A: Datasheet

Algorithm: synesis_005

Developer: Synesis

Submission Date: 2020_09_08

Template size: 4104 bytes

Template time (2.5 percentile): 754 msec

Template time (median): 757 msec

Template time (97.5 percentile): 808 msec

Investigation:

Frontal mugshot ranking 125 (out of 279) −− FNIR(1600000, 0, 1) = 0.0085 vs. lowest 0.0009 from sensetime_005

Mugshot webcam ranking 37 (out of 241) −− FNIR(1600000, 0, 1) = 0.0127 vs. lowest 0.0062 from sensetime_005

Mugshot profile ranking 94 (out of 210) −− FNIR(1600000, 0, 1) = 0.7441 vs. lowest 0.0587 from xforwardai_002

Immigration visa−border ranking 21 (out of 168) −− FNIR(1600000, 0, 1) = 0.0032 vs. lowest 0.0013 from visionlabs_010

Immigration visa−kiosk ranking 23 (out of 165) −− FNIR(1600000, 0, 1) = 0.0923 vs. lowest 0.0568 from cloudwalk_hr_000

Identification:

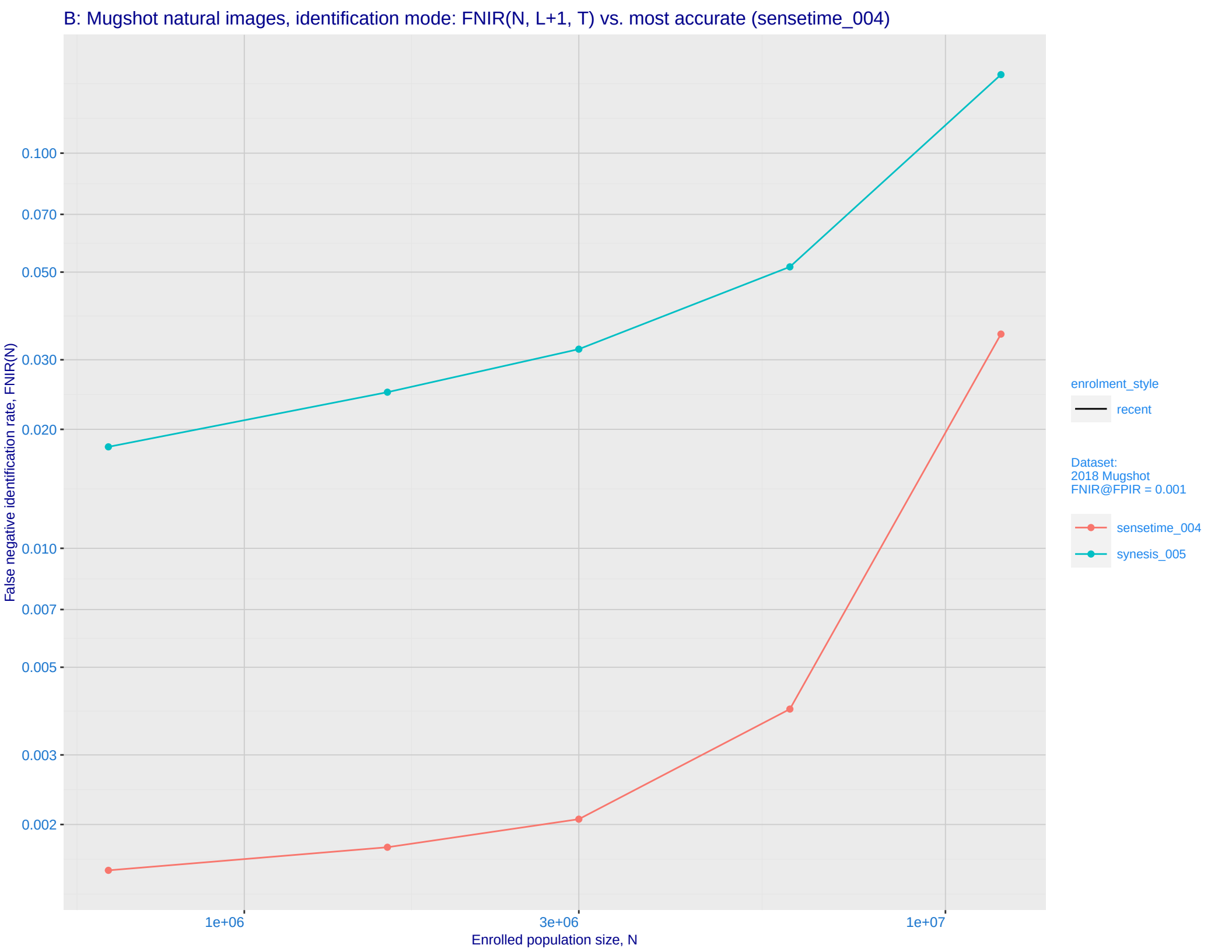
Frontal mugshot ranking 48 (out of 279) −− FNIR(1600000, T, L+1) = 0.0248, FPIR=0.001000 vs. lowest 0.0018 from sensetime_004

Mugshot webcam ranking 47 (out of 236) −− FNIR(1600000, T, L+1) = 0.0714, FPIR=0.001000 vs. lowest 0.0122 from sensetime_003

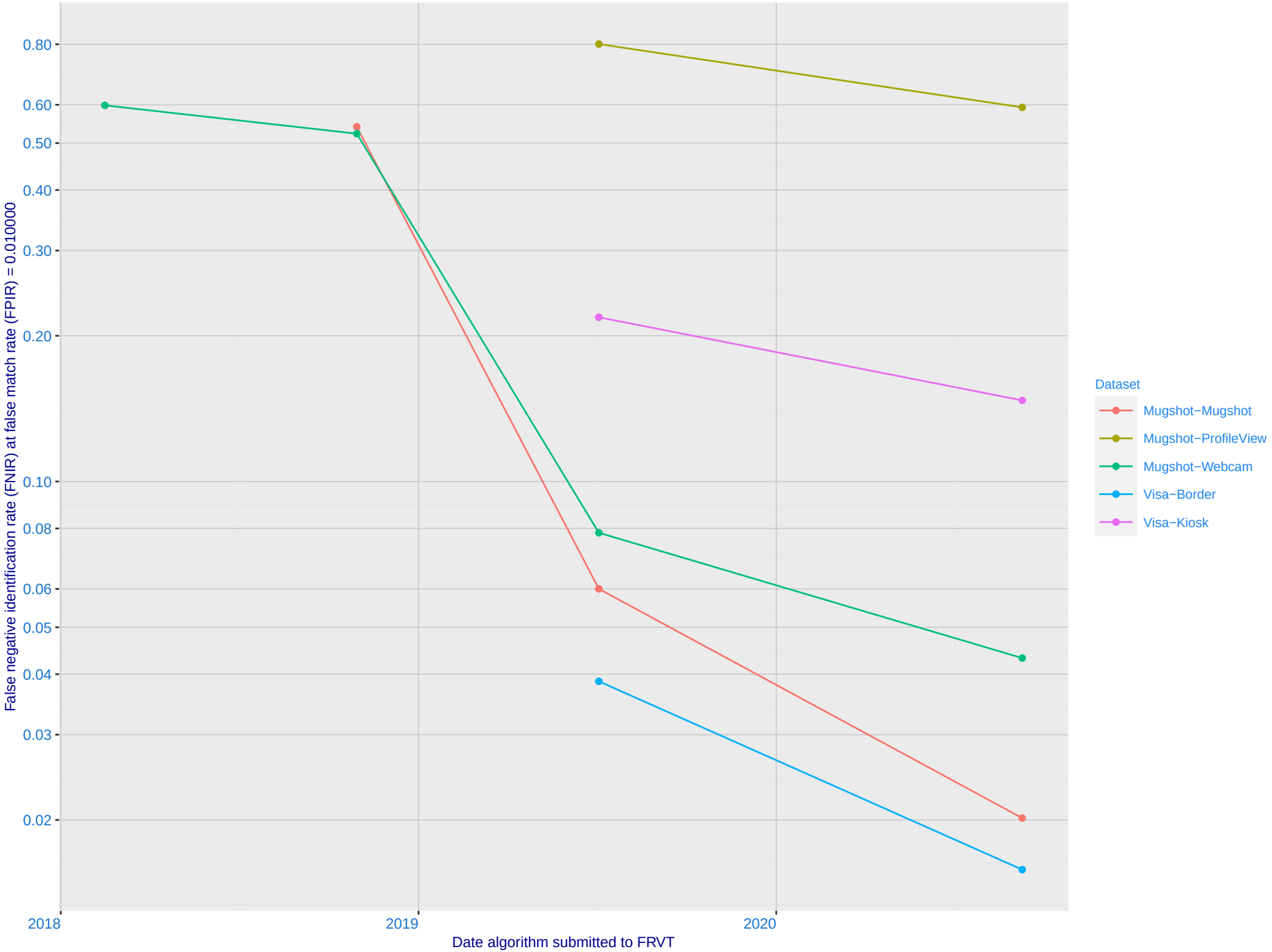
Mugshot profile ranking 72 (out of 209) −− FNIR(1600000, T, L+1) = 0.9837, FPIR=0.001000 vs. lowest 0.1331 from cloudwalk_hr_000

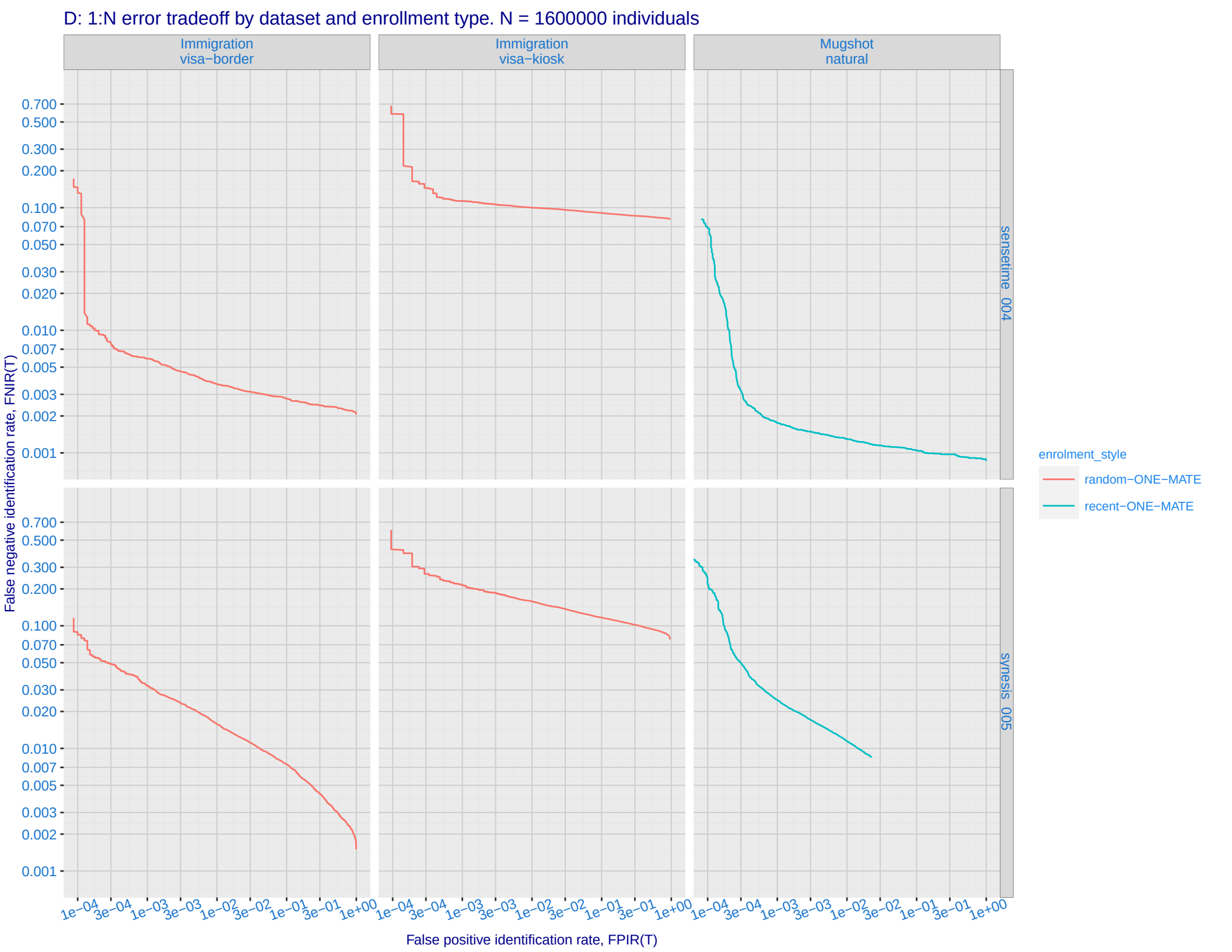
Immigration visa−border ranking 37 (out of 167) −− FNIR(1600000, T, L+1) = 0.0325, FPIR=0.001000 vs. lowest 0.0047 from idemia_008

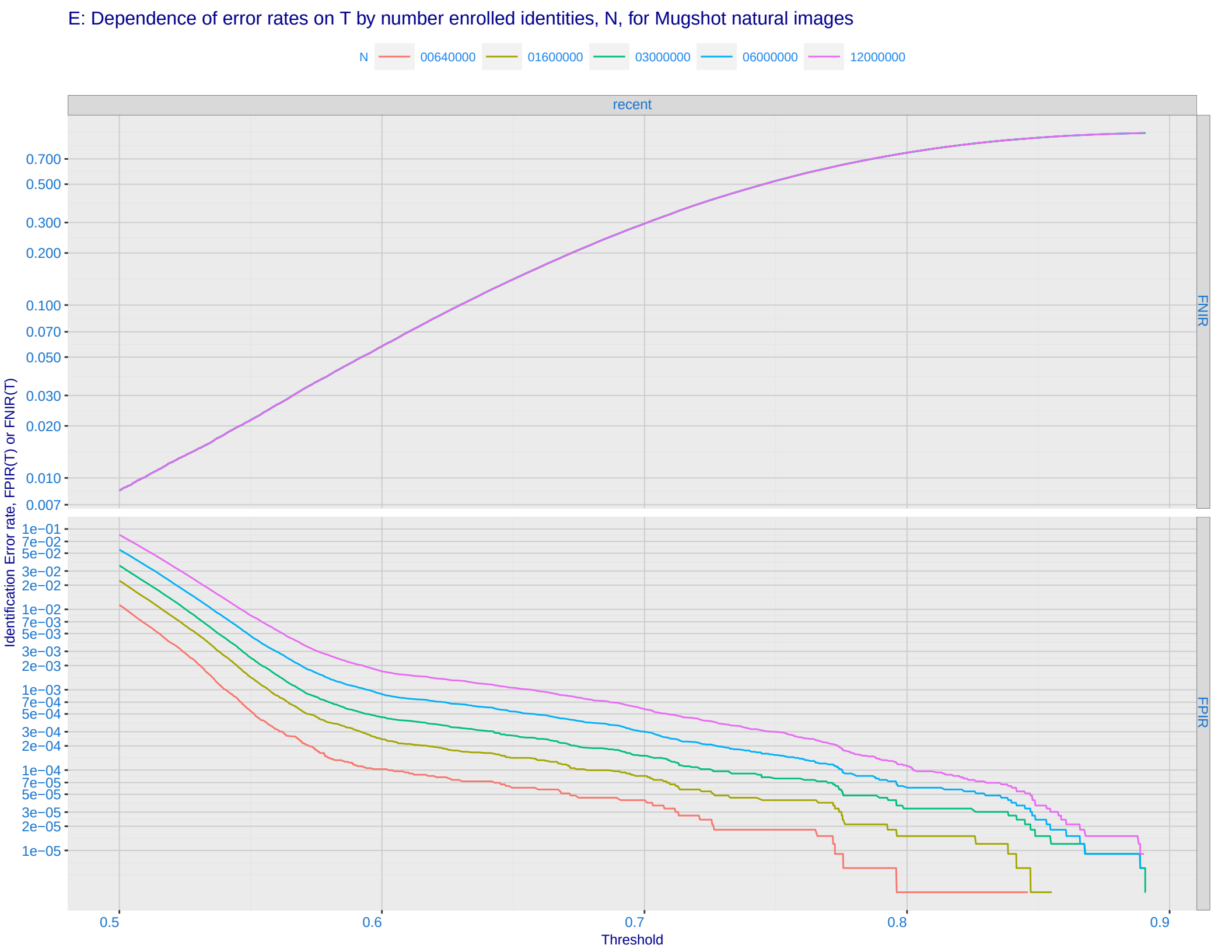
Immigration visa−kiosk ranking 25 (out of 162) −− FNIR(1600000, T, L+1) = 0.2160, FPIR=0.001000 vs. lowest 0.0996 from cloudwalk_hr_000

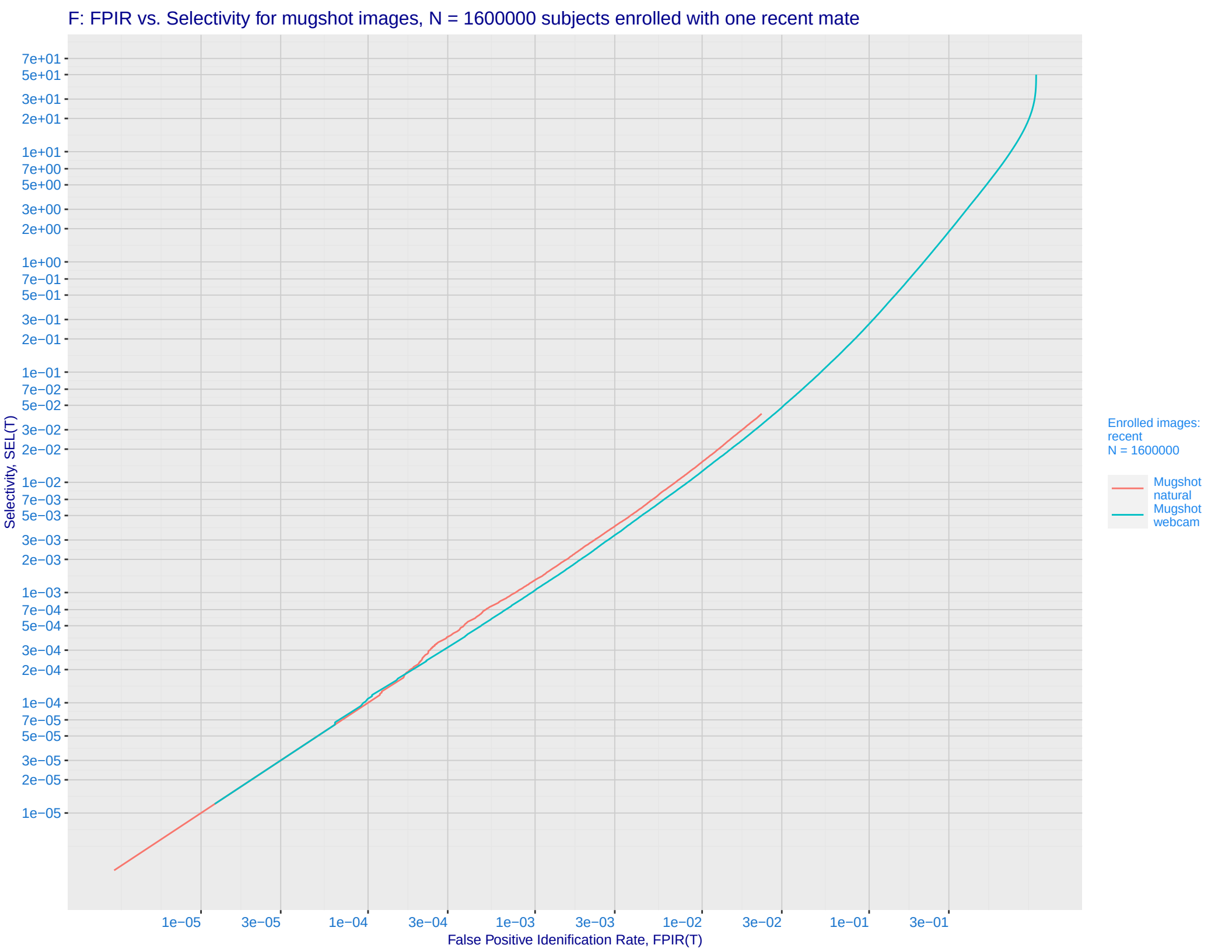

B: Mugshot natural images, identification mode: FNIR(N, L+1, T) vs. most accurate (sensetime_004)
False negative identification rate, FNIR(N)
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
1e+06
3e+06
1e+07
Enrolled population size, N
enrolment_style
recent
Dataset:
2018 Mugshot
FNIR@FPIR = 0.001
sensetime_004
synesis_005

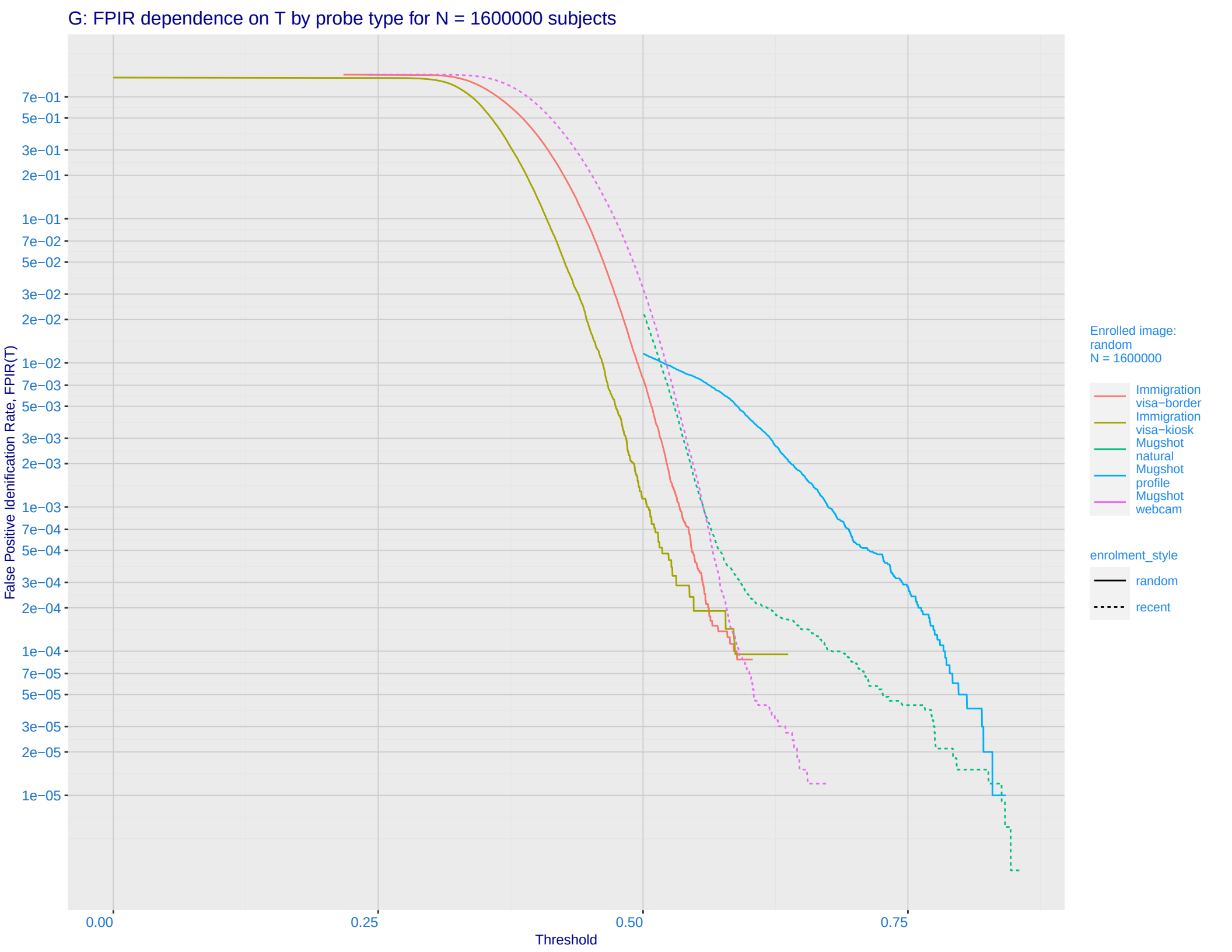
C: Evolution of accuracy for SYNESIS algorithms on three datasets 2018 − present

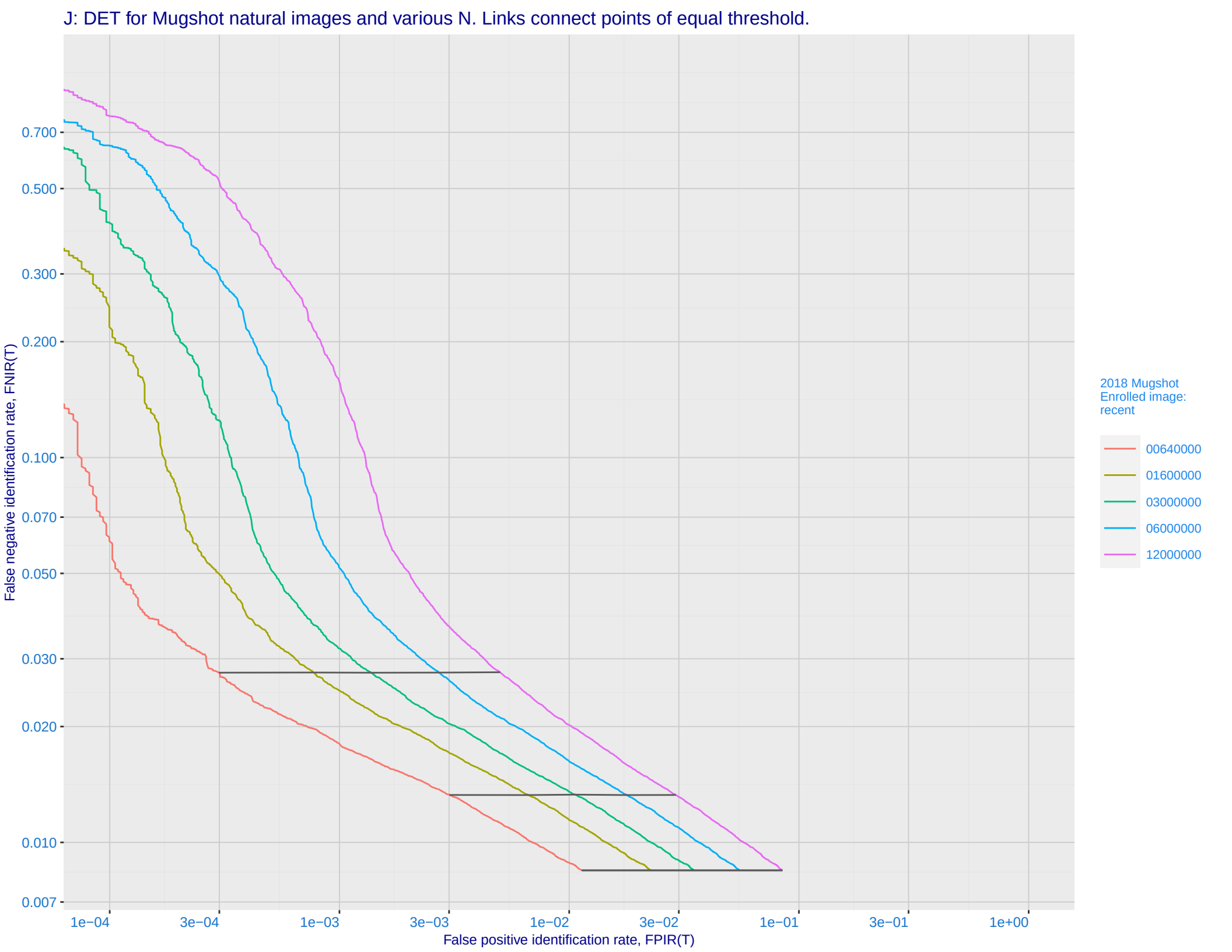


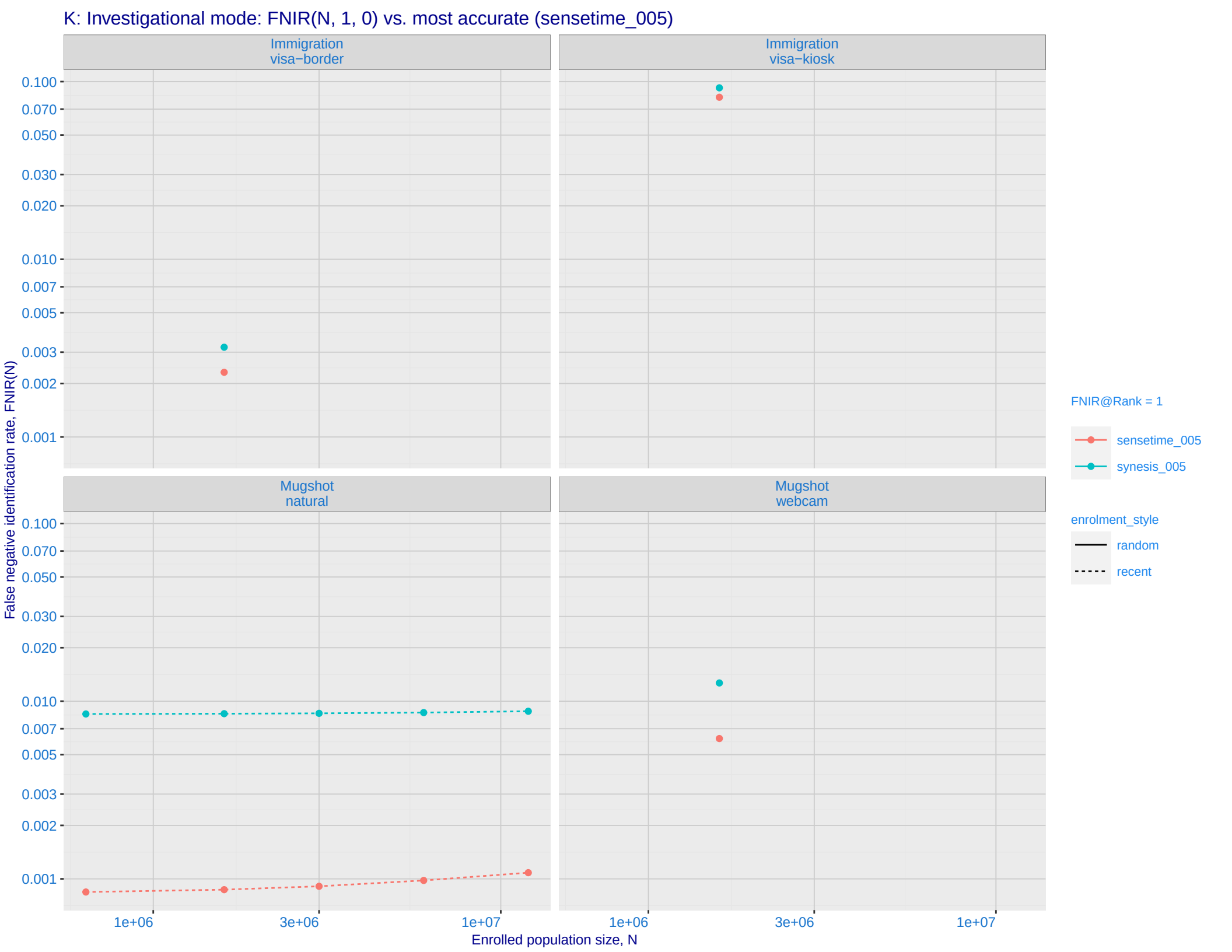

D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals
Immigration visa−border
Immigration visa−kiosk
Mugshot natural
sensetime_004
synesis_005
False negative identification rate, FNIR(T)
0.700
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
0.001
1e−04
3e−04
1e−03
3e−03
1e−02
3e−02
1e−01
3e−01
1e+00
False positive identification rate, FPIR(T)
enrolment_style
random−ONE−MATE
recent−ONE−MATE

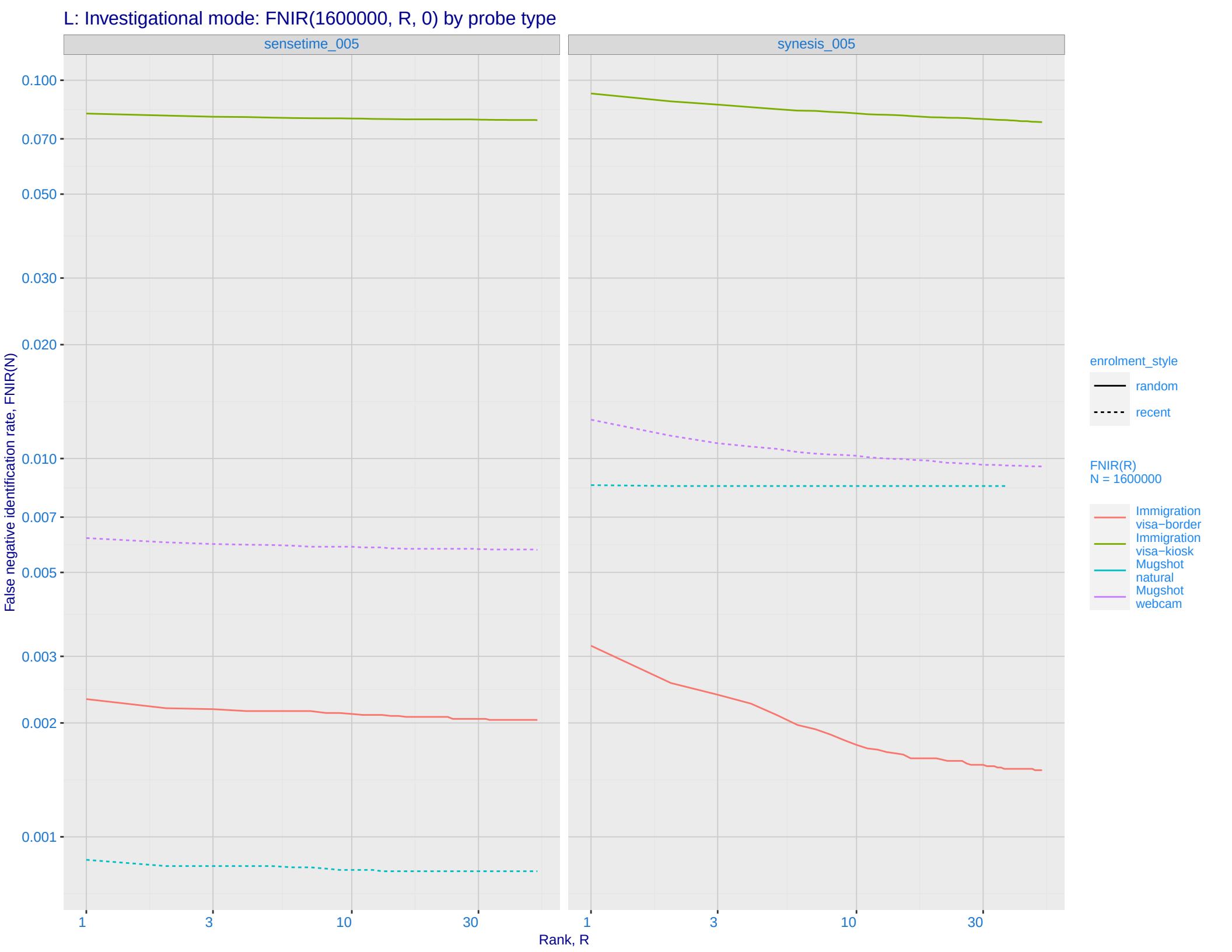

E: Dependence of error rates on T by number enrolled identities, N, for Mugshot natural images
N
00640000
01600000
03000000
06000000
12000000
recent
FNIR
FPIR
Identification Error rate, FPIR(T) or FNIR(T)
0.700
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
1e−01
7e−02
5e−02
3e−02
2e−02
1e−02
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
0.5
0.6
0.7
0.8
0.9
Threshold


F: FPIR vs. Selectivity for mugshot images, N = 1600000 subjects enrolled with one recent mate
Selectivity, SEL(T)
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
2e−02
1e−02
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)
Enrolled images:
recent
N = 1600000
Mugshot
natural
Mugshot
webcam

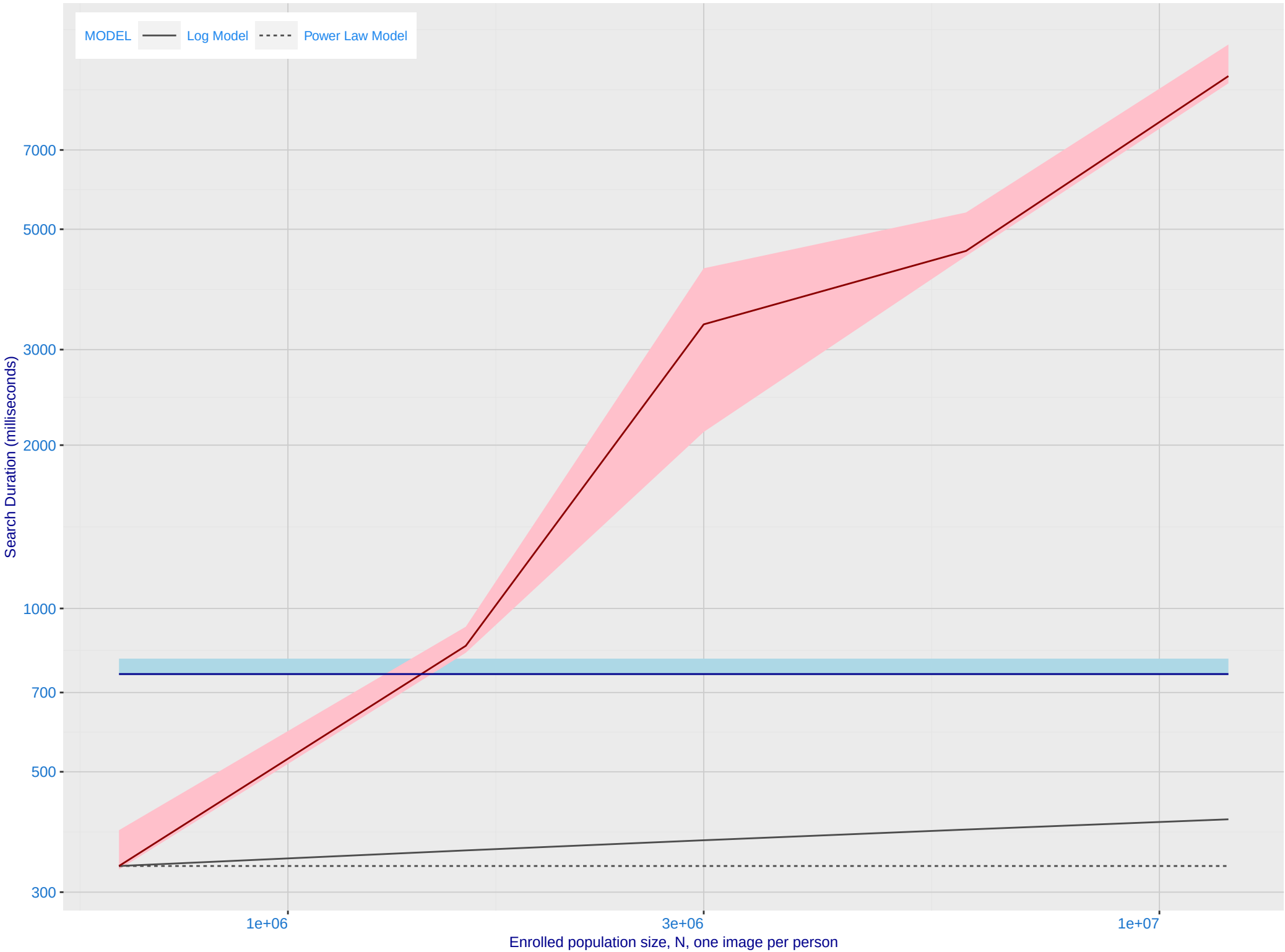

G: FPIR dependence on T by probe type for N = 1600000 subjects
False Positive Idenification Rate, FPIR(T)
7e−01
5e−01
3e−01
2e−01
1e−01
7e−02
5e−02
3e−02
2e−02
1e−02
7e−03
5e−03
3e−03
2e−03
1e−03
7e−04
5e−04
3e−04
2e−04
1e−04
7e−05
5e−05
3e−05
2e−05
1e−05
0.00
0.25
0.50
0.75
Threshold
Enrolled image:
random
N = 1600000
Immigration visa−border
Immigration visa−kiosk
Mugshot natural
Mugshot profile
Mugshot webcam
enrolment_style
random
recent

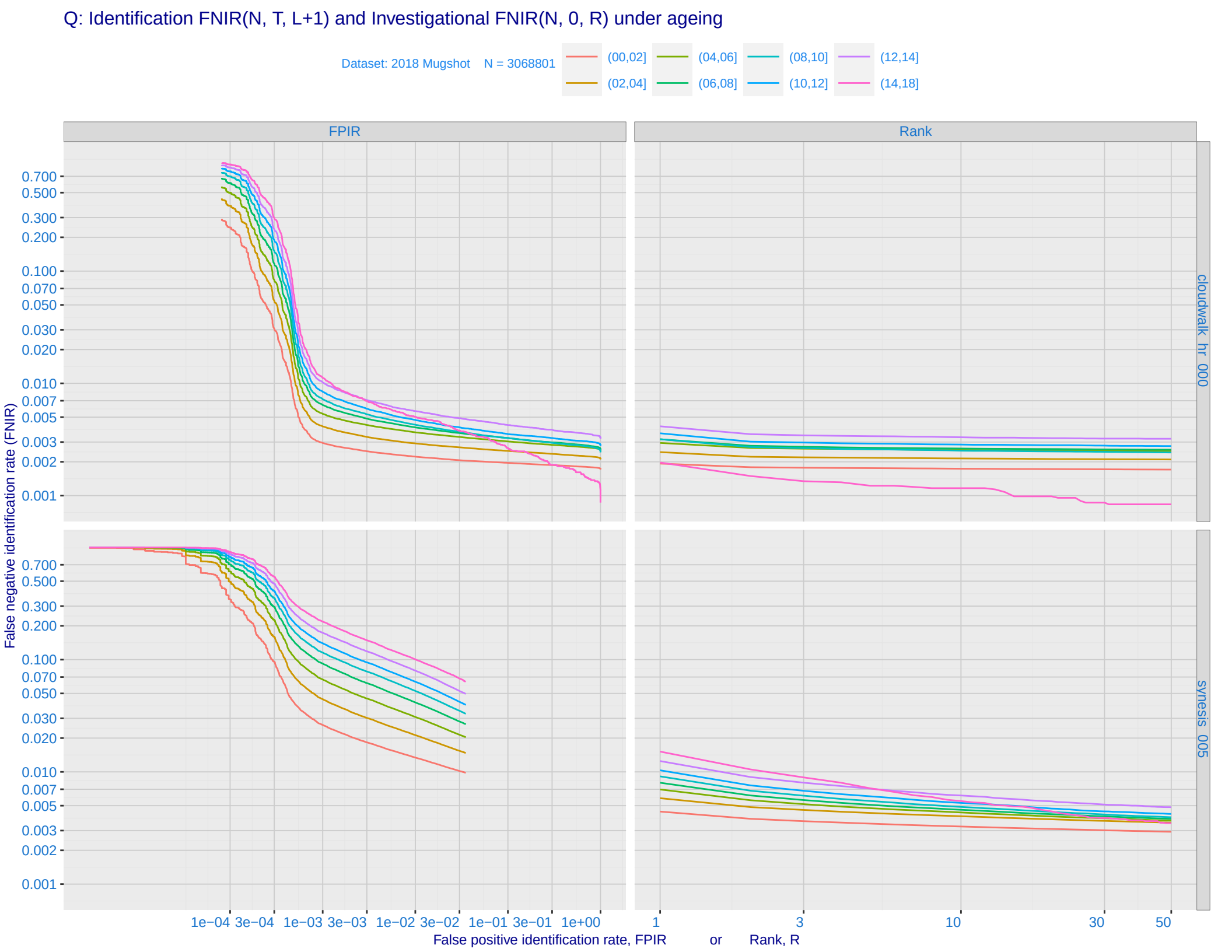

J: DET for Mugshot natural images and various N. Links connect points of equal threshold.
False negative identification rate, FNIR(T)
0.700
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
1e−04
3e−04
1e−03
3e−03
1e−02
3e−02
1e−01
3e−01
1e+00
False positive identification rate, FPIR(T)
2018 Mugshot
Enrolled image:
recent
00640000
01600000
03000000
06000000
12000000


K: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime_005)
Immigration
visa−border
Immigration
visa−kiosk
Mugshot
natural
Mugshot
webcam
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
0.001
False negative identification rate, FNIR(N)
1e+06
3e+06
1e+07
Enrolled population size, N
FNIR@Rank = 1
sensetime_005
synesis_005
enrolment_style
random
recent


L: Investigational mode: FNIR(1600000, R, 0) by probe type
sensetime_005
synesis_005
False negative identification rate, FNIR(N)
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
0.001
1
3
10
30
Rank, R
enrolment_style
random
recent
FNIR(R)
N = 1600000
Immigration visa−border
Immigration visa−kiosk
Mugshot natural
Mugshot webcam

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
Dataset: 2018 Mugshot N = 3068801
(00,02]
(02,04]
(04,06]
(06,08]
(08,10]
(10,12]
(12,14]
(14,18]
FPIR
Rank
cloudwalk hr 000
synesis 005
False negative identification rate (FNIR)
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
1e−04 3e−04 1e−03 3e−03 1e−02 3e−02 1e−01 3e−01 1e+00
1
3
10
30
50
False positive identification rate, FPIR or Rank, R

R: Decline of genuine scores with ageing, with some eventually dropping below typical thresholds shown by the horizontal lines