## A: Datasheet

Algorithm: xforwardai\_001

Developer: Xforward Al Technology

Submission Date: 2021\_01\_21

Template size: 2048 bytes

Template time (2.5 percentile): 676 msec

Template time (median): 677 msec

Template time (97.5 percentile): 696 msec

Investigation:

Frontal mugshot ranking 29 (out of 259) -- FNIR(1600000, 0, 1) = 0.0020 vs. lowest 0.0009 from sensetime\_005

Mugshot webcam ranking 26 (out of 221) -- FNIR(1600000, 0, 1) = 0.0125 vs. lowest 0.0062 from sensetime\_005

Mugshot profile ranking 3 (out of 190) — FNIR(1600000, 0, 1) = 0.0667 vs. lowest 0.0591 from sensetime\_005

Immigration visa-border ranking 11 (out of 142) -- FNIR(1600000, 0, 1) = 0.0028 vs. lowest 0.0014 from visionlabs\_009

Immigration visa-kiosk ranking 7 (out of 139) — FNIR(1600000, 0, 1) = 0.0819 vs. lowest 0.0694 from cib\_000

Identification:

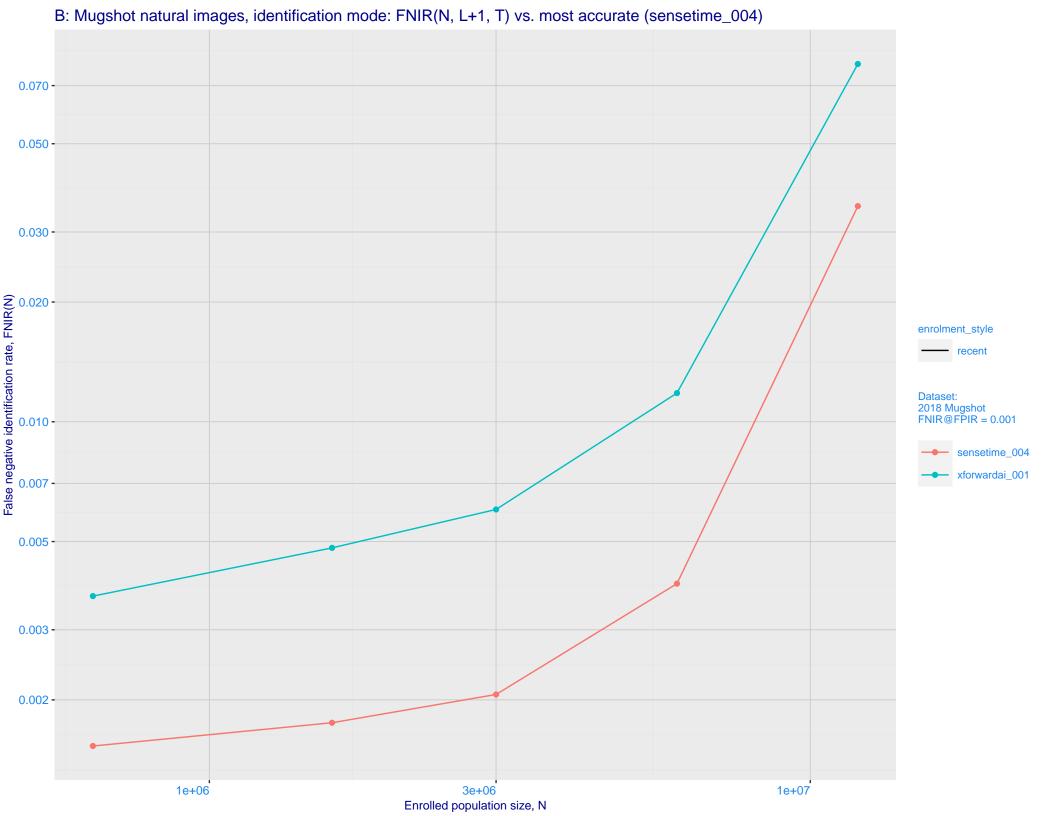
Frontal mugshot ranking 10 (out of 259) -- FNIR(1600000, T, L+1) = 0.0048, FPIR=0.001000 vs. lowest 0.0018 from sensetime\_004

Mugshot webcam ranking 12 (out of 219) -- FNIR(1600000, T, L+1) = 0.0282, FPIR=0.001000 vs. lowest 0.0122 from sensetime\_003

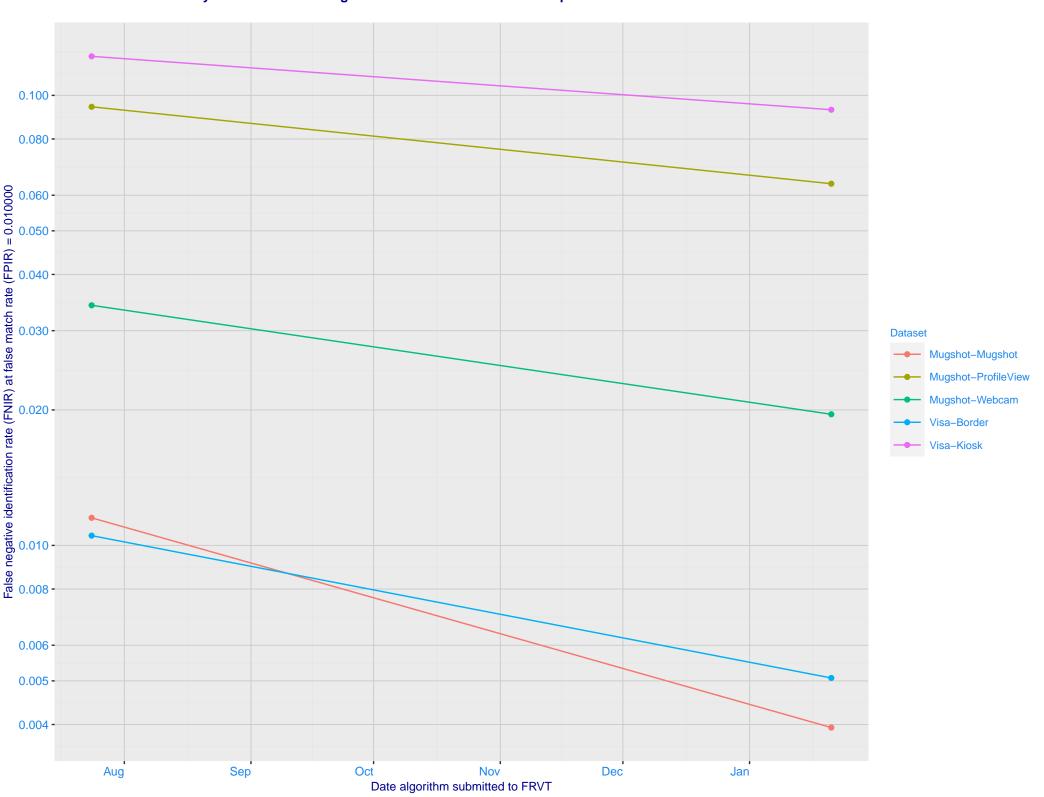
Mugshot profile ranking 5 (out of 189) -- FNIR(1600000, T, L+1) = 0.4479, FPIR=0.001000 vs. lowest 0.1733 from sensetime\_005

Immigration visa-border ranking 6 (out of 139) -- FNIR(1600000, T, L+1) = 0.0080, FPIR=0.001000 vs. lowest 0.0059 from sensetime\_004

Immigration visa-kiosk ranking 4 (out of 134) -- FNIR(1600000, T, L+1) = 0.1241, FPIR=0.001000 vs. lowest 0.1048 from sensetime\_005



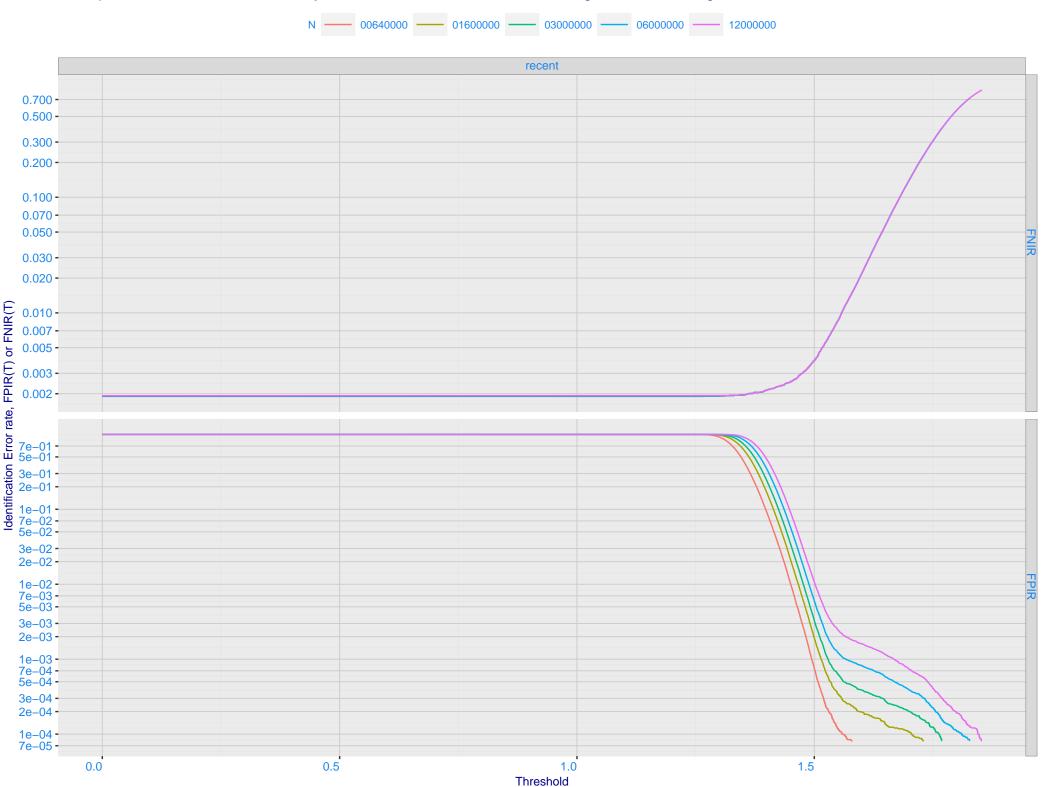
C: Evolution of accuracy for XFORWARDAI algorithms on three datasets 2018 – present



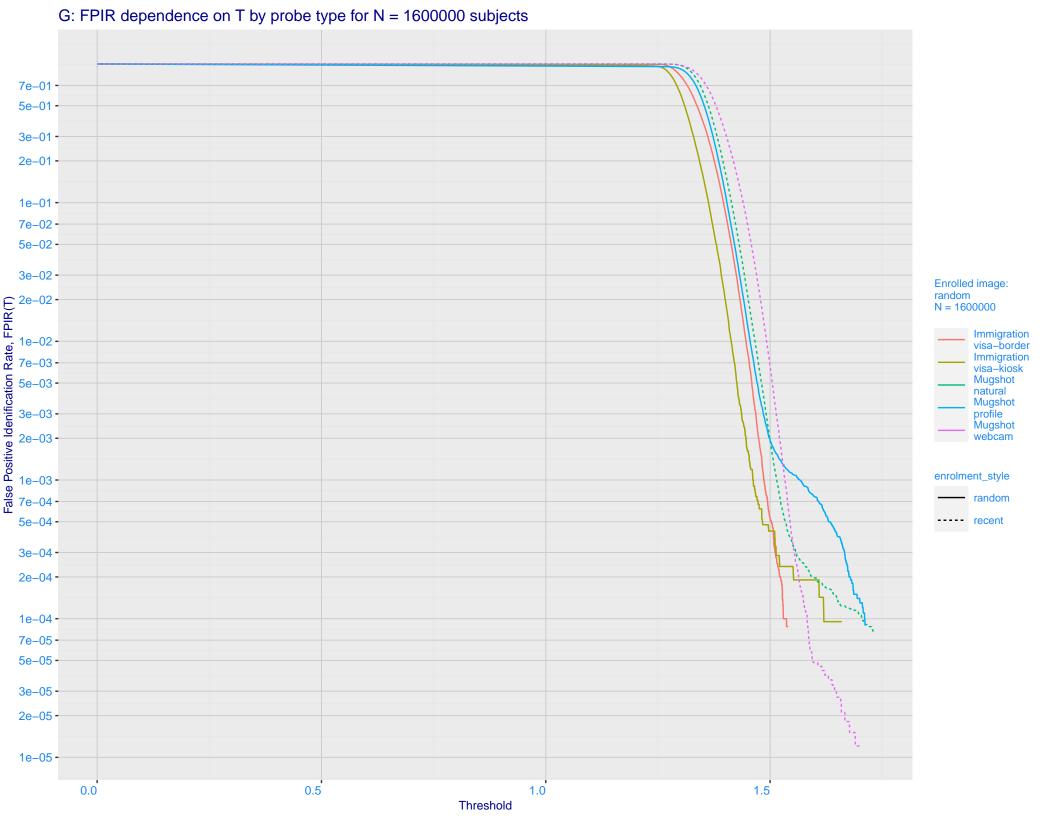
D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals Immigration Immigration Mugshot visa-border visa-kiosk natural 0.700 -0.500 -0.300 -0.200 -0.100 -0.070 -0.050 -0.030 -0.020 -0.010 -0.007 -Ealse negative identification rate, FNIR(T) 0.003 - 0.0001 - 0.700 - 0.500 - 0.200 - 0.100 - 0 enrolment\_style random-ONE-MATE recent-ONE-MATE 0.070 -0.050 -0.030 -0.020 -0.010 -0.007 -0.005 -0.003 -0.002 -0.001 - $1e^{-0.4}e^{-0.3}e^{-0.4}e^{-0.3}e^{-0.3}e^{-0.3}e^{-0.3}e^{-0.3}e^{-0.3}e^{-0.1}e^{-0.3}e^{-0.1}e^{-0.3}e^{-0.4}e^{-0.3}e^{$ 

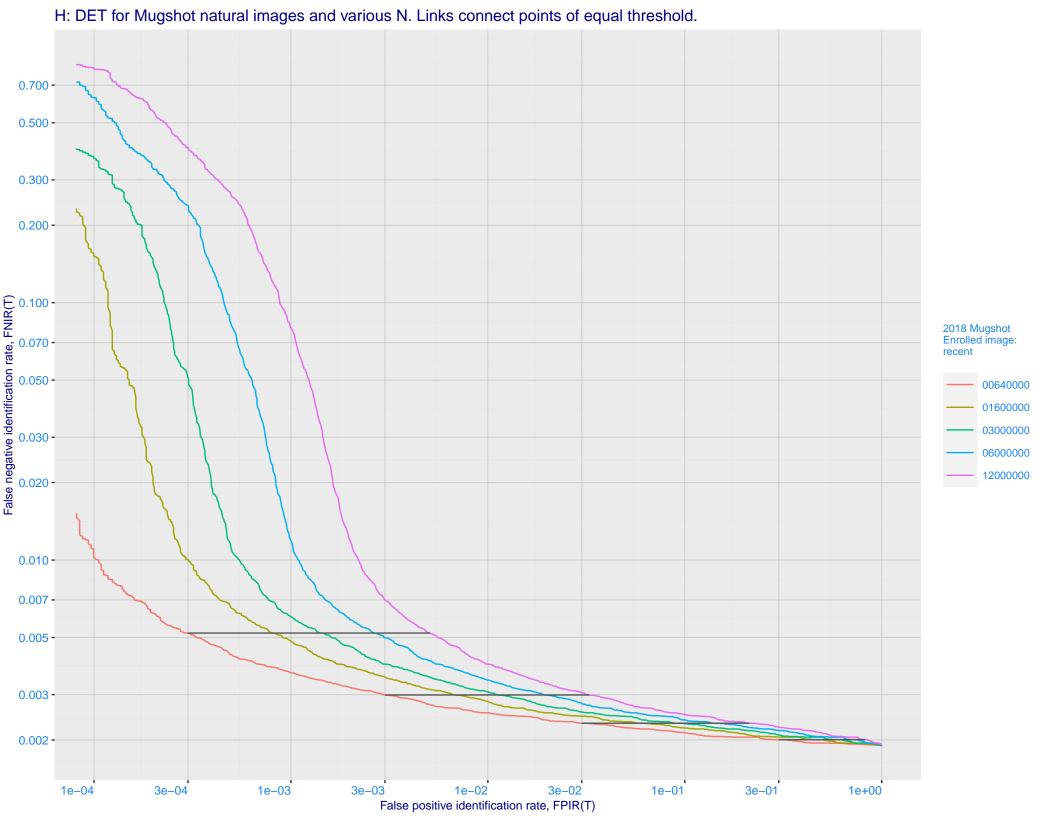
False positive identification rate, FPIR(T)

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

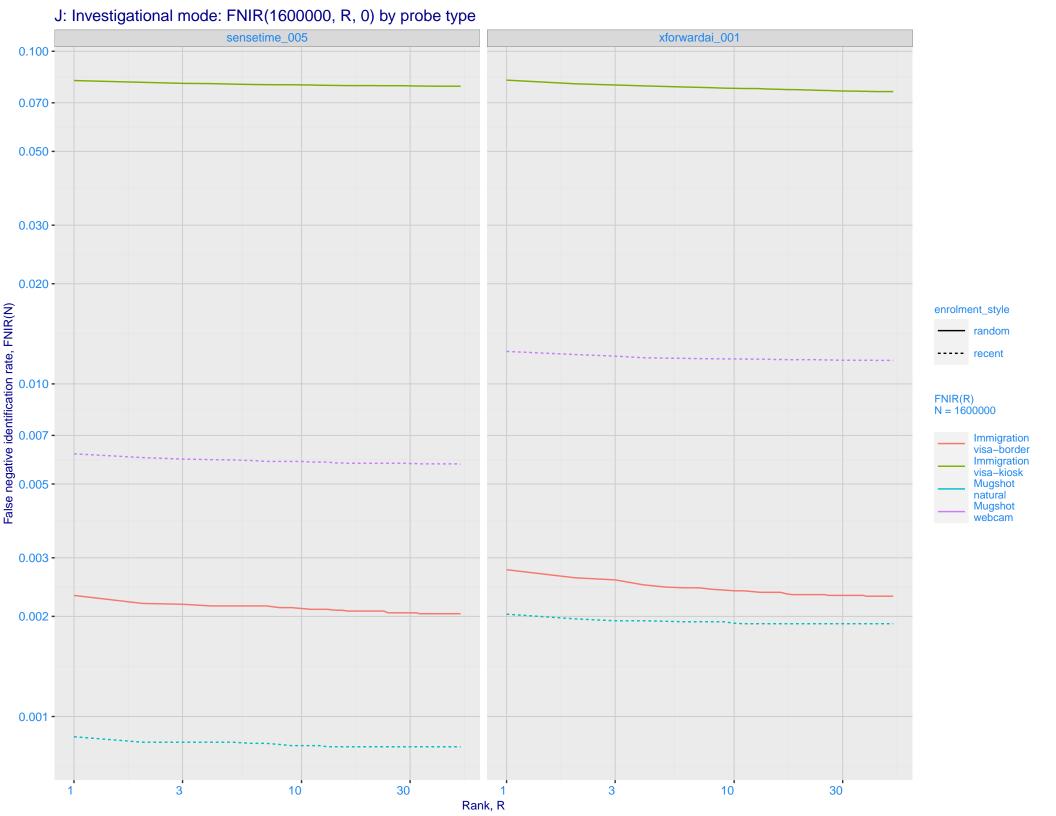


F: FPIR vs. Selectivity for mugshot images, N = 1600000 subjects enrolled with one recent mate 7e+01 -5e+01 -3e+01 -2e+01 -1e+01 -7e+00 -5e+00 -3e+00 -2e+00 -1e+00 -7e-01 -5e-01 -3e-01 -2e-01 -1e-01 -7e-02 -5e-02 -3e-02 -3e-02 -1e-02 -**Enrolled images:** recent N = 1600000 Mugshot natural Mugshot webcam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

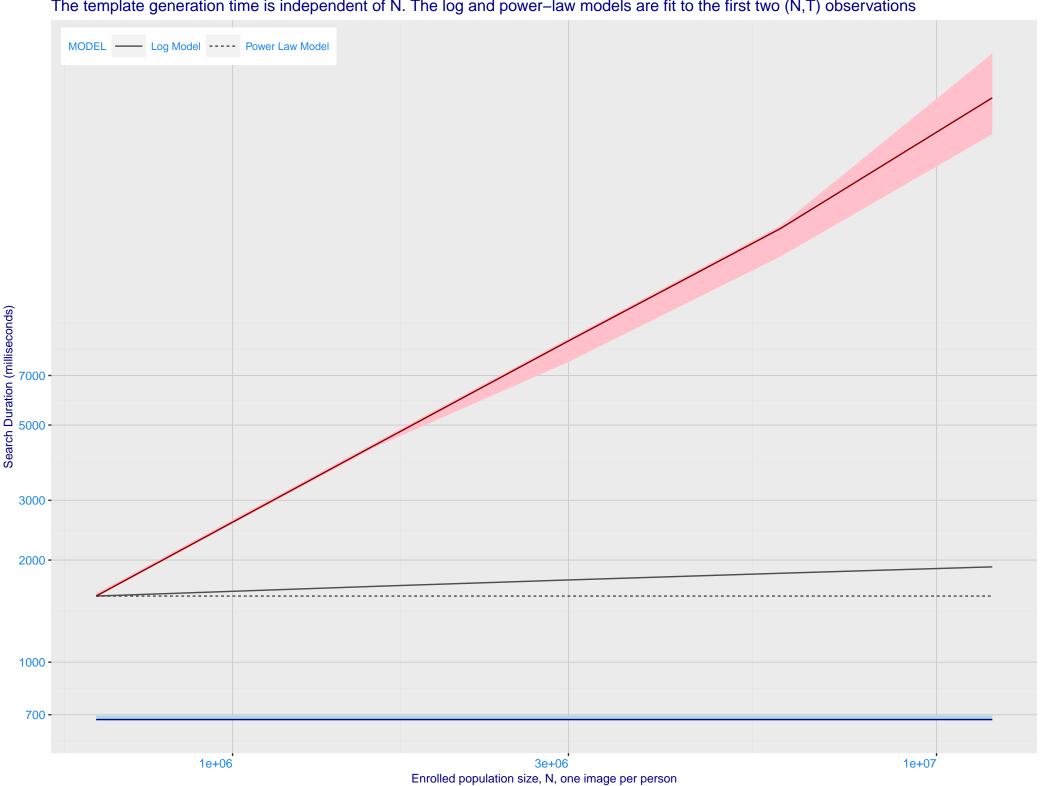




I: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime\_005) Immigration **Immigration** visa-border visa-kiosk 0.100 -0.070 -0.050 -0.030 -0.020 -0.010 -0.007 -0.005 -0.003 -Ealse negative identification rate, FNIR(N) 0.002 - 0.001 - 0.000 - 0.050 - 0.030 - 0. enrolment\_style random ---- recent Mugshot Mugshot webcam natural FNIR@Rank = 1 sensetime\_005 xforwardai\_001 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



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



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



