## A: Datasheet

Algorithm: 3divi\_5

Developer: 3Divi

Submission Date: 2018\_10\_26

Template size: 4096 bytes

Template time (2.5 percentile): 506 msec

Template time (median): 639 msec

Template time (97.5 percentile): 866 msec

Investigation:

Frontal mugshot ranking 170 (out of 279) -- FNIR(1600000, 0, 1) = 0.0176 vs. lowest 0.0009 from sensetime\_005

Mugshot webcam ranking 170 (out of 241) -- FNIR(1600000, 0, 1) = 0.0619 vs. lowest 0.0062 from sensetime\_005

Mugshot profile ranking 135 (out of 210) — FNIR(1600000, 0, 1) = 0.9296 vs. lowest 0.0587 from xforwardai\_002

Immigration visa-border ranking 159 (out of 168) -- FNIR(1600000, 0, 1) = 0.8207 vs. lowest 0.0013 from visionlabs\_010

Immigration visa-kiosk ranking 111 (out of 165) -- FNIR(1600000, 0, 1) = 0.2790 vs. lowest 0.0568 from cloudwalk\_hr\_000

Identification:

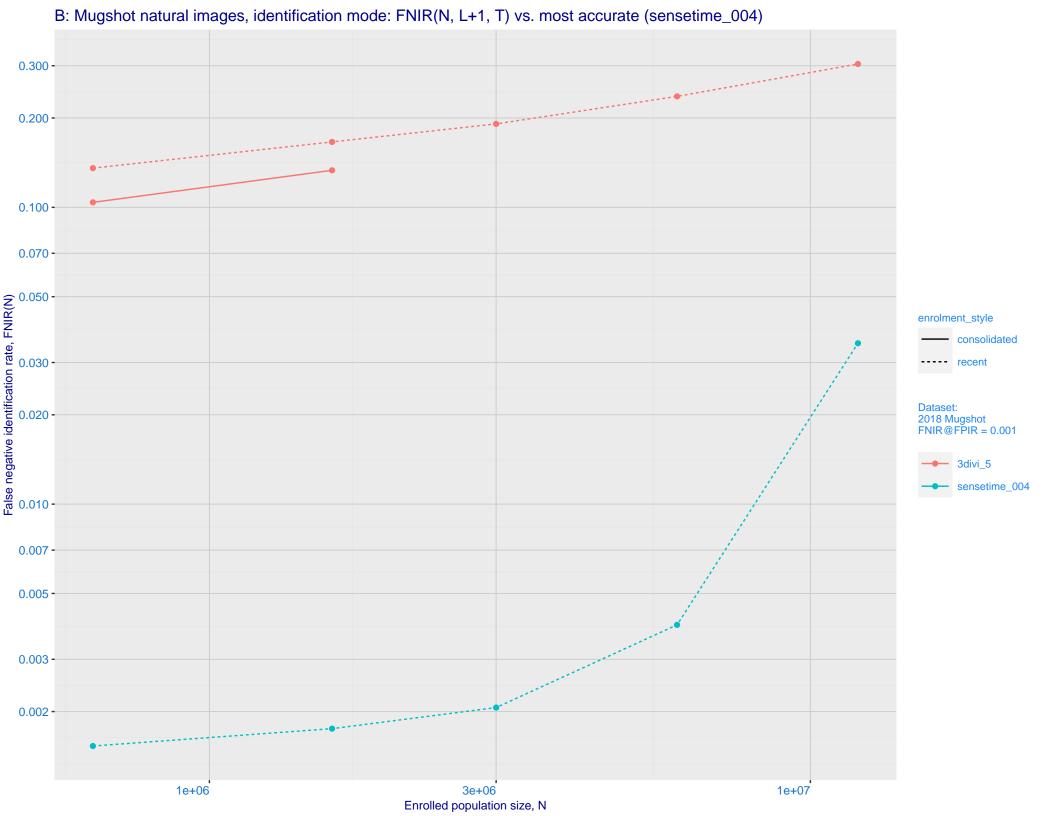
Frontal mugshot ranking 177 (out of 279) -- FNIR(1600000, T, L+1) = 0.1661, FPIR=0.001000 vs. lowest 0.0018 from sensetime\_004

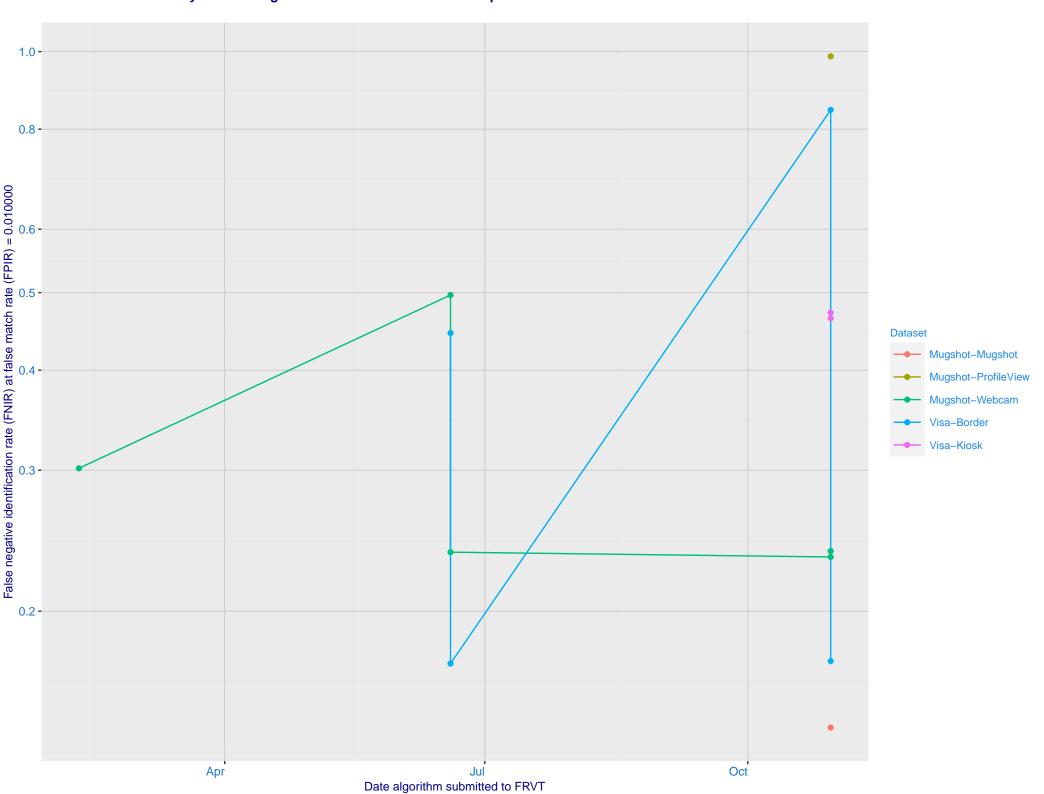
Mugshot webcam ranking 175 (out of 236) -- FNIR(1600000, T, L+1) = 0.3392, FPIR=0.001000 vs. lowest 0.0122 from sensetime\_003

Mugshot profile ranking 115 (out of 209) -- FNIR(1600000, T, L+1) = 0.9962, FPIR=0.001000 vs. lowest 0.1331 from cloudwalk\_hr\_000

Immigration visa-border ranking 140 (out of 167) -- FNIR(1600000, T, L+1) = 0.8646, FPIR=0.001000 vs. lowest 0.0047 from idemia\_008

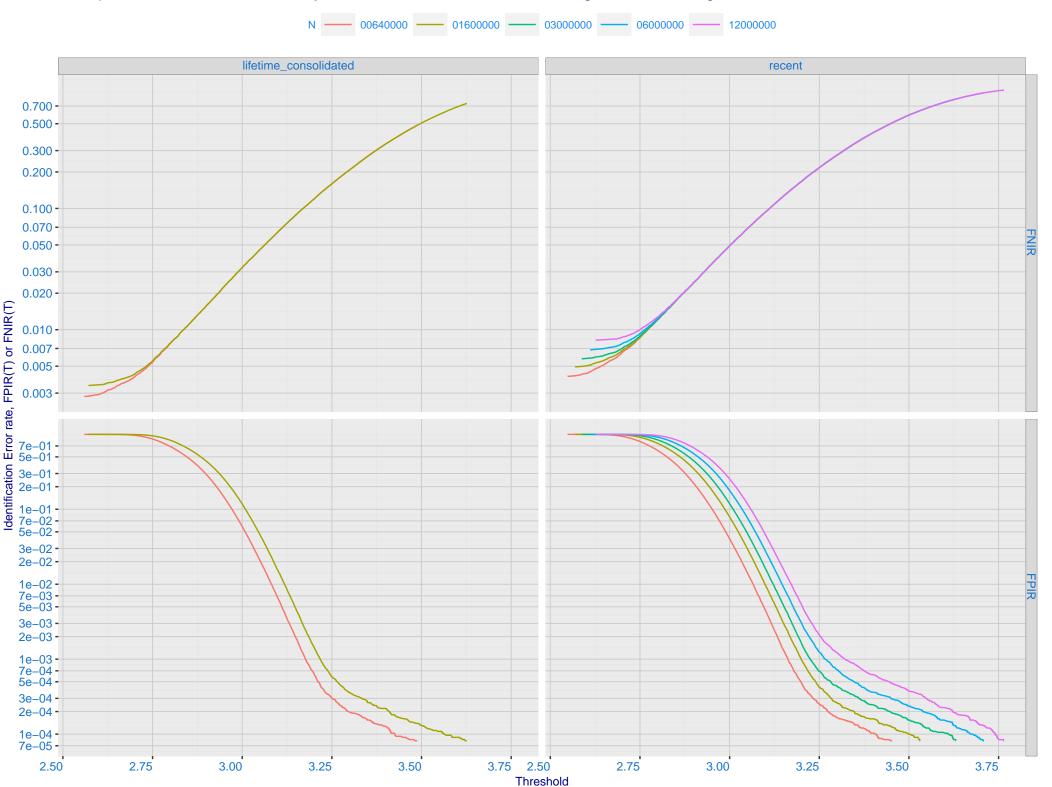
Immigration visa-kiosk ranking 82 (out of 162) — FNIR(1600000, T, L+1) = 0.6000, FPIR=0.001000 vs. lowest 0.0996 from cloudwalk\_hr\_000



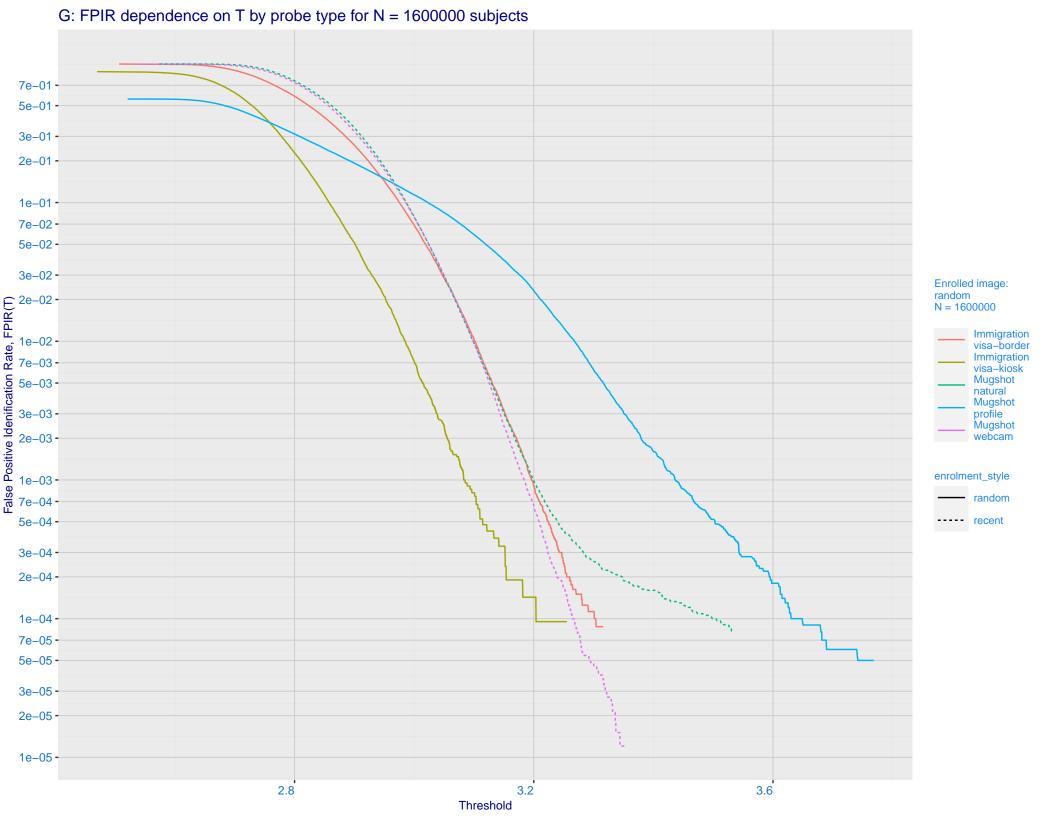


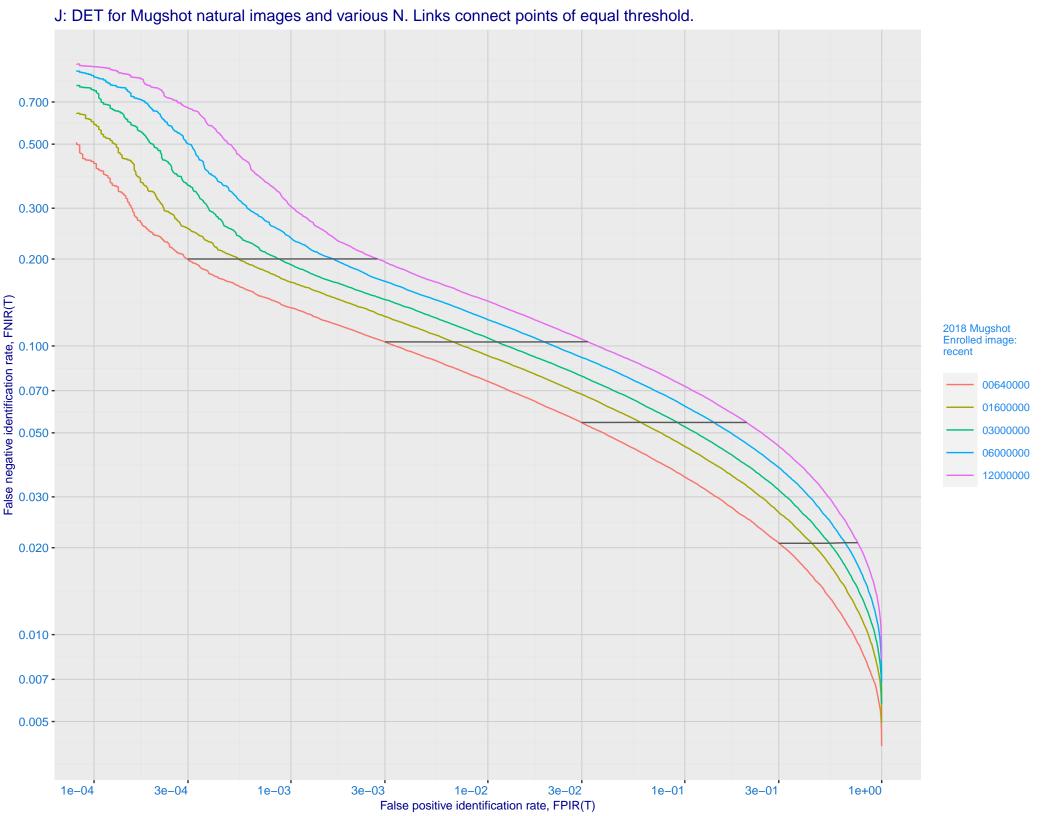
D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals Immigration **Immigration** Mugshot visa-border visa-kiosk natural 0.700 -0.500 -0.300 -0.200 -0.100 -0.070 -0.050 -0.030 -0.020 -0.010 -0.007 -Ealse negative identification rate, FNIR(T) 0.003 - 0.002 - 0.001 - 0.500 - 0.200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

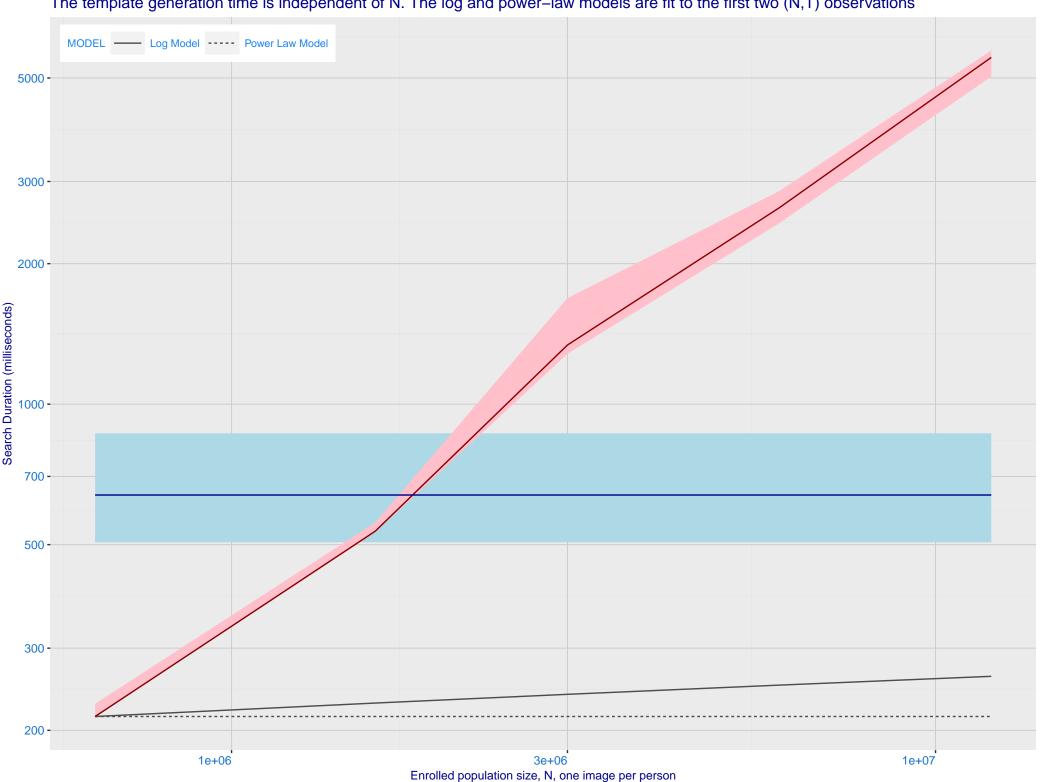




K: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime\_005) Immigration **Immigration** visa-border visa-kiosk 0.700 -0.500 -0.300 -0.200 -0.100 -0.070 -0.050 -0.030 -0.020 -0.010 -0.007 -0.005 - 0.003 - 0.002 - 0.001 - 0.001 - 0.500 - 0.500 - 0.200 FNIR@Rank = 1 --- 3divi\_5 sensetime\_005 Mugshot webcam Mugshot natural enrolment\_style consolidated ---- random --- recent 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

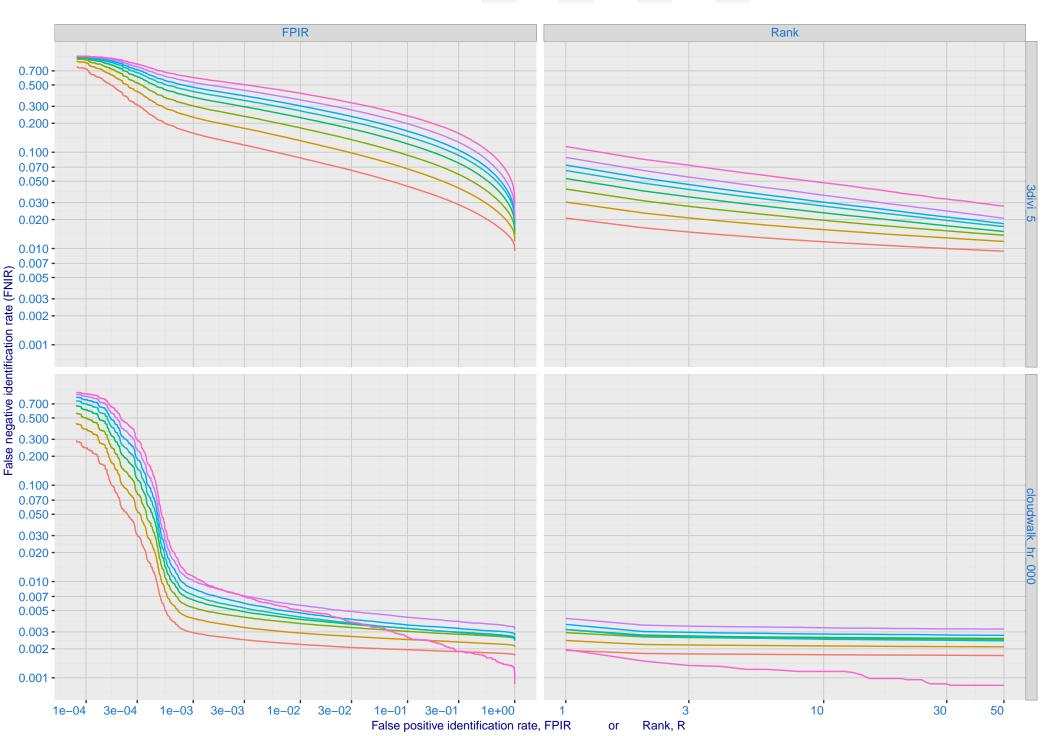
L: Investigational mode: FNIR(1600000, R, 0) by probe type 3divi\_5 sensetime\_005 0.700 -0.500 -0.300 -0.200 -0.100 enrolment\_style Ealse negative identification rate, FNIR(N) - 0.000 - 0.030 - 0.010 - lifetime\_consolidated ---- random --- recent FNIR(R) N = 1600000 Immigration visa-border Immigration visa-kiosk Mugshot natural Mugshot webcam 0.007 -0.005 -0.003 -0.002 -0.001 -10 30 3 10 30 Rank, R

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 4.0 -Dataset: 2018 Mugshot N= 3.1M Color encodes FNIR (Rank = 1) 0.15 3.5 -0.10 0.05 0.00 TVAL - FPIR = 0.001 3.0 -FPIR = 0.003 FPIR = 0.010FPIR = 0.030 2.5 -(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)