A: Datasheet

Algorithm: hzailu_001

Developer: Hangzhuo Allu Network Information Technology

Submission Date: 2022_08_18

Template size: 2048 bytes

Template time (2.5 percentile): 772 msec

Template time (median): 777 msec

Template time (97.5 percentile): 782 msec

Investigation:

Mugshot webcam ranking 74 (out of 337) -- FNIR(1600000, 0, 1) = 0.0110 vs. lowest 0.0055 from sensetime_008

Mugshot profile ranking 49 (out of 306) -- FNIR(1600000, 0, 1) = 0.1058 vs. lowest 0.0521 from sensetime_007

Immigration visa-border ranking 48 (out of 264) -- FNIR(1600000, 0, 1) = 0.0023 vs. lowest 0.0006 from cloudwalk_mt_001

Immigration visa-kiosk ranking 76 (out of 209) -- FNIR(1600000, 0, 1) = 0.0854 vs. lowest 0.0395 from cloudwalk_mt_001

Identification:

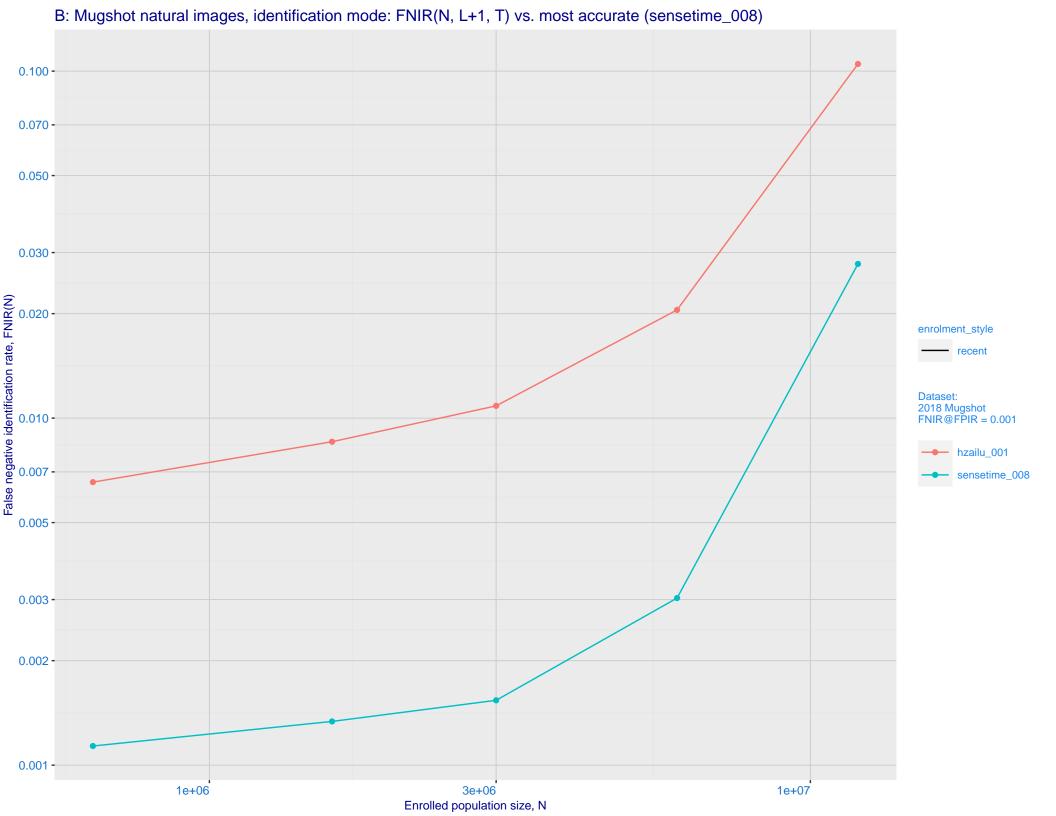
Frontal mugshot ranking 56 (out of 375) -- FNIR(1600000, T, L+1) = 0.0086, FPIR=0.001000 vs. lowest 0.0013 from sensetime_008

Mugshot webcam ranking 220 (out of 335) -- FNIR(1600000, T, L+1) = 0.1809, FPIR=0.001000 vs. lowest 0.0090 from sensetime_008

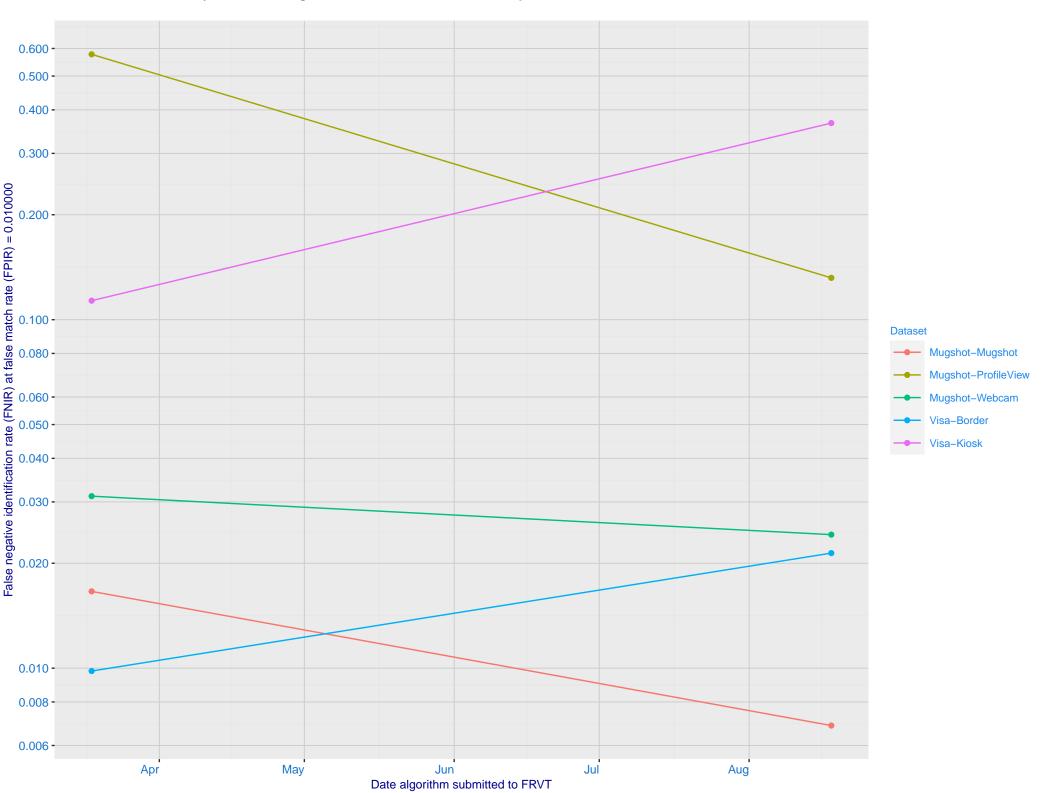
Mugshot profile ranking 130 (out of 305) -- FNIR(1600000, T, L+1) = 0.9865, FPIR=0.001000 vs. lowest 0.0698 from cloudwalk_mt_001

Immigration visa-border ranking 189 (out of 263) -- FNIR(1600000, T, L+1) = 0.1961, FPIR=0.001000 vs. lowest 0.0013 from cloudwalk_mt_001

Immigration visa-kiosk ranking 151 (out of 209) -- FNIR(1600000, T, L+1) = 0.6649, FPIR=0.001000 vs. lowest 0.0532 from cloudwalk_mt_001

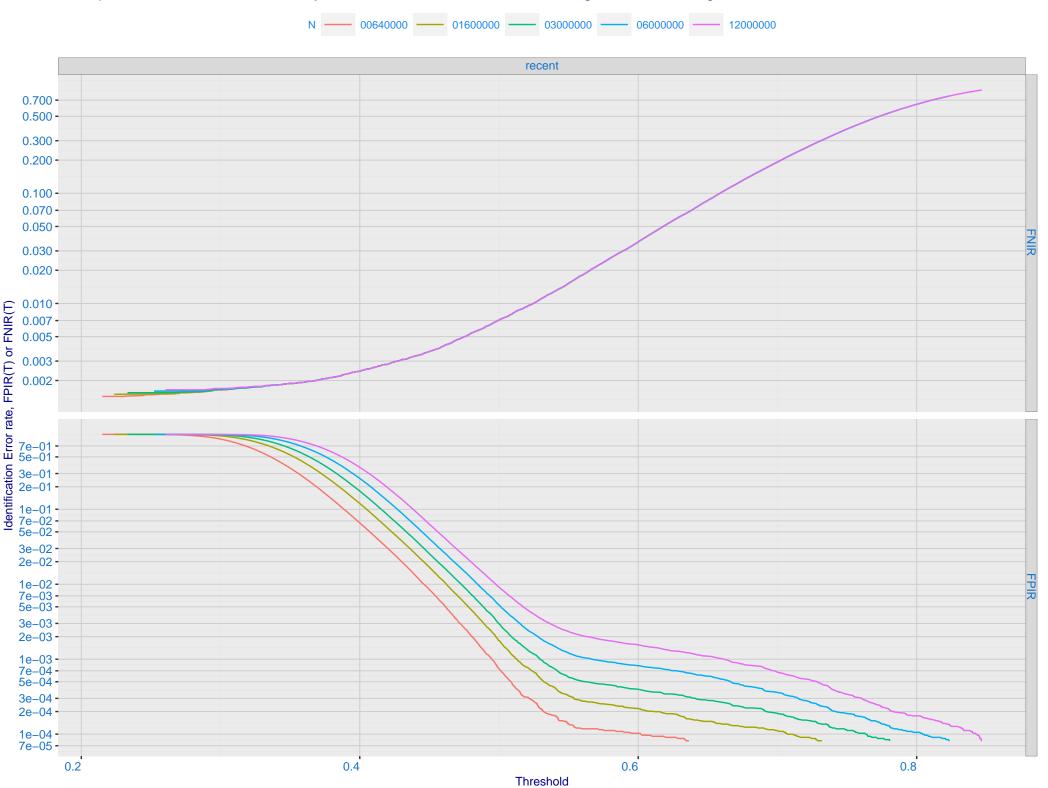


C: Evolution of accuracy for HZAILU algorithms on three datasets 2018 – present

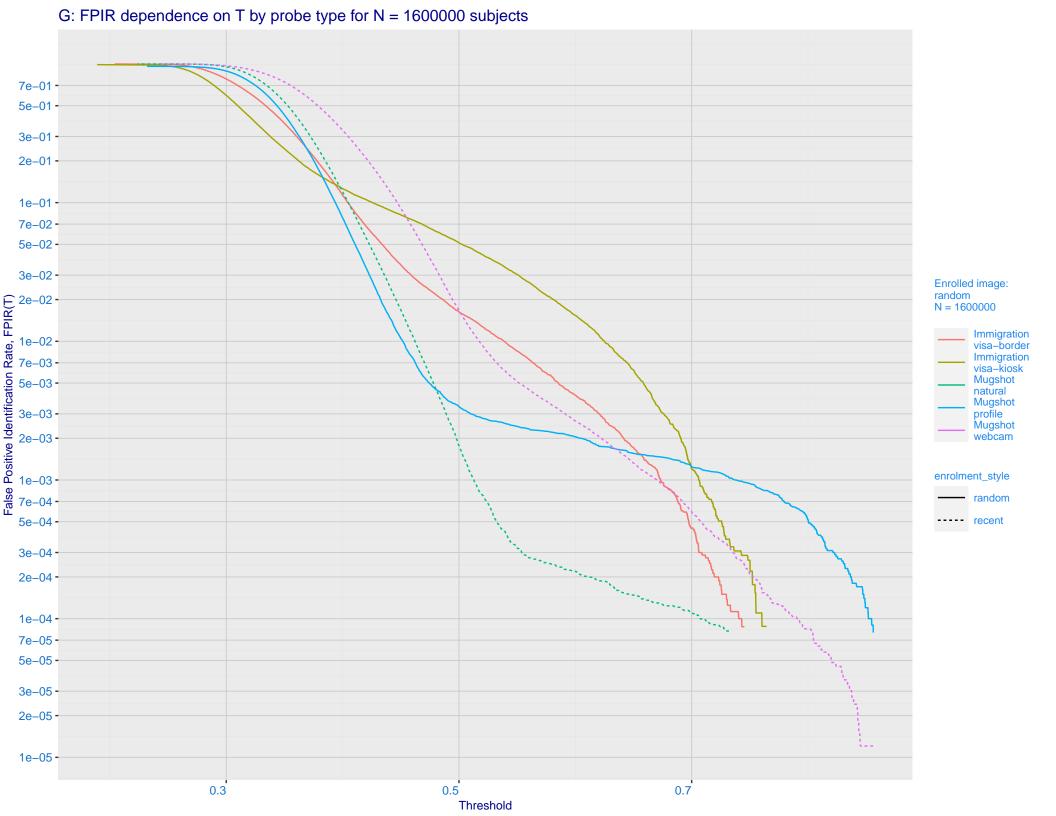


D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals Immigration Immigration Mugshot visa-border visa-kiosk natural 0.700 -0.500 -0.300 -0.200 -0.100 -0.070 -0.050 -0.030 -0.020 -0.010 -0.007 -0.005 - 0.003 - 0.001 - 0.001 - 0.700 - 0.500 - 0.200 enrolment_style random-ONE-MATE recent-ONE-MATE 0.100 -0.070 -0.050 -0.030 -0.020 -0.010 -0.007 -0.005 -0.003 -0.002 -0.001 -False positive identification rate, FPIR(T)

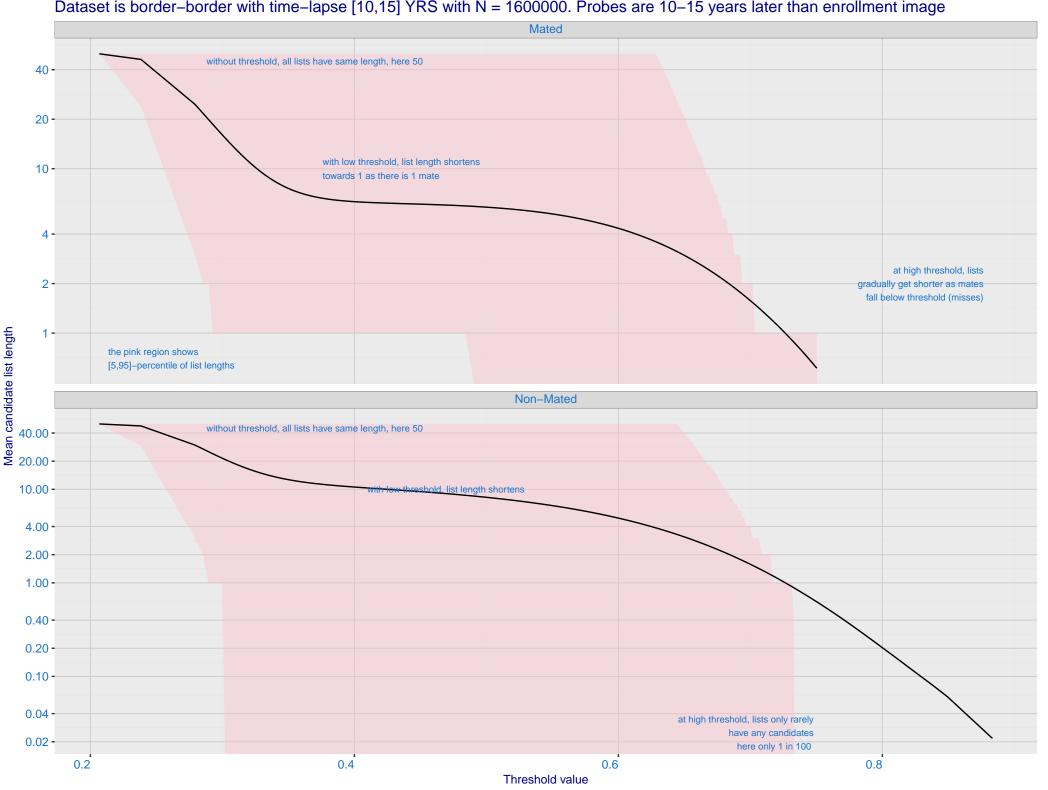
E: Dependence of error rates on T by number enrolled identities, N, for Mugshot natural images



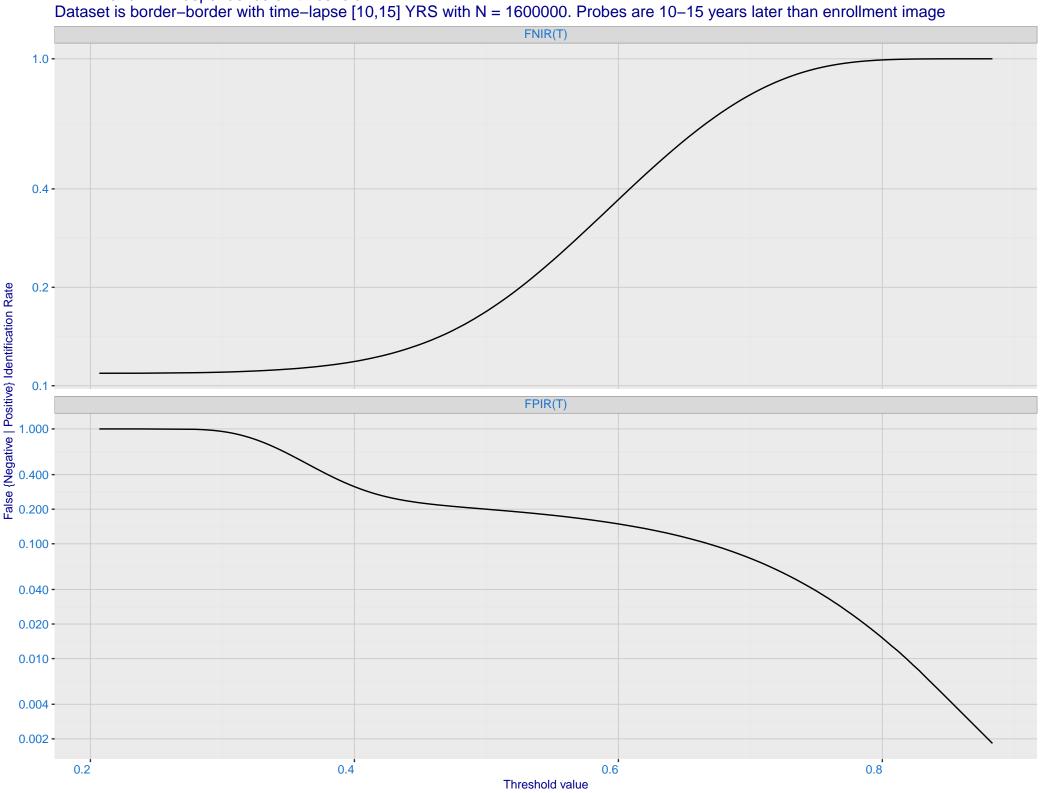
F: FPIR vs. Selectivity for mugshot images, N = 1600000 subjects enrolled with one recent mate 7e+01 -5e+01 -3e+01 -2e+01 -1e+01 -7e+00 -5e+00 -3e+00 -2e+00 -1e+00 -7e-01 -5e-01 -3e-01 -2e-01 -1e-01 -7e-02 -5e-02 -5e-02 -3e-02 -1e-02 -Enrolled images: recent N = 1600000 Mugshot natural Mugshot webcam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

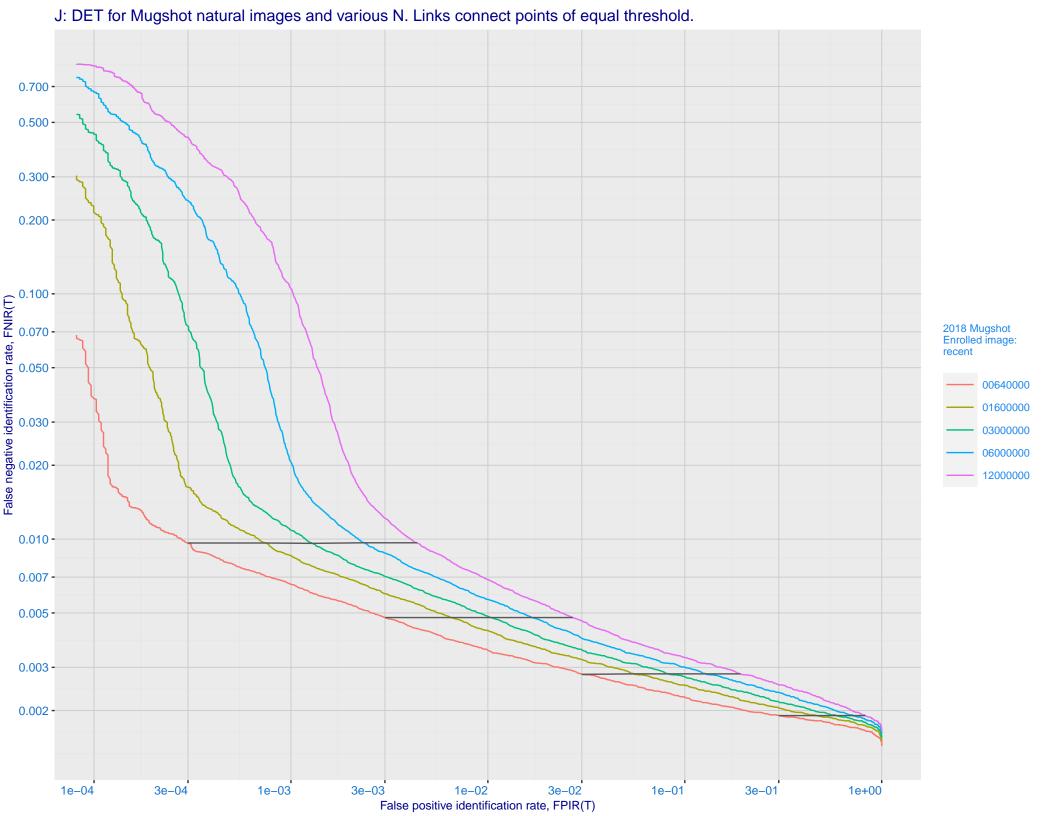


H: Reduced length candidate lists for human review Dataset is border–border with time–lapse [10,15] YRS with N = 1600000. Probes are 10–15 years later than enrollment image

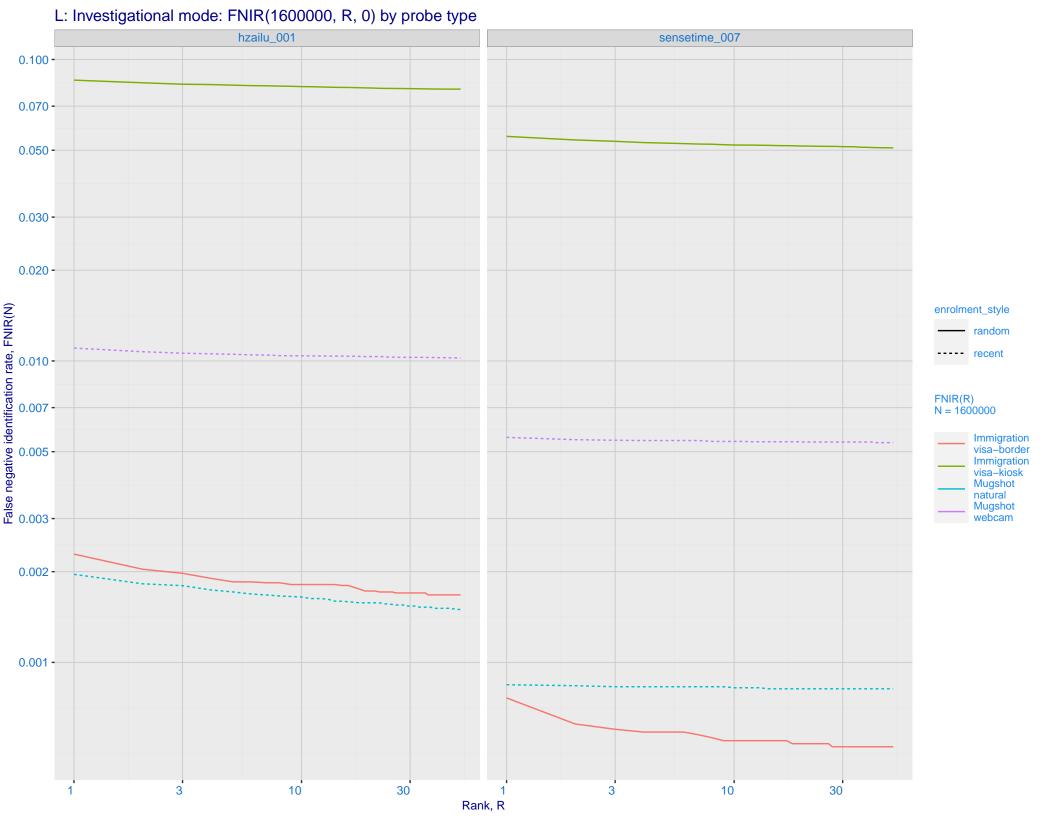


I: FNIR and FPIR dependence on threshold Dataset is border–border with time–lapse [10,15] YRS with N = 1600000. Probes are 10–15 years later than enrollment image

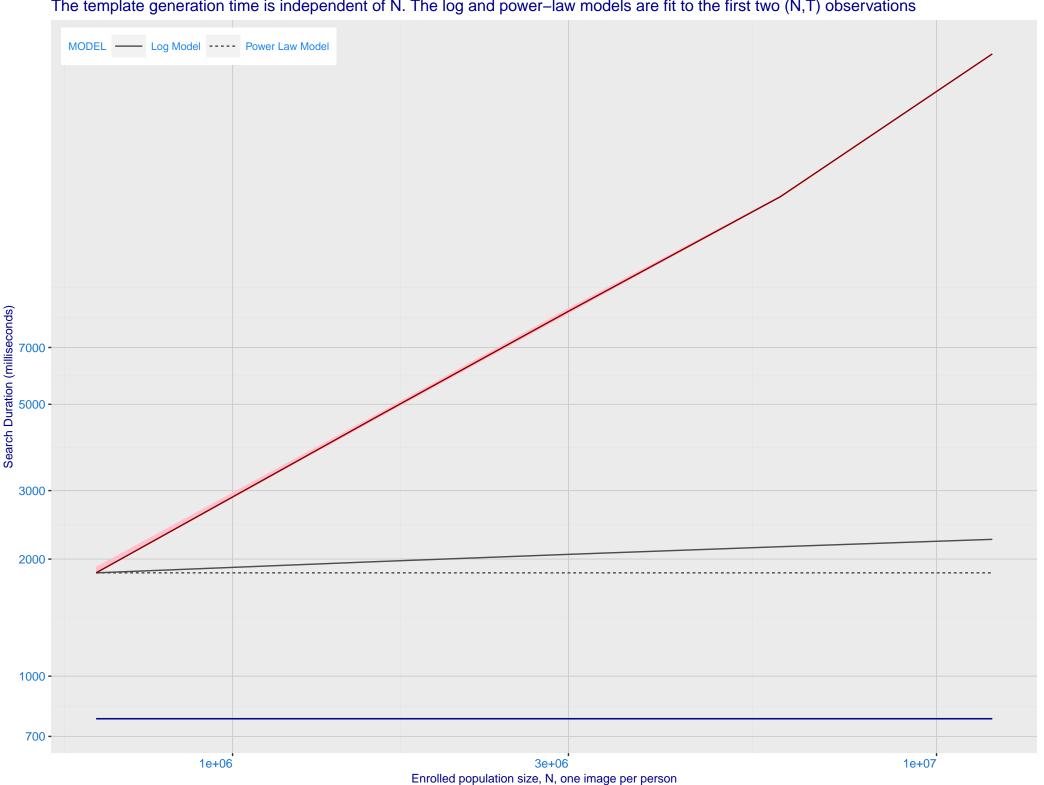




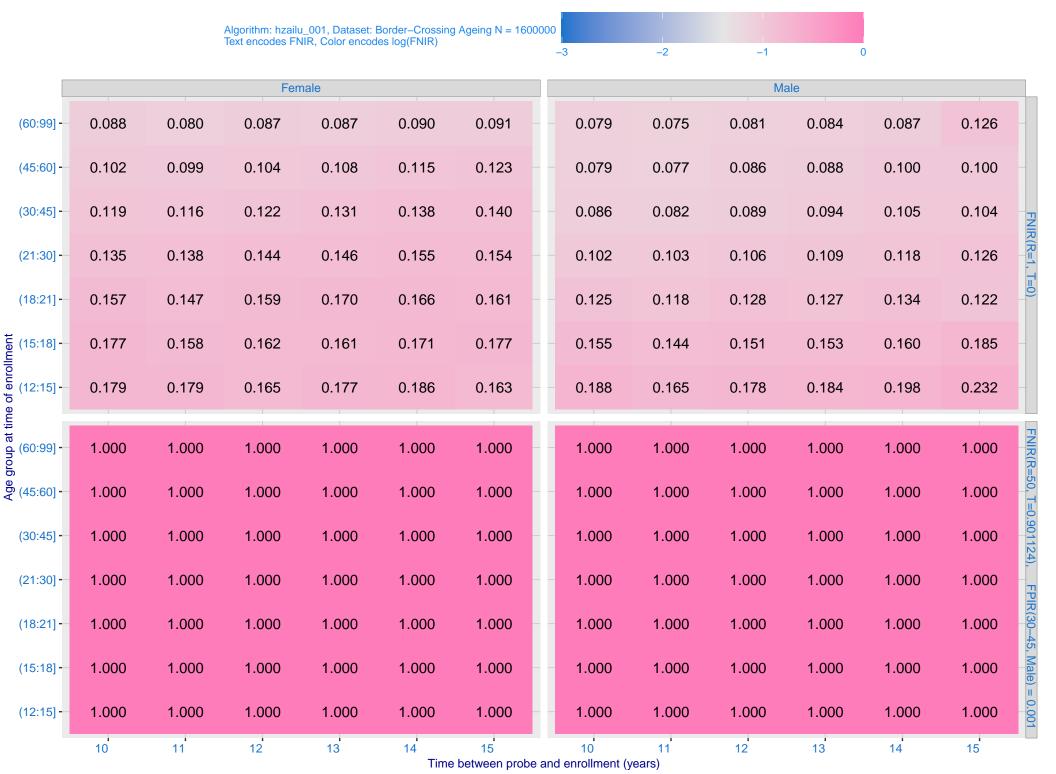
K: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime_007) Immigration **Immigration** visa-border visa-kiosk 0.100 -0.070 -0.050 -0.030 -0.020 -0.010 -0.007 -0.005 -0.003 -Ealse negative identification rate, FNIR(N) - 0.001 - 0.100 - 0.050 - 0.030 enrolment_style - random ---- recent Mugshot webcam Mugshot natural FNIR@Rank = 1 hzailu_001 sensetime_007 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



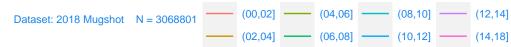
O: FNIR(T, N = 1.6 million) by sex, age and time-lapse. The top row gives investigational rank-1 miss rates. The bottom panels give high threshold for more lights-out identification with low FPIR.

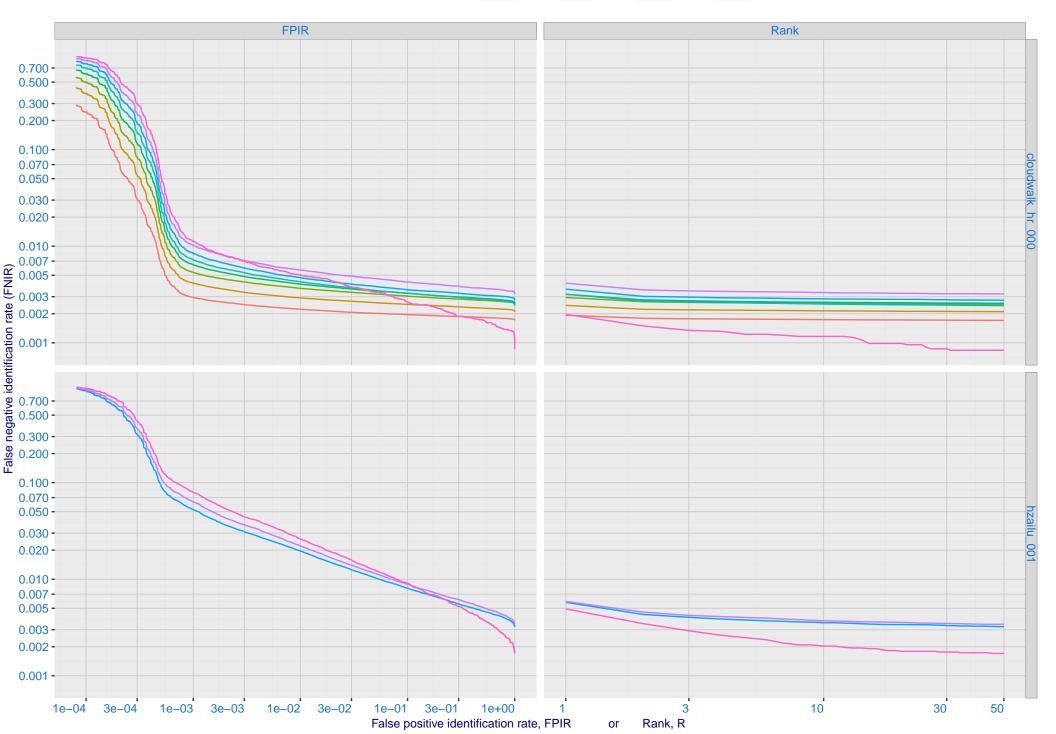


P: FPIR(N = 1.6 million) by sex and age. It is typical for false positive identification rates to be higher in women except in their teens.



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 1.0 -Dataset: 2018 Mugshot N= 3.1M Color encodes FNIR (Rank = 1) 0.8 -0.15 0.10 0.05 Score - 6.0 0.00 TVAL - FPIR = 0.001 - FPIR = 0.003 FPIR = 0.010 --- FPIR = 0.030 0.4 -

(12,14] Time lapse between search and initial encounter enrollment (years)

(10,12]

(14,18]