Minimum</i> | 3072 | 3804 | 2000 | 880 | 1368 | 1628 | 2292 | 2308 |

Table 1: Sample Dataset — Template Size Distribution

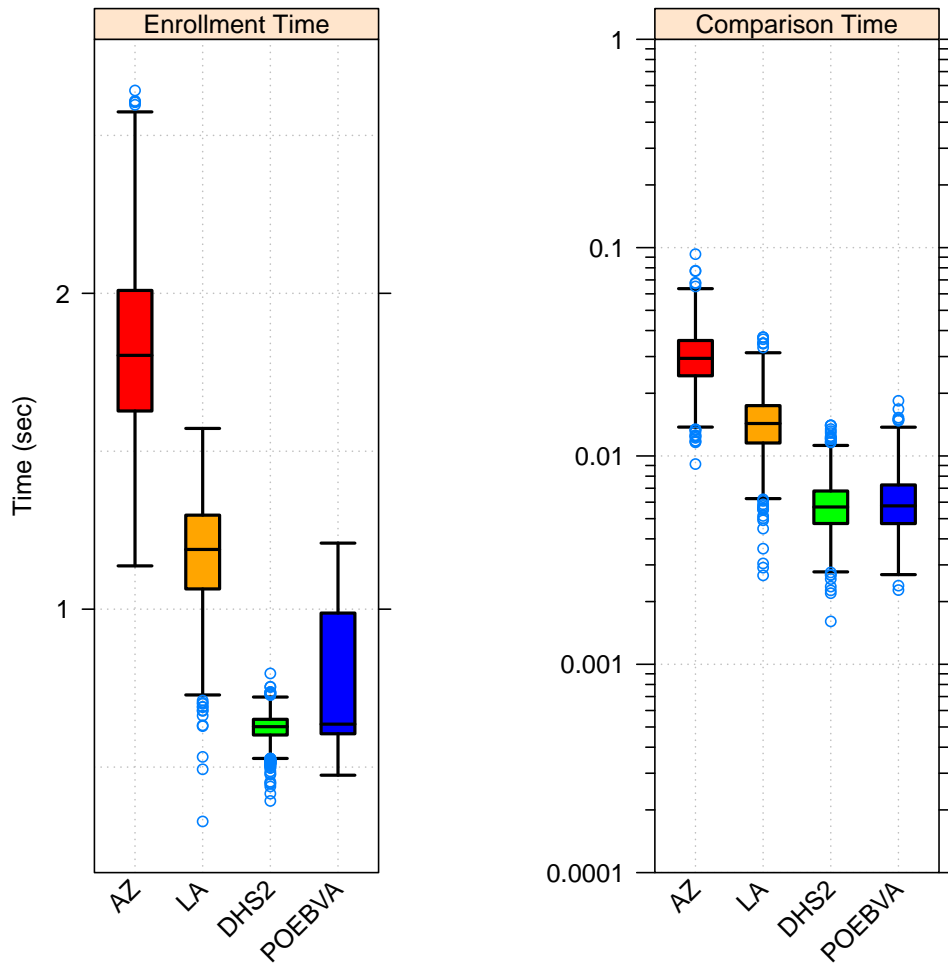


Figure 2: 1K Sample Evaluation – Enrollment and Comparison Timing

| | AZ | LA | DHS2 | POEBVA |
|----------------|-------|-------|-------|--------|
| <i>Maximum</i> | 2.642 | 1.572 | 0.797 | 1.209 |
| <i>75%</i> | 2.009 | 1.298 | 0.651 | 0.988 |
| <i>Median</i> | 1.804 | 1.189 | 0.628 | 0.636 |
| <i>25%</i> | 1.627 | 1.064 | 0.602 | 0.605 |
| <i>Minimum</i> | 1.137 | 0.328 | 0.393 | 0.474 |

Table 2: Enrollment Times (sec)

| | AZ | LA | DHS2 | POEBVA |
|----------------|-------|-------|-------|--------|
| <i>Maximum</i> | 0.093 | 0.037 | 0.014 | 0.018 |
| <i>75%</i> | 0.036 | 0.017 | 0.007 | 0.007 |
| <i>Median</i> | 0.029 | 0.014 | 0.006 | 0.006 |
| <i>25%</i> | 0.024 | 0.012 | 0.005 | 0.005 |
| <i>Minimum</i> | 0.009 | 0.003 | 0.002 | 0.002 |

Table 3: Comparison Times (sec)

2 Full Evaluation

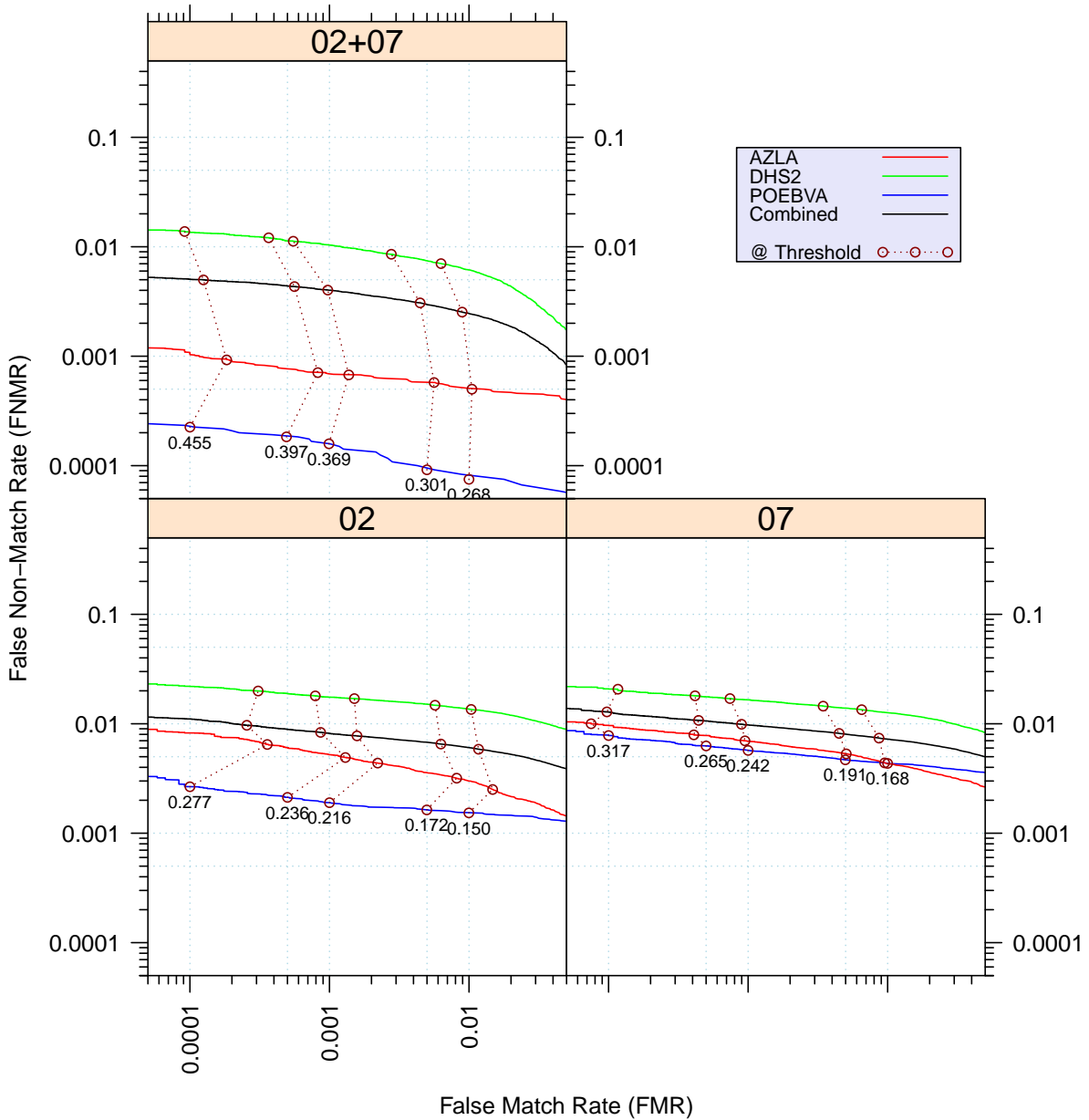


Figure 3: Full Evaluation – DET for POEBVA, DHS2, AZLA, and combined from R Index, L Index, and R/L Index

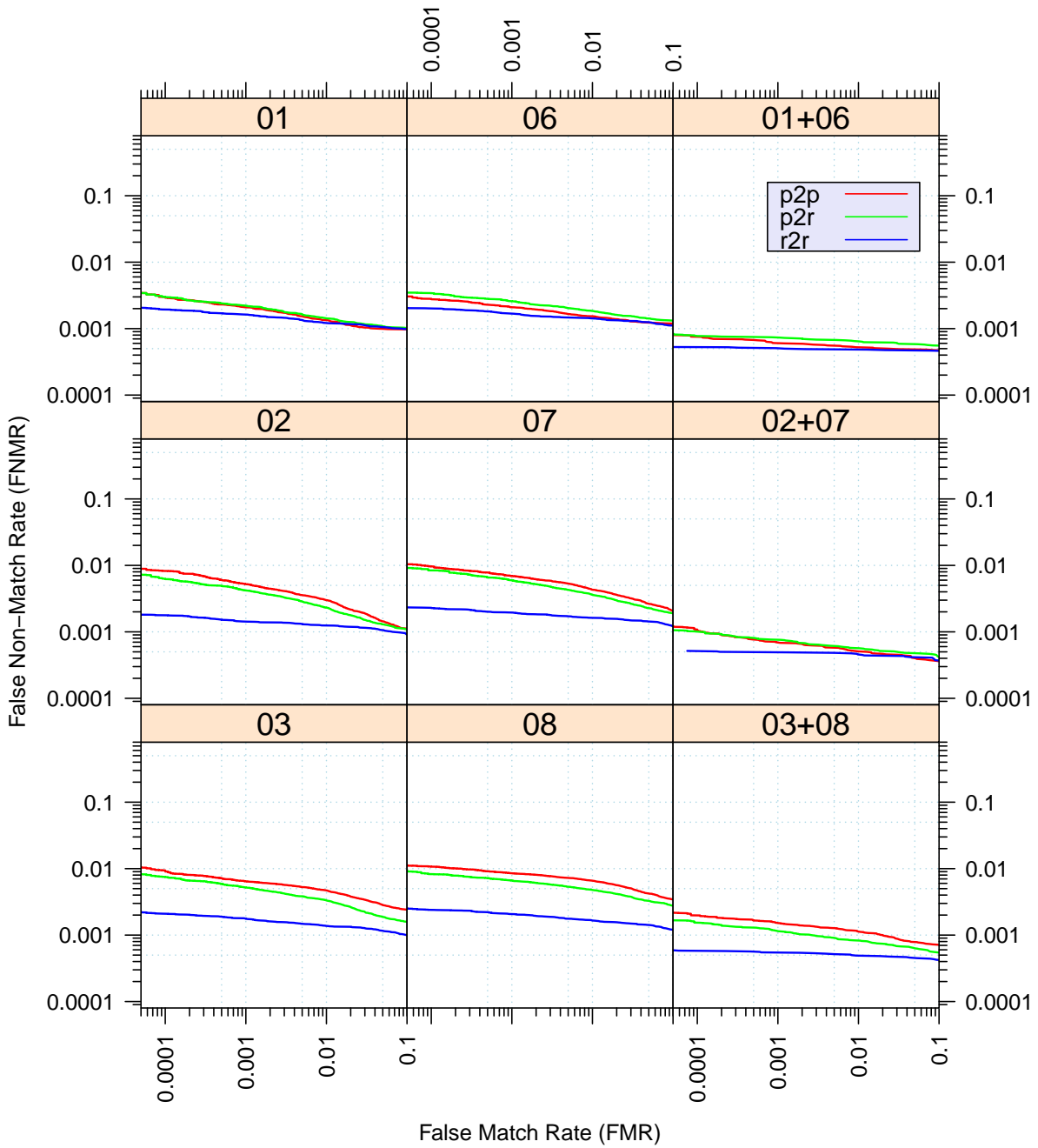


Figure 4: Full Evaluation – DET for all finger positions from AZLA

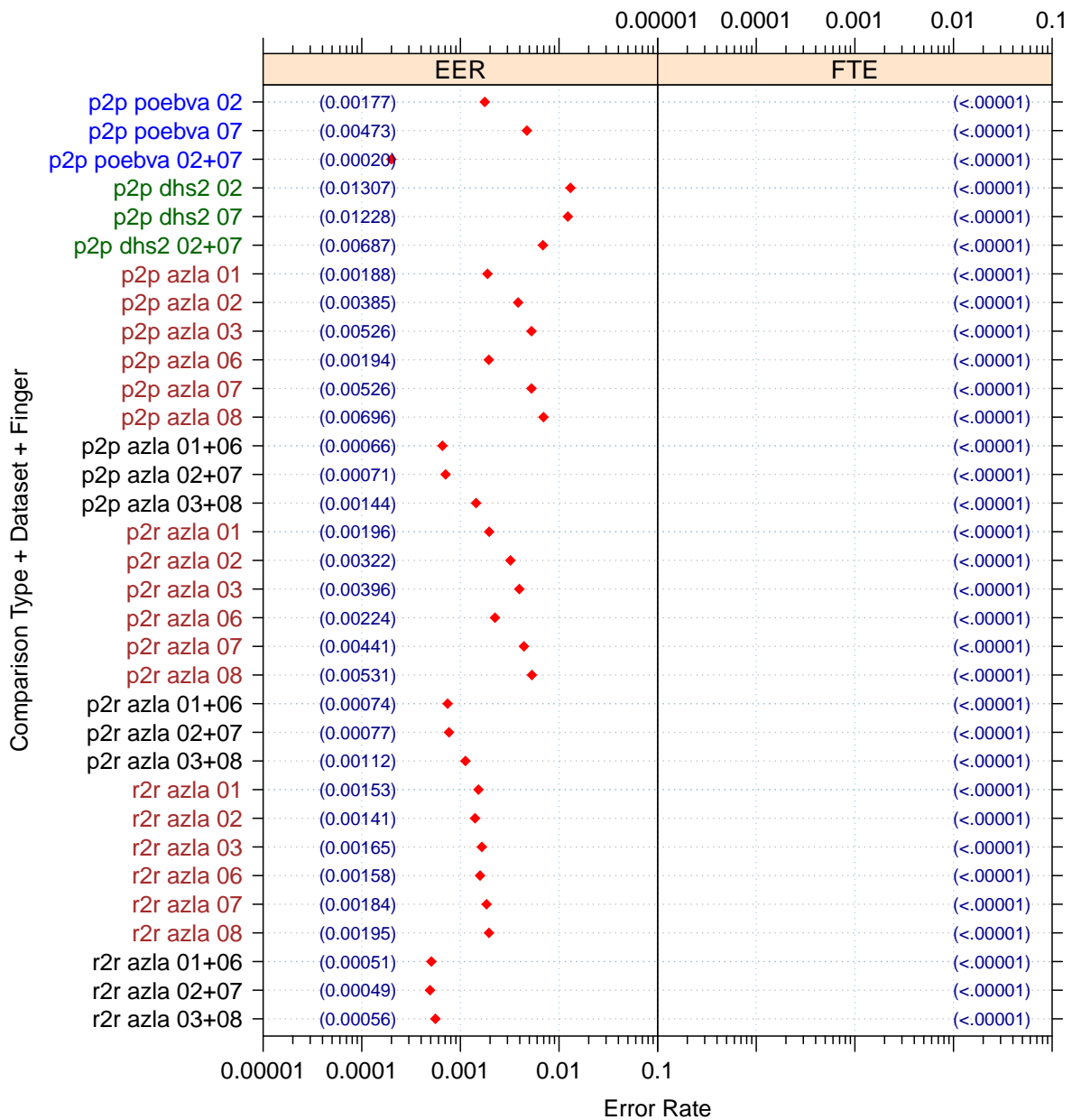


Figure 5: Full Evaluation – EERs and FTEs

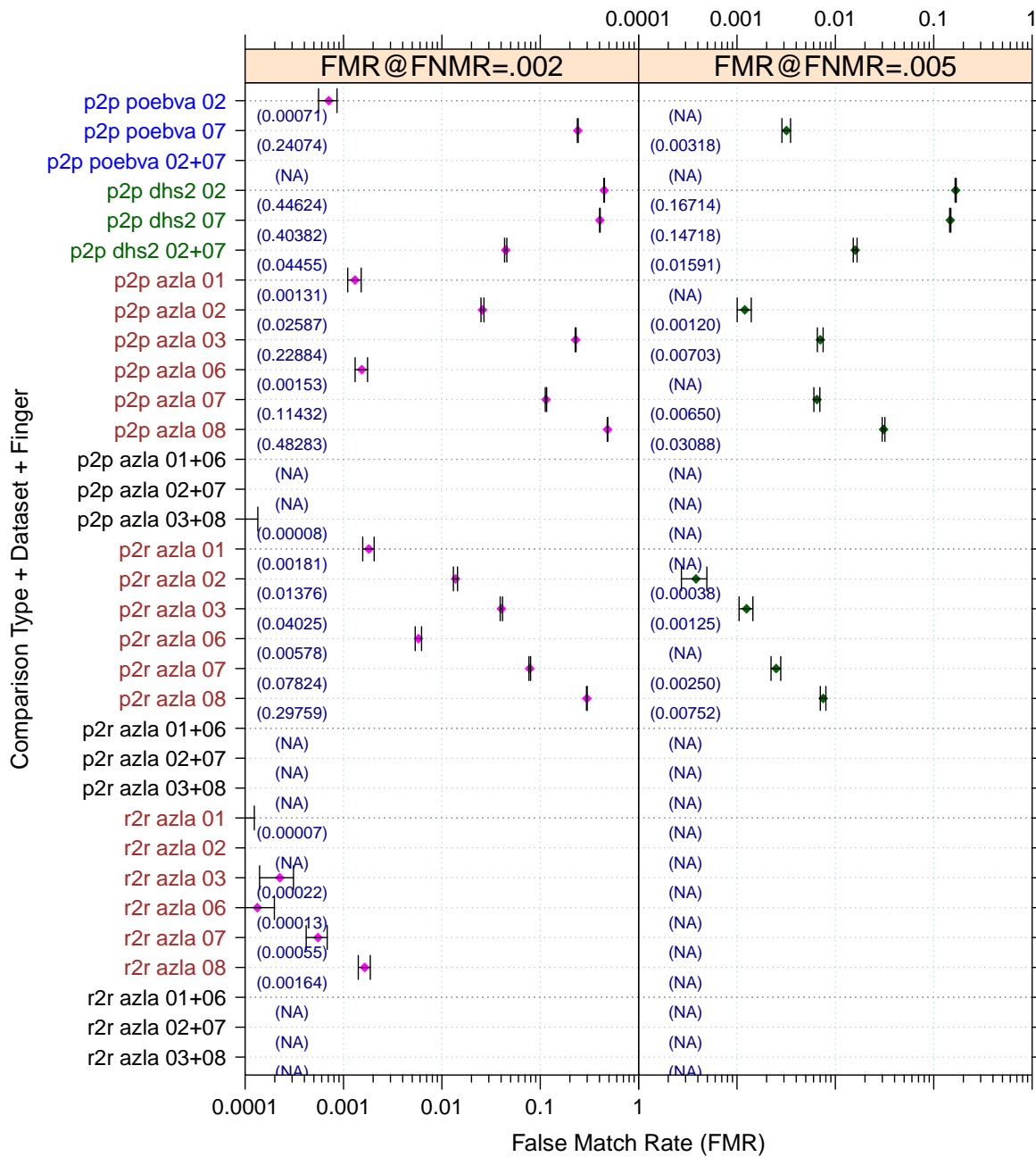


Figure 6: Full Evaluation – FMR@FNMR = (0.002, 0.005) and 95% Confidence Intervals

Note: “n/a” indicates that the value could not be reliably measured with the available sample size.

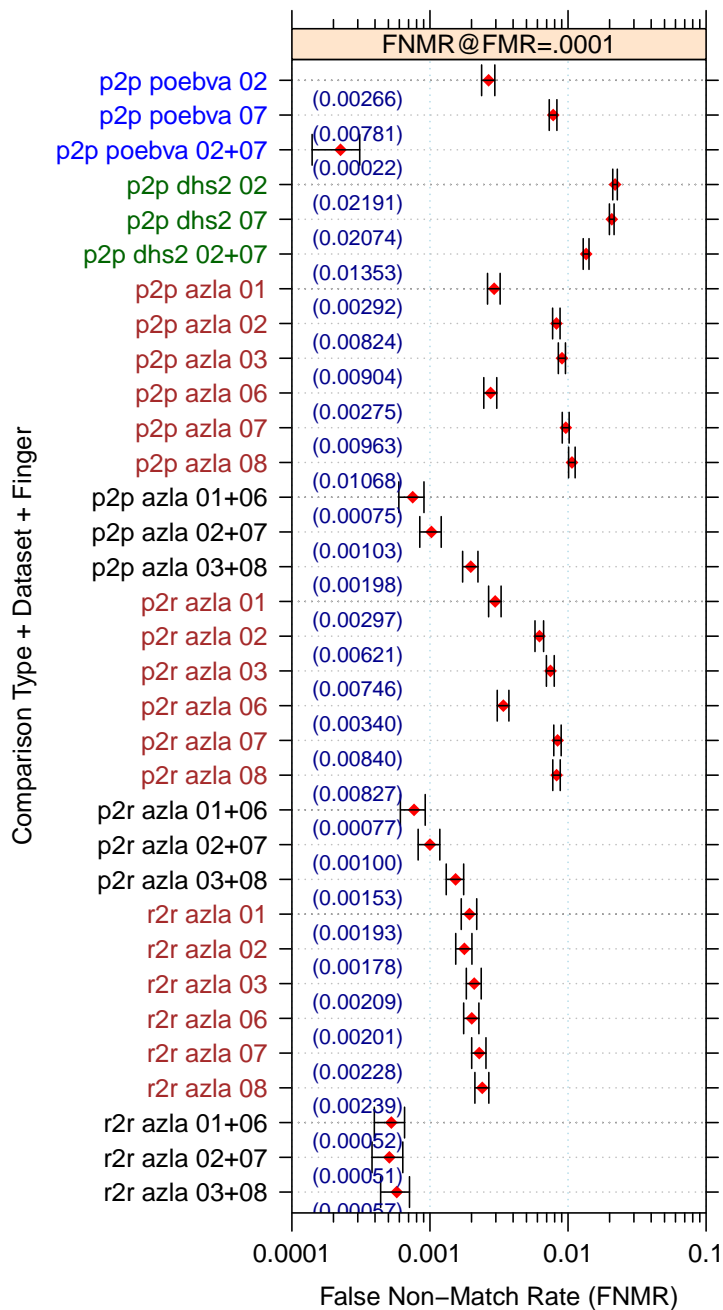


Figure 7: Full Evaluation – FNMR@FMR = 0.0001 and 95% Confidence Intervals

Note: “n/a” indicates that the value could not be reliably measured with the available sample size.

| | | EER | FTE Rate |
|-------------------------|-------------------|------------|-----------------|
| Plain to Plain | <i>R Thumb</i> | 0.0019 | 0.0000 |
| | <i>R Index</i> | 0.0039 | 0.0000 |
| | <i>R Middle</i> | 0.0053 | 0.0000 |
| | <i>L Thumb</i> | 0.0019 | 0.0000 |
| | <i>L Index</i> | 0.0053 | 0.0000 |
| | <i>L Middle</i> | 0.0070 | 0.0000 |
| | <i>R/L Thumb</i> | 0.0007 | 0.0000 |
| | <i>R/L Index</i> | 0.0007 | 0.0000 |
| | <i>R/L Middle</i> | 0.0014 | 0.0000 |
| Plain to Rolled | <i>R Thumb</i> | 0.0020 | 0.0000 |
| | <i>R Index</i> | 0.0032 | 0.0000 |
| | <i>R Middle</i> | 0.0040 | 0.0000 |
| | <i>L Thumb</i> | 0.0022 | 0.0000 |
| | <i>L Index</i> | 0.0044 | 0.0000 |
| | <i>L Middle</i> | 0.0053 | 0.0000 |
| | <i>R/L Thumb</i> | 0.0007 | 0.0000 |
| | <i>R/L Index</i> | 0.0008 | 0.0000 |
| | <i>R/L Middle</i> | 0.0011 | 0.0000 |
| Rolled to Rolled | <i>R Thumb</i> | 0.0015 | 0.0000 |
| | <i>R Index</i> | 0.0014 | 0.0000 |
| | <i>R Middle</i> | 0.0016 | 0.0000 |
| | <i>L Thumb</i> | 0.0016 | 0.0000 |
| | <i>L Index</i> | 0.0018 | 0.0000 |
| | <i>L Middle</i> | 0.0019 | 0.0000 |
| | <i>R/L Thumb</i> | 0.0005 | 0.0000 |
| | <i>R/L Index</i> | 0.0005 | 0.0000 |
| | <i>R/L Middle</i> | 0.0006 | 0.0000 |

Table 4: EER and FTE — Dataset AZLA

| | EER | FTE Rate |
|------------------|------------|-----------------|
| <i>R Index</i> | 0.0131 | 0.0000 |
| <i>L Index</i> | 0.0123 | 0.0000 |
| <i>R/L Index</i> | 0.0069 | 0.0000 |

Table 5: EER and FTE — Dataset DHS2

| | EER | FTE Rate |
|------------------|------------|-----------------|
| <i>R Index</i> | 0.0018 | 0.0000 |
| <i>L Index</i> | 0.0047 | 0.0000 |
| <i>R/L Index</i> | 0.0002 | 0.0000 |

Table 6: EER and FTE — Dataset POEBVA

| | | FNMR@FMR = 0.0001 | FMR@FNMR = 0.002 | FMR@FNMR = 0.005 |
|------------------|-------------------|-------------------|------------------|------------------|
| Plain to Plain | <i>R Thumb</i> | 0.0029 ±0.00030 | 0.0013 ±0.00020 | n/a |
| | <i>R Index</i> | 0.0082 ±0.00051 | 0.0259 ±0.00090 | 0.0012 ±0.00020 |
| | <i>R Middle</i> | 0.0090 ±0.00054 | 0.2288 ±0.00238 | 0.0070 ±0.00047 |
| | <i>L Thumb</i> | 0.0027 ±0.00030 | 0.0015 ±0.00022 | n/a |
| | <i>L Index</i> | 0.0096 ±0.00055 | 0.1143 ±0.00180 | 0.0065 ±0.00046 |
| | <i>L Middle</i> | 0.0107 ±0.00058 | 0.4828 ±0.00283 | 0.0309 ±0.00098 |
| | <i>R/L Thumb</i> | 0.0008 ±0.00015 | n/a | n/a |
| | <i>R/L Index</i> | 0.0010 ±0.00018 | n/a | n/a |
| | <i>R/L Middle</i> | 0.0020 ±0.00025 | n/a | n/a |
| Plain to Rolled | <i>R Thumb</i> | 0.0030 ±0.00031 | 0.0018 ±0.00024 | n/a |
| | <i>R Index</i> | 0.0062 ±0.00044 | 0.0138 ±0.00066 | 0.0004 ±0.00011 |
| | <i>R Middle</i> | 0.0075 ±0.00049 | 0.0403 ±0.00111 | 0.0013 ±0.00020 |
| | <i>L Thumb</i> | 0.0034 ±0.00033 | 0.0058 ±0.00043 | n/a |
| | <i>L Index</i> | 0.0084 ±0.00052 | 0.0782 ±0.00152 | 0.0025 ±0.00028 |
| | <i>L Middle</i> | 0.0083 ±0.00051 | 0.2976 ±0.00259 | 0.0075 ±0.00049 |
| | <i>R/L Thumb</i> | 0.0008 ±0.00016 | n/a | n/a |
| | <i>R/L Index</i> | 0.0010 ±0.00018 | n/a | n/a |
| | <i>R/L Middle</i> | 0.0015 ±0.00022 | n/a | n/a |
| Rolled to Rolled | <i>R Thumb</i> | 0.0019 ±0.00025 | n/a | n/a |
| | <i>R Index</i> | 0.0018 ±0.00024 | n/a | n/a |
| | <i>R Middle</i> | 0.0021 ±0.00026 | 0.0002 ±0.00009 | n/a |
| | <i>L Thumb</i> | 0.0020 ±0.00025 | 0.0001 ±0.00006 | n/a |
| | <i>L Index</i> | 0.0023 ±0.00027 | 0.0006 ±0.00013 | n/a |
| | <i>L Middle</i> | 0.0024 ±0.00028 | 0.0016 ±0.00023 | n/a |
| | <i>R/L Thumb</i> | 0.0005 ±0.00013 | n/a | n/a |
| | <i>R/L Index</i> | 0.0005 ±0.00013 | n/a | n/a |
| | <i>R/L Middle</i> | 0.0006 ±0.00014 | n/a | n/a |

Table 7: Details for FNMR@FMR = 0.0001 and FMR@FNMR = (0.002, 0.005) — Dataset AZLA

Note: “n/a” indicates that the value could not be reliably measured with the available sample size.

| | FNMR@FMR = 0.0001 | FMR@FNMR = 0.002 | FMR@FNMR = 0.005 |
|------------------|--------------------------|-------------------------|-------------------------|
| <i>R Index</i> | 0.0219 ±0.00083 | 0.4462 ±0.00281 | 0.1671 ±0.00211 |
| <i>L Index</i> | 0.0207 ±0.00081 | 0.4038 ±0.00278 | 0.1472 ±0.00200 |
| <i>R/L Index</i> | 0.0135 ±0.00065 | 0.0445 ±0.00117 | 0.0159 ±0.00071 |

Table 8: Details for FNMR@FMR = 0.0001 and FMR@FNMR = (0.002, 0.005) — Dataset DHS2

| | FNMR@FMR = 0.0001 | FMR@FNMR = 0.002 | FMR@FNMR = 0.005 |
|------------------|--------------------------|-------------------------|-------------------------|
| <i>R Index</i> | 0.0027 ±0.00029 | 0.0007 ±0.00015 | n/a |
| <i>L Index</i> | 0.0078 ±0.00050 | 0.2407 ±0.00242 | 0.0032 ±0.00032 |
| <i>R/L Index</i> | 0.0002 ±0.00009 | n/a | n/a |

Table 9: Details for FNMR@FMR = 0.0001 and FMR@FNMR = (0.002, 0.005) — Dataset POEBVA

Note: “n/a” indicates that the value could not be reliably measured with the available sample size.

3 Original PFT Dataset

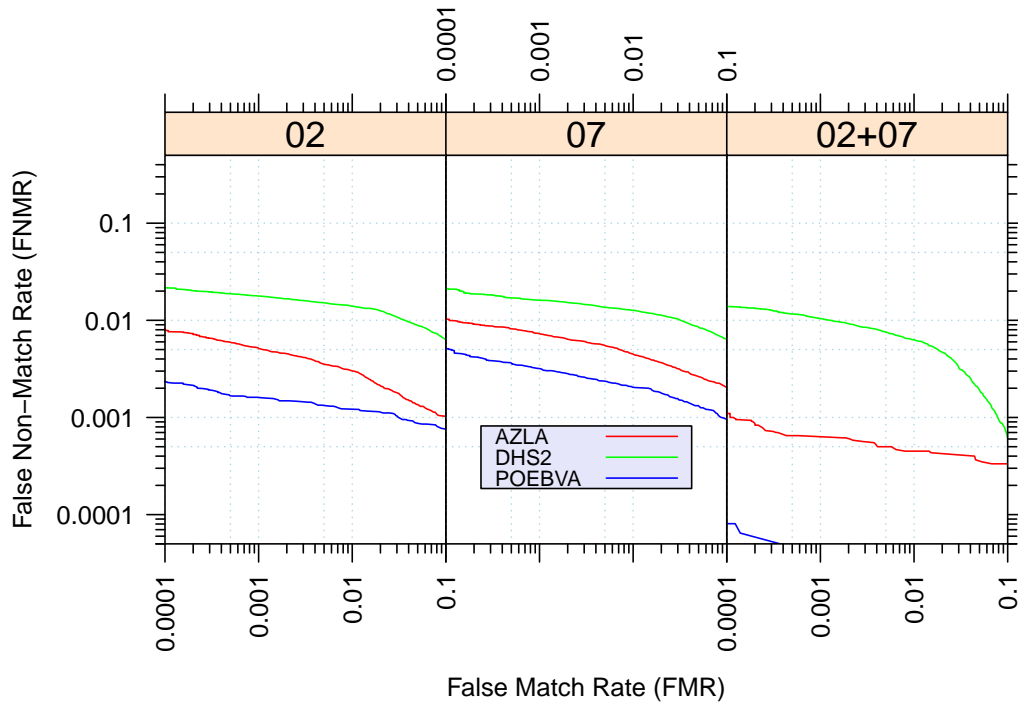


Figure 8: Original PFT Dataset – DET

| | | EER | FNMR@FMR = 0.0001 | FMR@FNMR = 0.005 |
|---------------|------------------|--------|-------------------|------------------|
| AZLA | <i>R Index</i> | 0.0039 | 0.0078 | 0.0011 |
| | <i>L Index</i> | 0.0054 | 0.0103 | 0.0073 |
| | <i>R/L Index</i> | 0.0006 | 0.0011 | n/a |
| DHS2 | <i>R Index</i> | 0.0133 | 0.0216 | 0.1517 |
| | <i>L Index</i> | 0.0122 | 0.0211 | 0.1493 |
| | <i>R/L Index</i> | 0.0069 | 0.0139 | 0.0180 |
| POEBVA | <i>R Index</i> | 0.0015 | 0.0023 | n/a |
| | <i>L Index</i> | n/a | 0.0051 | 0.0001 |
| | <i>R/L Index</i> | n/a | n/a | n/a |

Table 10: Details for EER, FNMR@FMR = 0.0001, and FMR@FNMR = 0.005 — Original PFT Dataset

Note: “n/a” indicates that the value could not be reliably measured with the available sample size.