## A: Datasheet

Algorithm: irex\_000

Developer: IrexAl

Submission Date: 2021\_02\_09

Template size: 3080 bytes

Template time (2.5 percentile): 841 msec

Template time (median): 845 msec

Template time (97.5 percentile): 7057 msec

Investigation:

Frontal mugshot ranking 74 (out of 265) -- FNIR(1600000, 0, 1) = 0.0044 vs. lowest 0.0009 from sensetime\_005

Mugshot webcam ranking 13 (out of 227) -- FNIR(1600000, 0, 1) = 0.0095 vs. lowest 0.0062 from sensetime\_005

Mugshot profile ranking 73 (out of 196) -- FNIR(1600000, 0, 1) = 0.6805 vs. lowest 0.0591 from sensetime\_005

Immigration visa-border ranking 10 (out of 148) -- FNIR(1600000, 0, 1) = 0.0024 vs. lowest 0.0013 from visionlabs\_010

Immigration visa-kiosk ranking 10 (out of 145) -- FNIR(1600000, 0, 1) = 0.0817 vs. lowest 0.0568 from hr\_000

Identification:

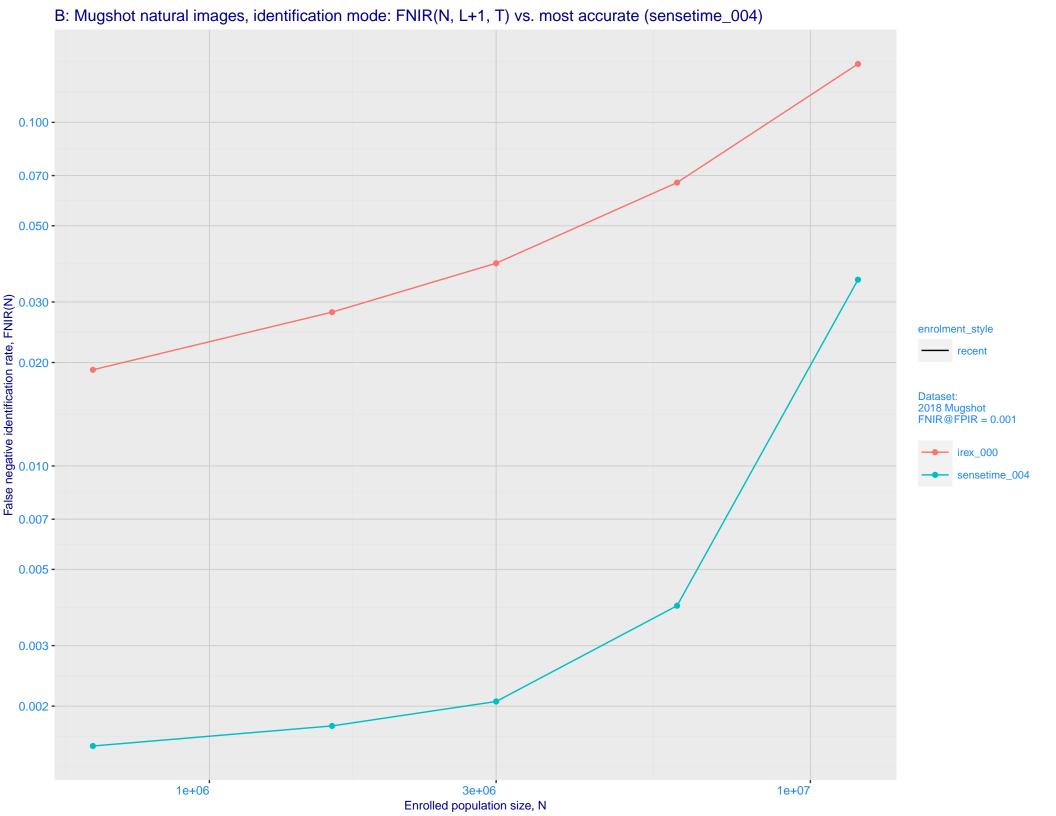
Frontal mugshot ranking 51 (out of 265) -- FNIR(1600000, T, L+1) = 0.0280, FPIR=0.001000 vs. lowest 0.0018 from sensetime\_004

Mugshot webcam ranking 32 (out of 225) -- FNIR(1600000, T, L+1) = 0.0597, FPIR=0.001000 vs. lowest 0.0122 from sensetime\_003

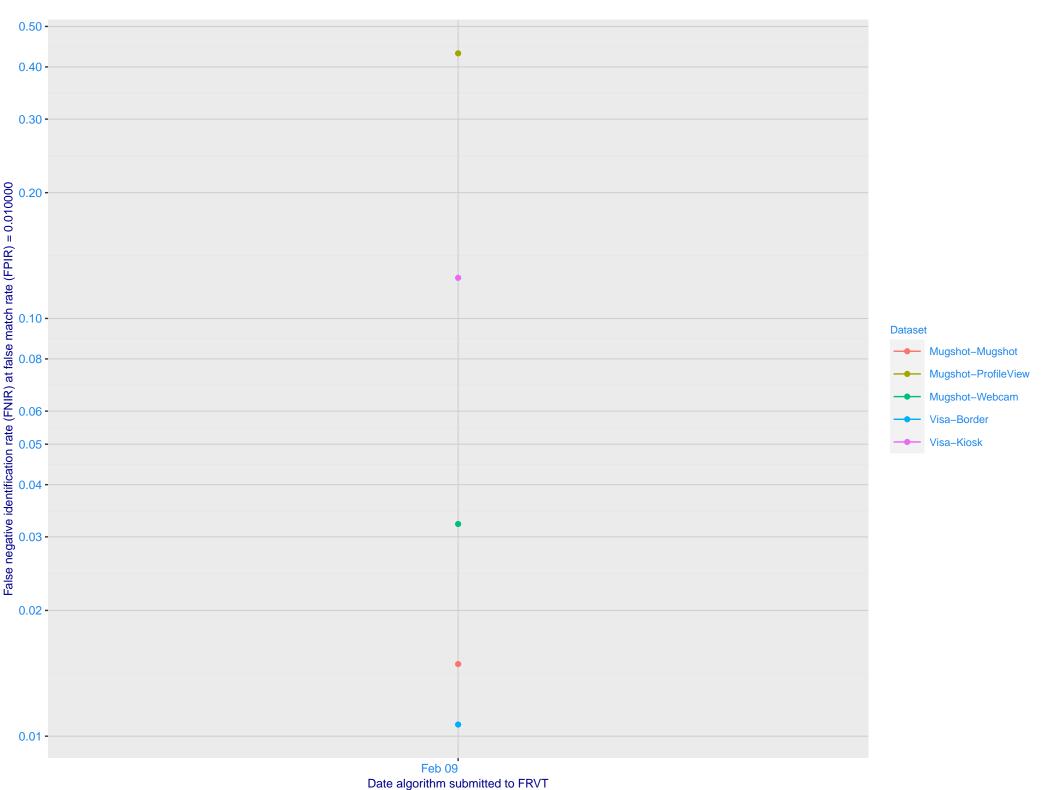
Mugshot profile ranking 38 (out of 195) -- FNIR(1600000, T, L+1) = 0.9568, FPIR=0.001000 vs. lowest 0.1331 from hr\_000

Immigration visa-border ranking 39 (out of 146) -- FNIR(1600000, T, L+1) = 0.0443, FPIR=0.001000 vs. lowest 0.0049 from hr\_000

Immigration visa-kiosk ranking 15 (out of 141) — FNIR(1600000, T, L+1) = 0.1715, FPIR=0.001000 vs. lowest 0.0996 from hr\_000

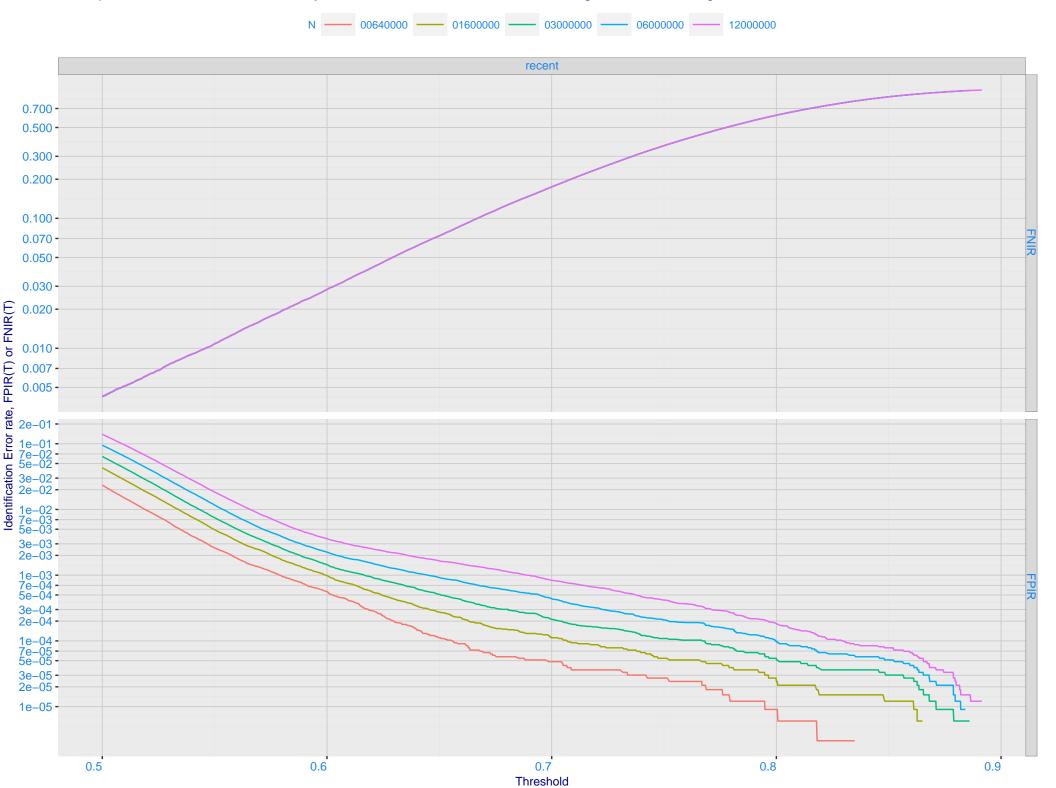


## C: Evolution of accuracy for IREX algorithms on three datasets 2018 - present

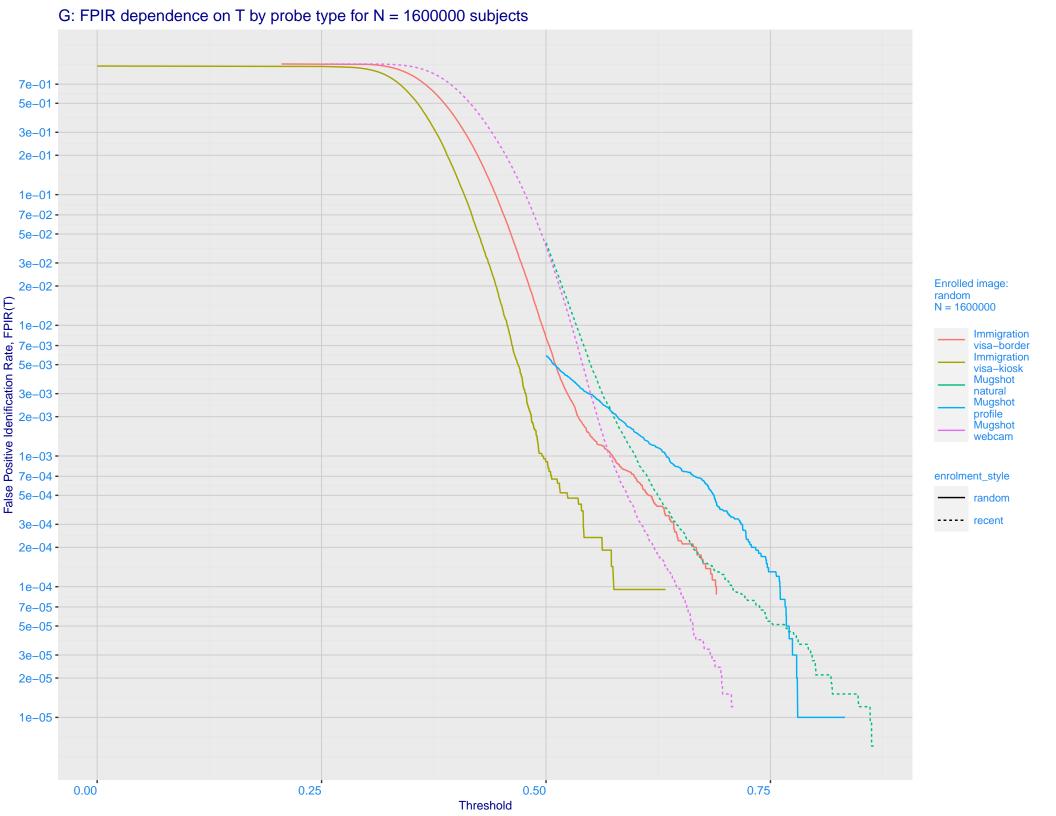


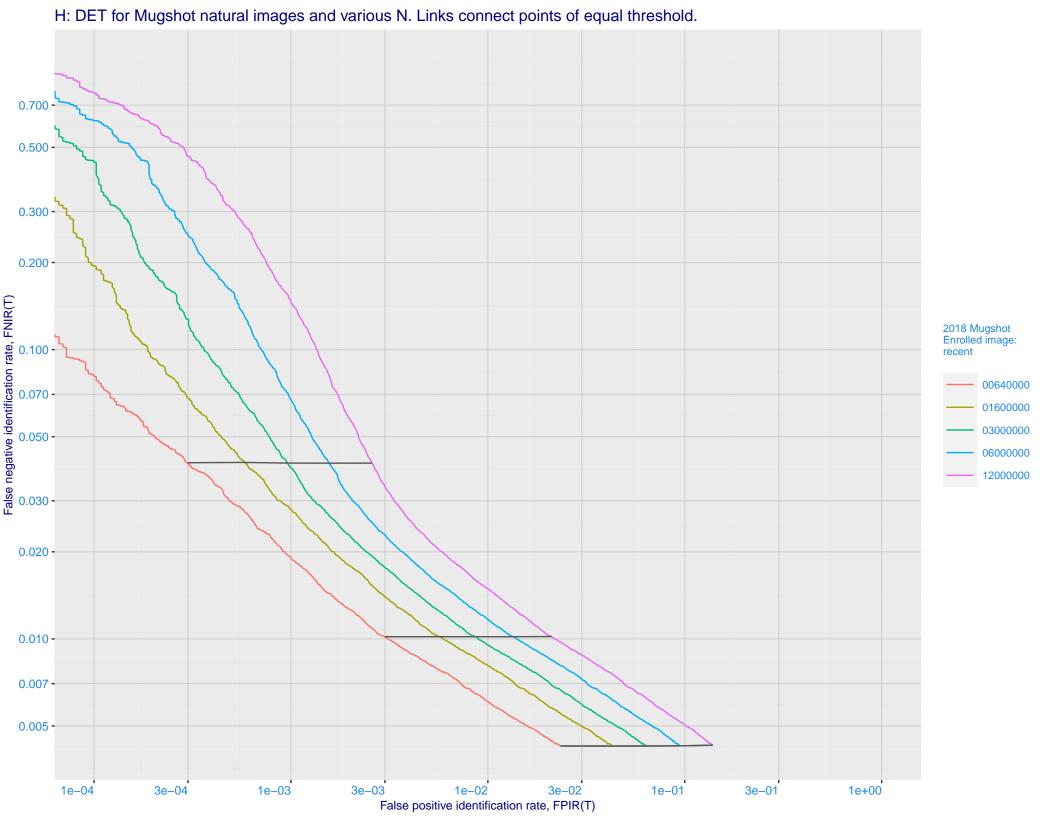
D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals Immigration Immigration Mugshot visa-border visa-kiosk natural 0.700 -0.500 -0.300 -0.200 -0.100 -0.070 -0.050 -0.030 -0.020 -0.010 -0.007 -Ealse negative identification rate, FNIR(T) 0.003 - 0.002 - 0.001 - 0.500 - 0.500 - 0.200 - 0. 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 - $1e^{-0.4}e^{-0.3}e^{-0.4}1e^{-0.3}e^{-0.3}e^{-0.3}e^{-0.2}e^{-0.2}1e^{-0.3}e^{-0.1}e^{-0.3}e^{-0.4}1e^{-0.3}e^{-0.4}1e^{-0.3}e^{-0.3}1e^{-0.3}e^{-0.3}1e^{-0.3}e^{-0.3}1e^{-$ False positive identification rate, FPIR(T)

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

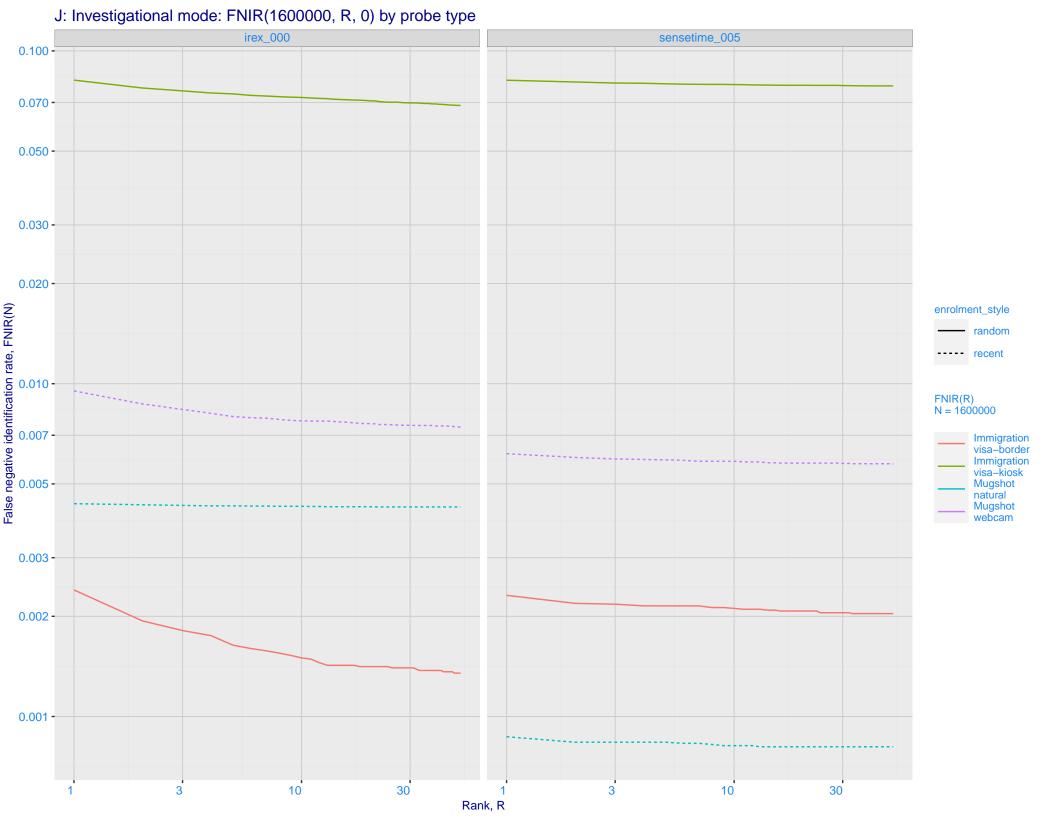


F: FPIR vs. Selectivity for mugshot images, N = 1600000 subjects enrolled with one recent mate 7e+01 -5e+01 -3e+01 -2e+01 -1e+01 -7e+00 -5e+00 -3e+00 -2e+00 -1e+00 -7e-01 -5e-01 -3e-01 -2e-01 -1e-01 -7e-02 -Selectivity. SEL(T) 3e-02 - 2e-02 - 1e-02 - 7e-03 - 7e-03 - 5e-03 - 2e-02 - 1e-02 - 7e-03 - 7e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

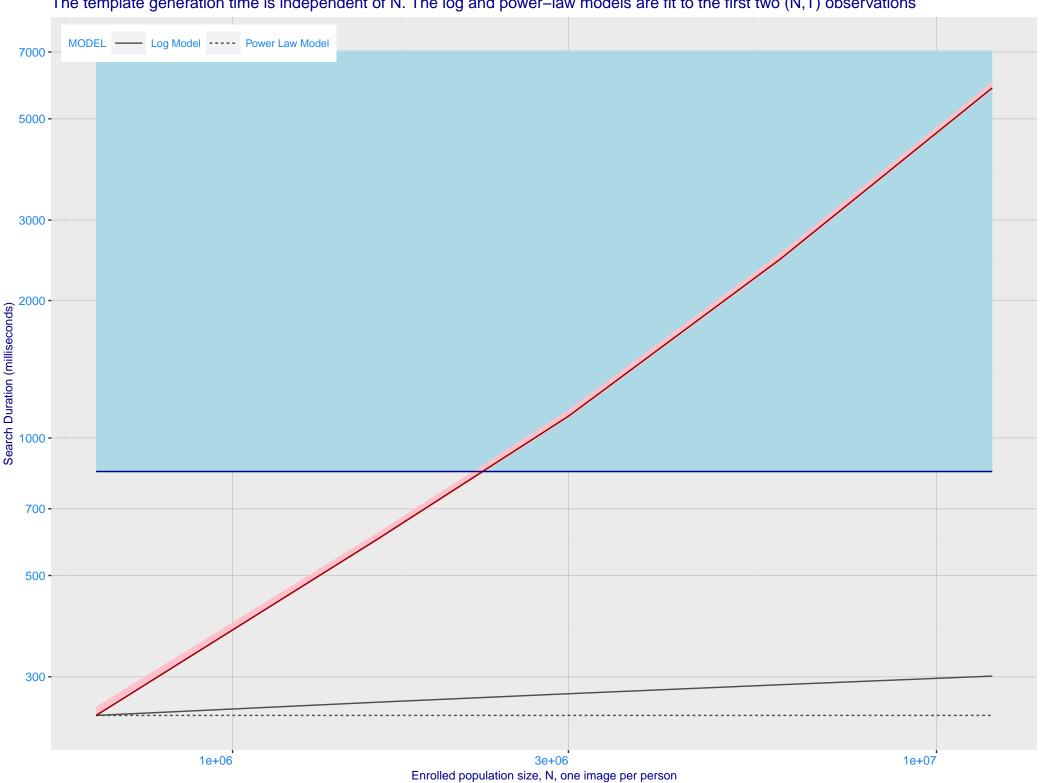




I: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime\_005) Immigration **Immigration** visa-border visa-kiosk 0.100 0.070 -0.050 -0.030 -0.020 -0.010 -0.007 -0.005 -0.003 -Ealse negative identification rate, FNIR(N) 0.002 - 0.001 - 0.000 - 0.050 - 0.030 - 0. enrolment\_style random ---- recent Mugshot Mugshot webcam natural FNIR@Rank = 1 -- irex\_000 sensetime\_005 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



