A: Datasheet

Algorithm: deepsea_001

Developer: Tencent Deepsea Lab

Submission Date: 2019_07_29

Template size: 2048 bytes

Template time (2.5 percentile): 731 msec

Template time (median): 738 msec

Template time (97.5 percentile): 1038 msec

Investigation:

Frontal mugshot ranking 84 (out of 279) -- FNIR(1600000, 0, 1) = 0.0043 vs. lowest 0.0009 from sensetime_005

Mugshot webcam ranking 58 (out of 241) -- FNIR(1600000, 0, 1) = 0.0159 vs. lowest 0.0062 from sensetime_005

Mugshot profile ranking 112 (out of 210) — FNIR(1600000, 0, 1) = 0.8138 vs. lowest 0.0587 from xforwardai_002

Immigration visa-border ranking 69 (out of 168) — FNIR(1600000, 0, 1) = 0.0095 vs. lowest 0.0013 from visionlabs_010

Immigration visa-kiosk ranking 70 (out of 165) -- FNIR(1600000, 0, 1) = 0.1398 vs. lowest 0.0568 from cloudwalk_hr_000

Identification:

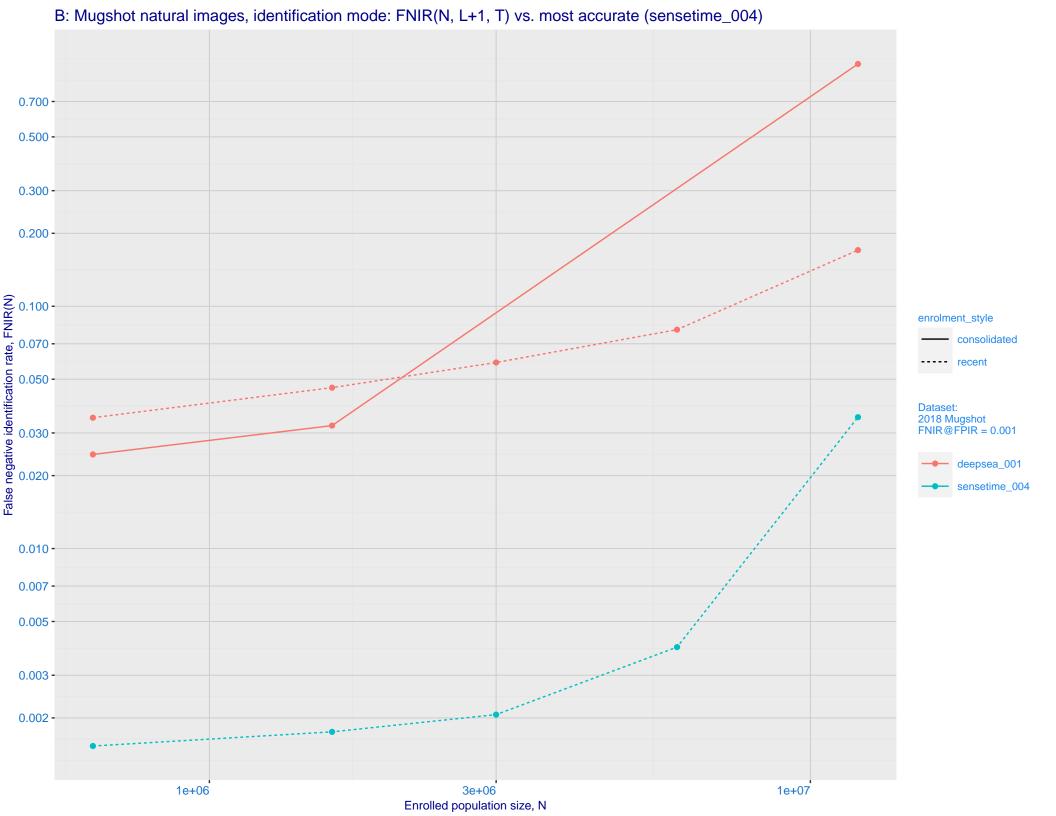
Frontal mugshot ranking 85 (out of 279) -- FNIR(1600000, T, L+1) = 0.0461, FPIR=0.001000 vs. lowest 0.0018 from sensetime_004

Mugshot webcam ranking 76 (out of 236) -- FNIR(1600000, T, L+1) = 0.1013, FPIR=0.001000 vs. lowest 0.0122 from sensetime_003

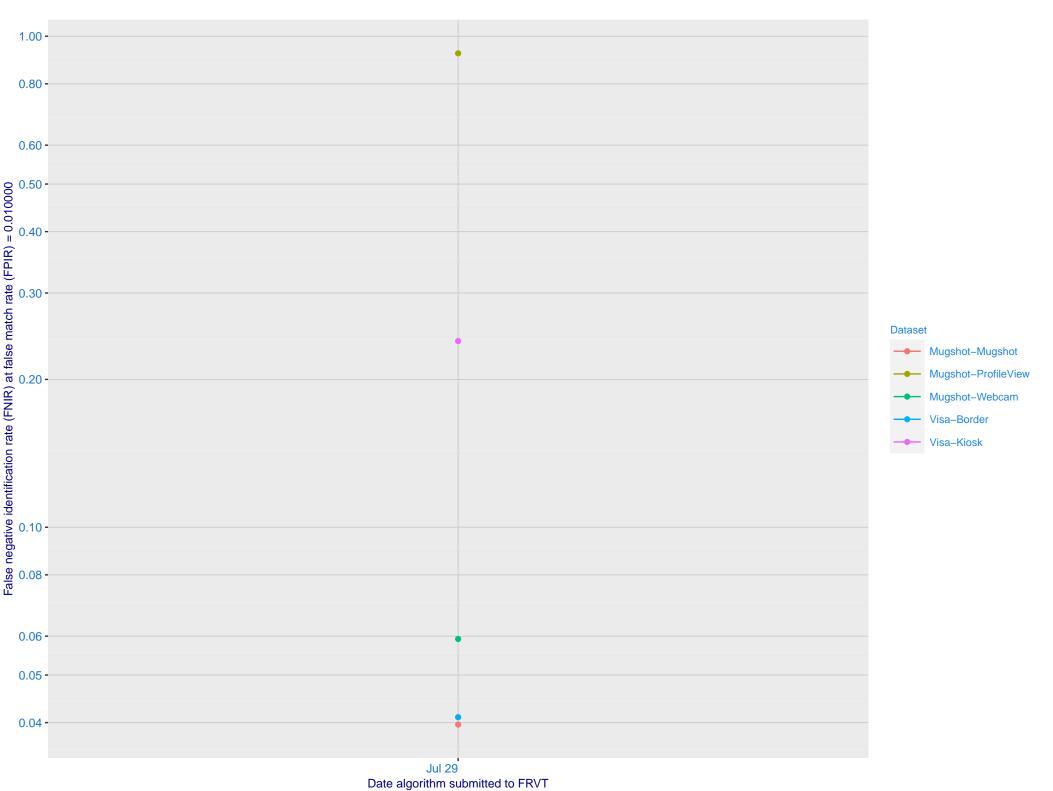
Mugshot profile ranking 74 (out of 209) — FNIR(1600000, T, L+1) = 0.9846, FPIR=0.001000 vs. lowest 0.1331 from cloudwalk_hr_000

Immigration visa-border ranking 73 (out of 167) -- FNIR(1600000, T, L+1) = 0.0768, FPIR=0.001000 vs. lowest 0.0047 from idemia_008

Immigration visa-kiosk ranking 53 (out of 162) — FNIR(1600000, T, L+1) = 0.3280, FPIR=0.001000 vs. lowest 0.0996 from cloudwalk_hr_000



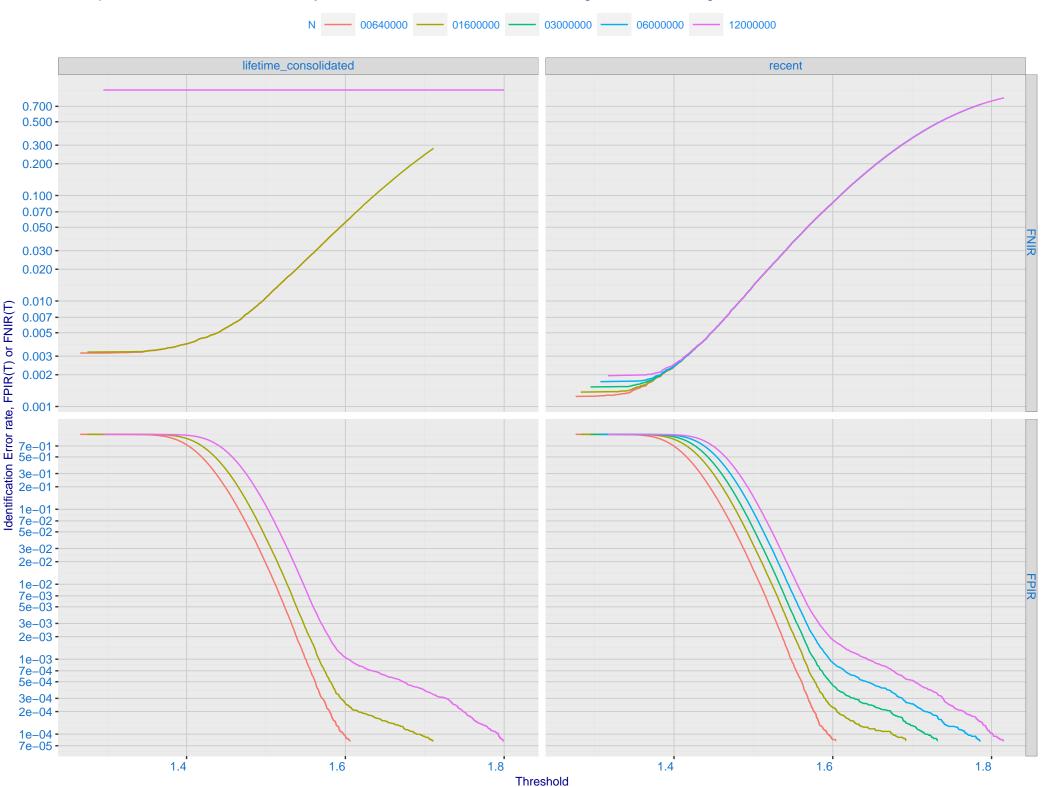
C: Evolution of accuracy for DEEPSEA algorithms on three datasets 2018 – present



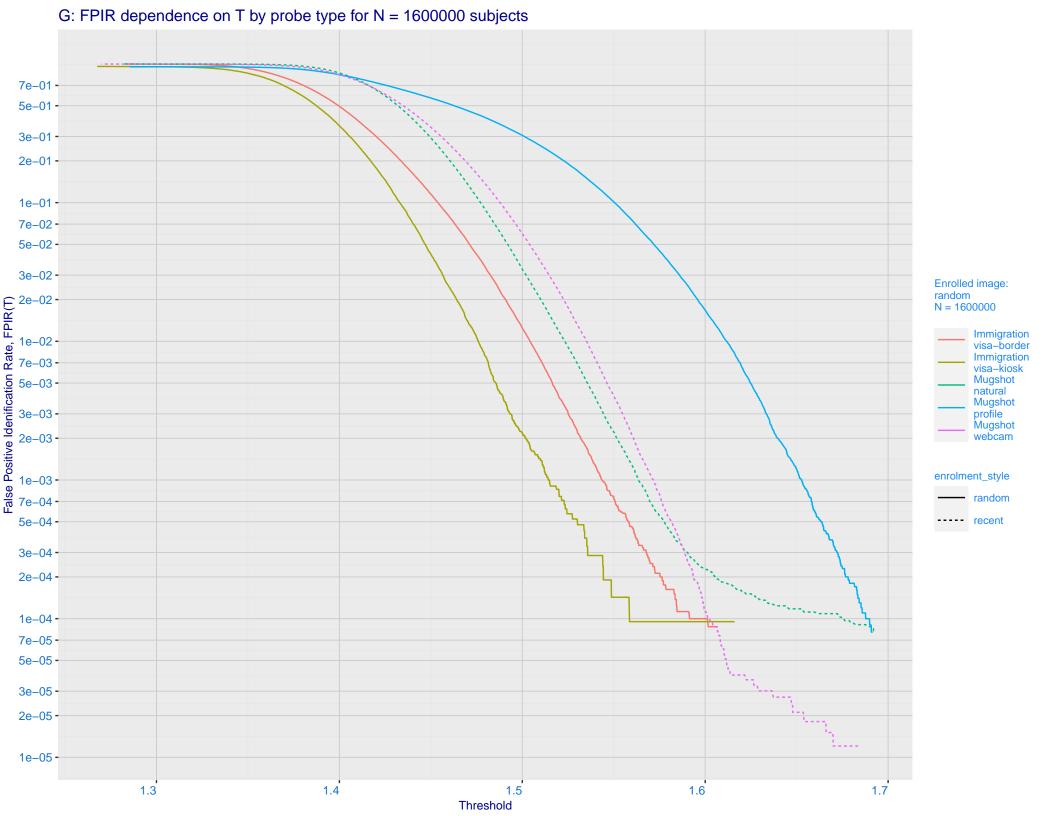
D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals Immigration **Immigration** Mugshot visa-border visa-kiosk natural 0.700 -0.500 -0.300 -0.200 -0.100 -0.070 -0.050 -0.030 -0.020 -0.010 -0.007 -Ealse negative identification rate, FNIR(T) 0.003 - 0.000 - 0.500 - 0.500 - 0.200 - 0.100 - 0. enrolment_style consolidated-ONE-MATE random-ONE-MATE recent-ONE-MATE unconsolidated-ALL-MATES unconsolidated-ANY-MATE 0.070 -0.050 sensetime 004 0.030 -0.020 -0.010 -0.007 -0.005 -0.003 -0.002 -0.001 -

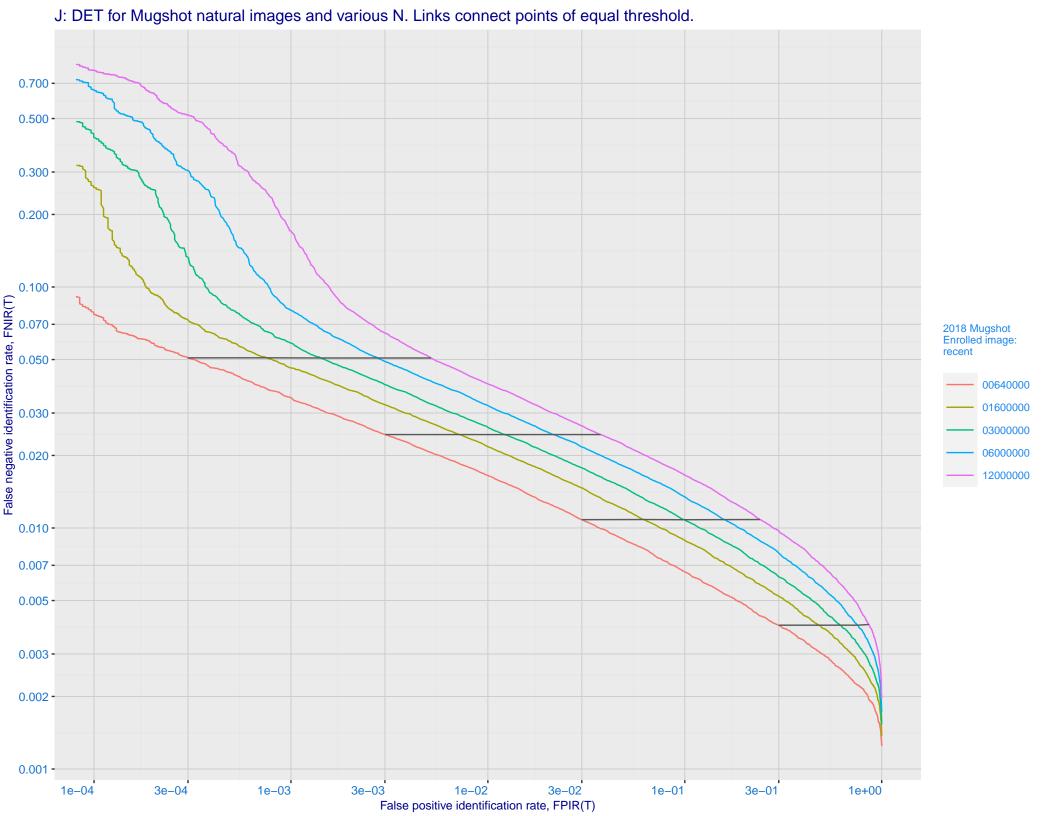
False positive identification rate, FPIR(T)

E: Dependence of error rates on T by number enrolled identities, N, for Mugshot natural images

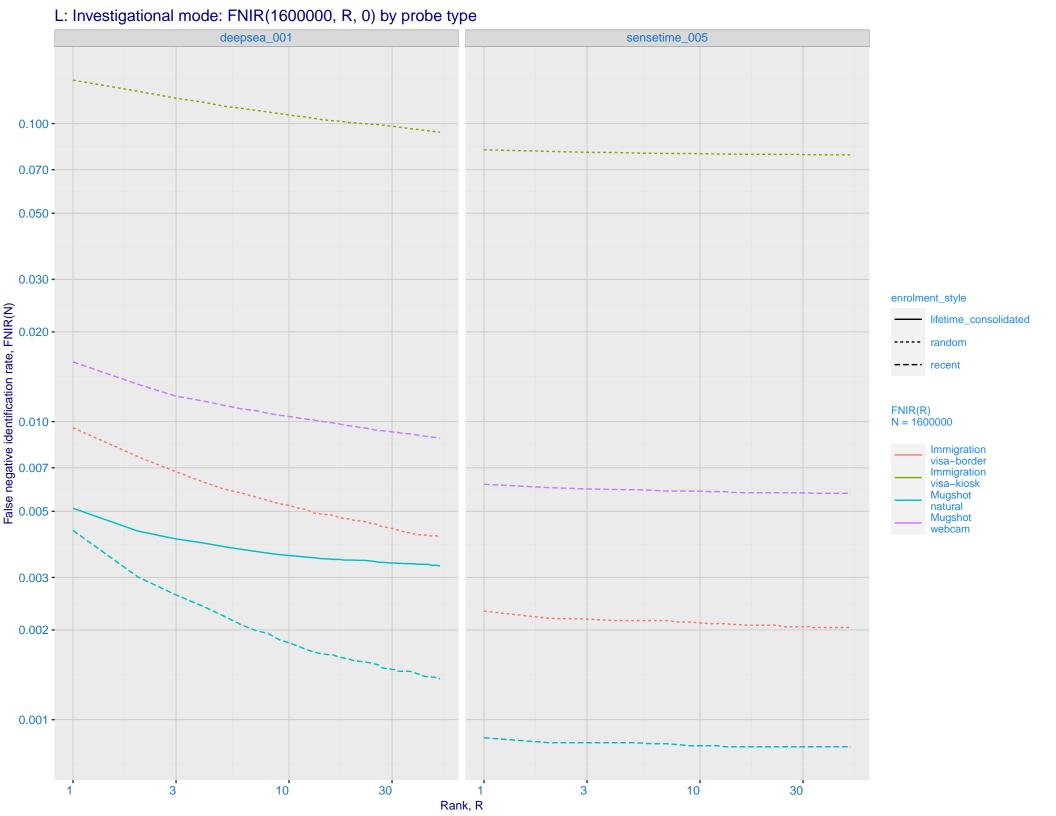


F: FPIR vs. Selectivity for mugshot images, N = 1600000 subjects enrolled with one recent mate 7e+01 -5e+01 -3e+01 -2e+01 -1e+01 -7e+00 -5e+00 -3e+00 -2e+00 -1e+00 -7e-01 -5e-01 -3e-01 -2e-01 -1e-01 -7e-02 -5e-02 -3e-02 -3e-02 -1e-02 -**Enrolled images:** recent N = 1600000 Mugshot natural Mugshot webcam 7e-03 -5e-03 -3e-03 -2e-03 -1e-03 -7e-04 -5e-04 -3e-04 -2e-04 -1e-04 -7e-05 -5e-05 -3e-05 -2e-05 -1e-05 -1e-05 3e-05 1e-04 3e-04 1e-03 3e-03 1e-02 3e-02 1e-01 3e-01 False Positive Idenification Rate, FPIR(T)

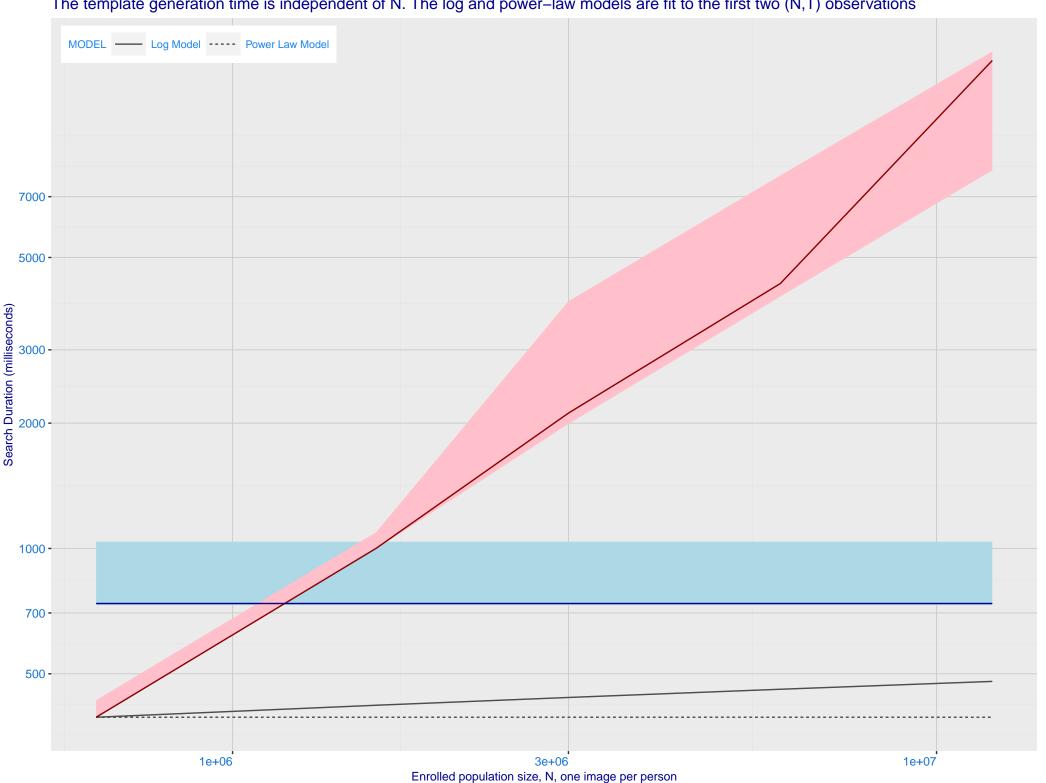




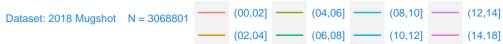
K: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime_005) Immigration **Immigration** visa-border visa-kiosk 0.700 -0.500 -0.300 -0.200 -0.100 -0.070 -0.050 -0.030 -0.020 -0.010 -0.007 -0.005 - 0.003 - 0.002 - 0.001 - 0.001 - 0.000 - 0.300 - 0.200 enrolment_style consolidated ---- random --- recent Mugshot webcam Mugshot natural FNIR@Rank = 1 deepsea_001 sensetime_005 0.100 -0.070 -0.050 -0.030 -0.020 -0.010 -0.007 -0.005 -0.003 -0.002 -0.001 -1e+06 3e+06 1e+07 1e+06 3e+06 1e+07 Enrolled population size, N

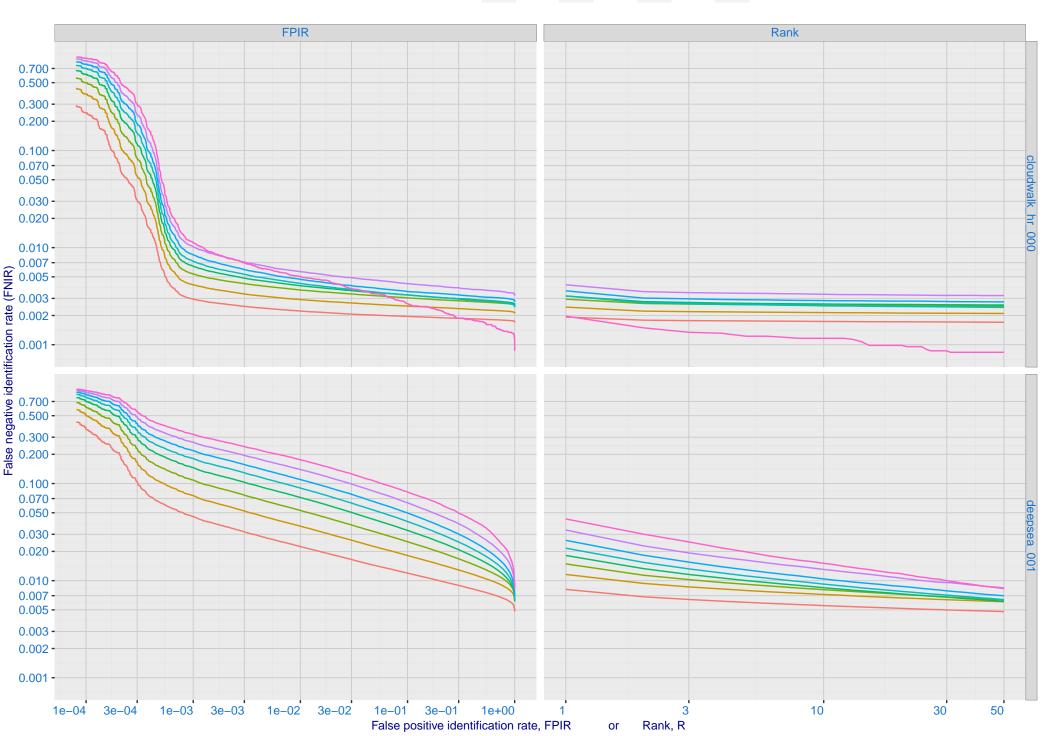


M: Template duration; search duration vs. N. The blue and pink ribbon covers 95 percent of observed measurements. The template generation time is independent of N. The log and power–law models are fit to the first two (N,T) observations



Q: Identification FNIR(N, T, L+1) and Investigational FNIR(N, 0, R) under ageing





R: Decline of genuine scores with ageing, with some eventually dropping below typical thresholds shown by the horizontal lines 2.0 -Dataset: 2018 Mugshot N= 3.1M Color encodes FNIR (Rank = 1) 1.8 -0.15 0.10 0.05 0.00 1.6 -TVAL - FPIR = 0.001 FPIR = 0.003 FPIR = 0.010FPIR = 0.030 1.4 -(00,02](02,04](04,06](06,08](08,10](10,12](12,14](14,18]Time lapse between search and initial encounter enrollment (years)