A: Datasheet

Algorithm: aware_5

Developer: Aware

Submission Date: 2018_10_30

Template size: 3100 bytes

Template time (2.5 percentile): 765 msec

Template time (median): 793 msec

Template time (97.5 percentile): 1280 msec

Investigation:

Frontal mugshot ranking 181 (out of 265) −− FNIR(1600000, 0, 1) = 0.0311 vs. lowest 0.0009 from sensetime_005

Mugshot webcam ranking 161 (out of 227) −− FNIR(1600000, 0, 1) = 0.0671 vs. lowest 0.0062 from sensetime_005

Mugshot profile ranking 180 (out of 196) −− FNIR(1600000, 0, 1) = 0.9780 vs. lowest 0.0591 from sensetime_005

Immigration visa−border ranking 93 (out of 148) −− FNIR(1600000, 0, 1) = 0.0481 vs. lowest 0.0013 from visionlabs_010

Immigration visa−kiosk ranking 102 (out of 145) −− FNIR(1600000, 0, 1) = 0.3081 vs. lowest 0.0568 from hr_000

Identification:

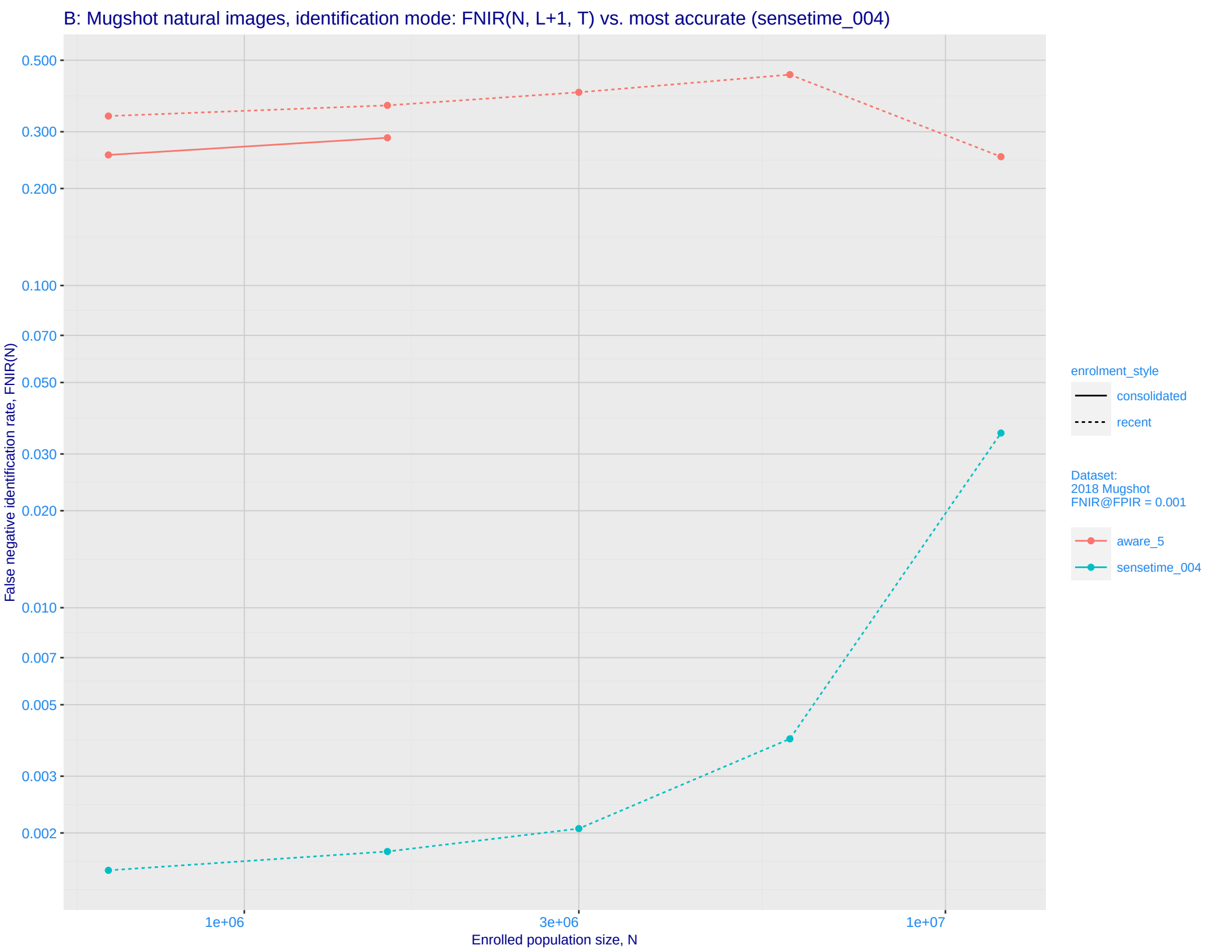
Frontal mugshot ranking 203 (out of 265) −− FNIR(1600000, T, L+1) = 0.3622, FPIR=0.001000 vs. lowest 0.0018 from sensetime_004

Mugshot webcam ranking 144 (out of 225) −− FNIR(1600000, T, L+1) = 0.2531, FPIR=0.001000 vs. lowest 0.0122 from sensetime_003

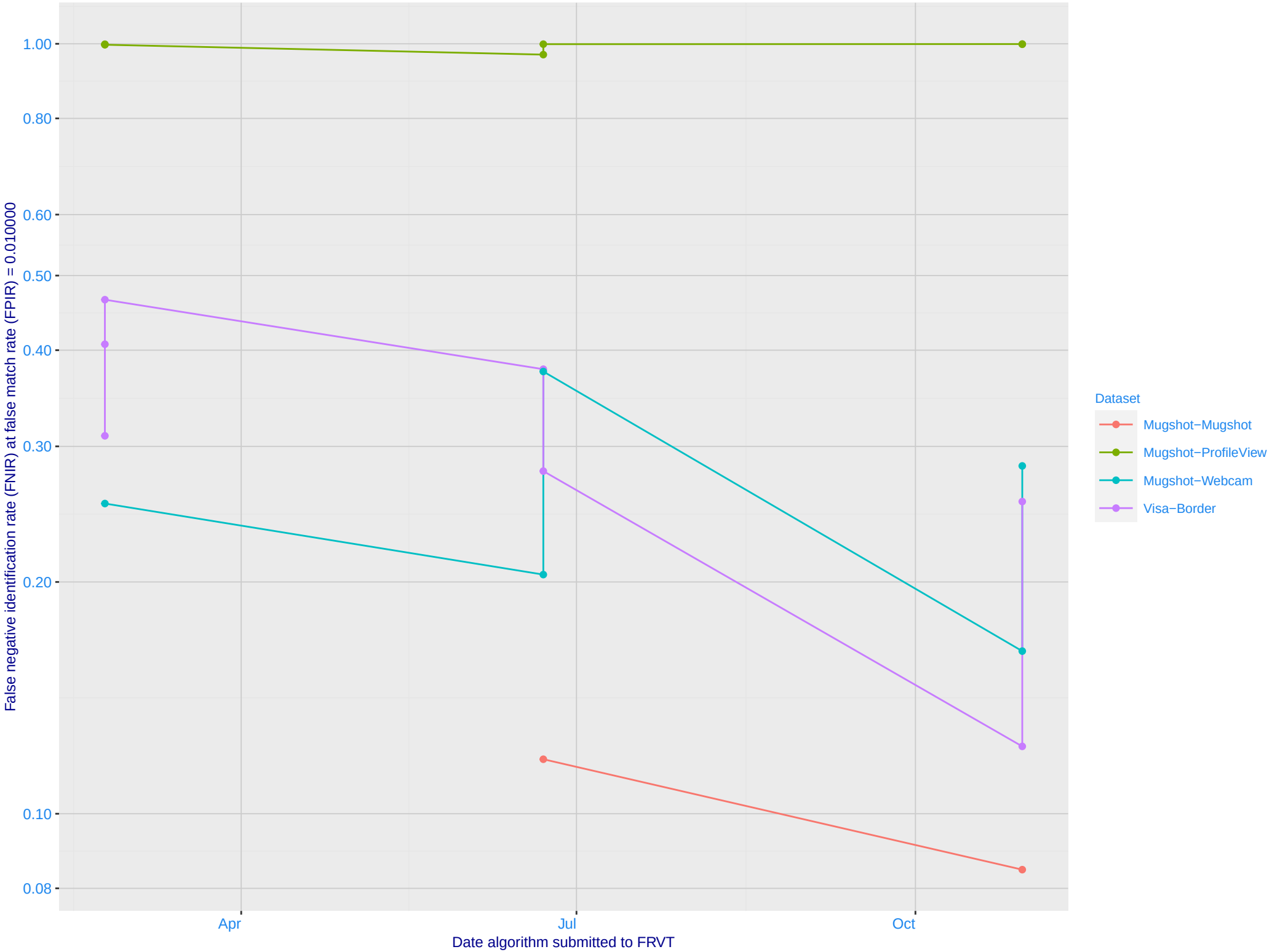
Mugshot profile ranking 156 (out of 195) −− FNIR(1600000, T, L+1) = 0.9997, FPIR=0.001000 vs. lowest 0.1331 from hr_000

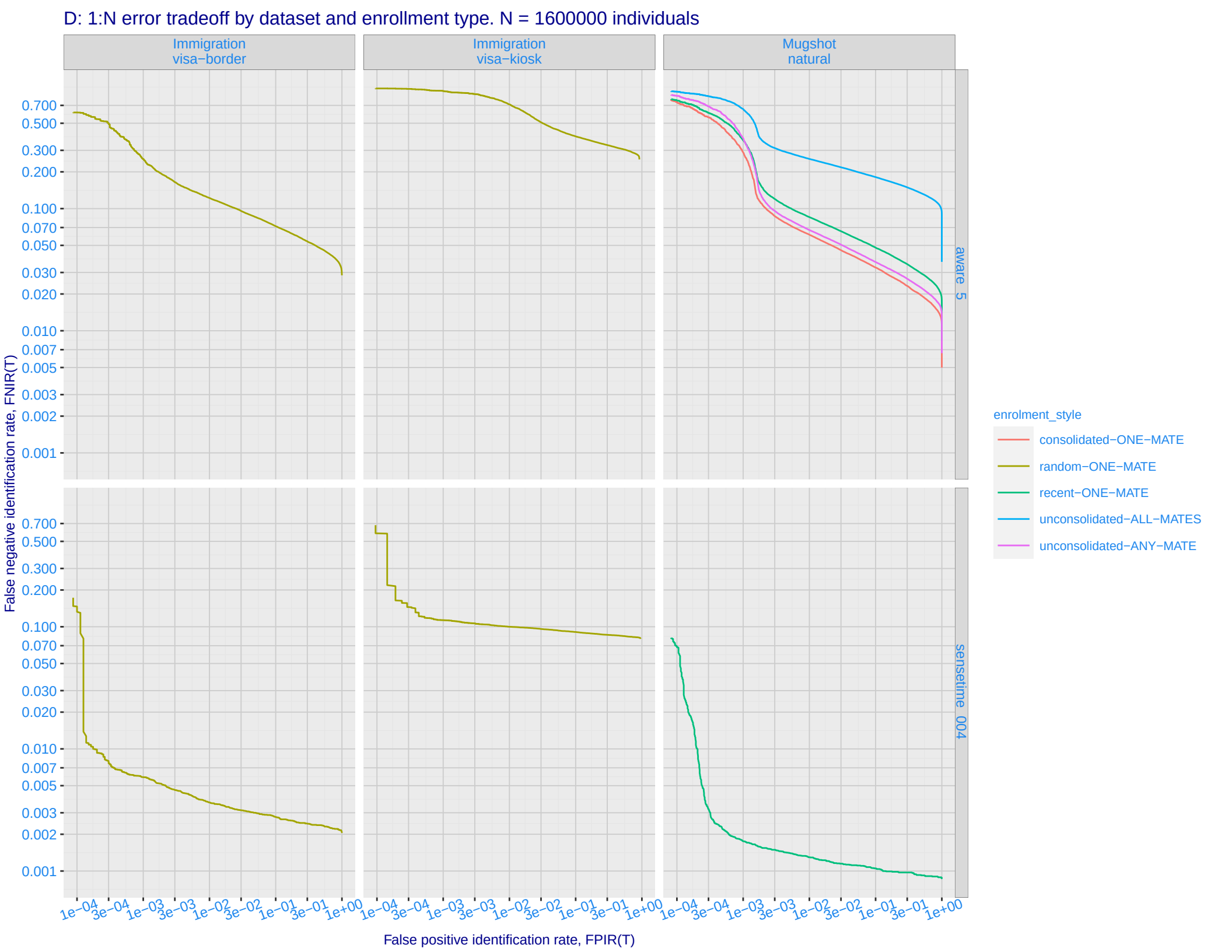
Immigration visa−border ranking 90 (out of 146) −− FNIR(1600000, T, L+1) = 0.2549, FPIR=0.001000 vs. lowest 0.0049 from hr_000

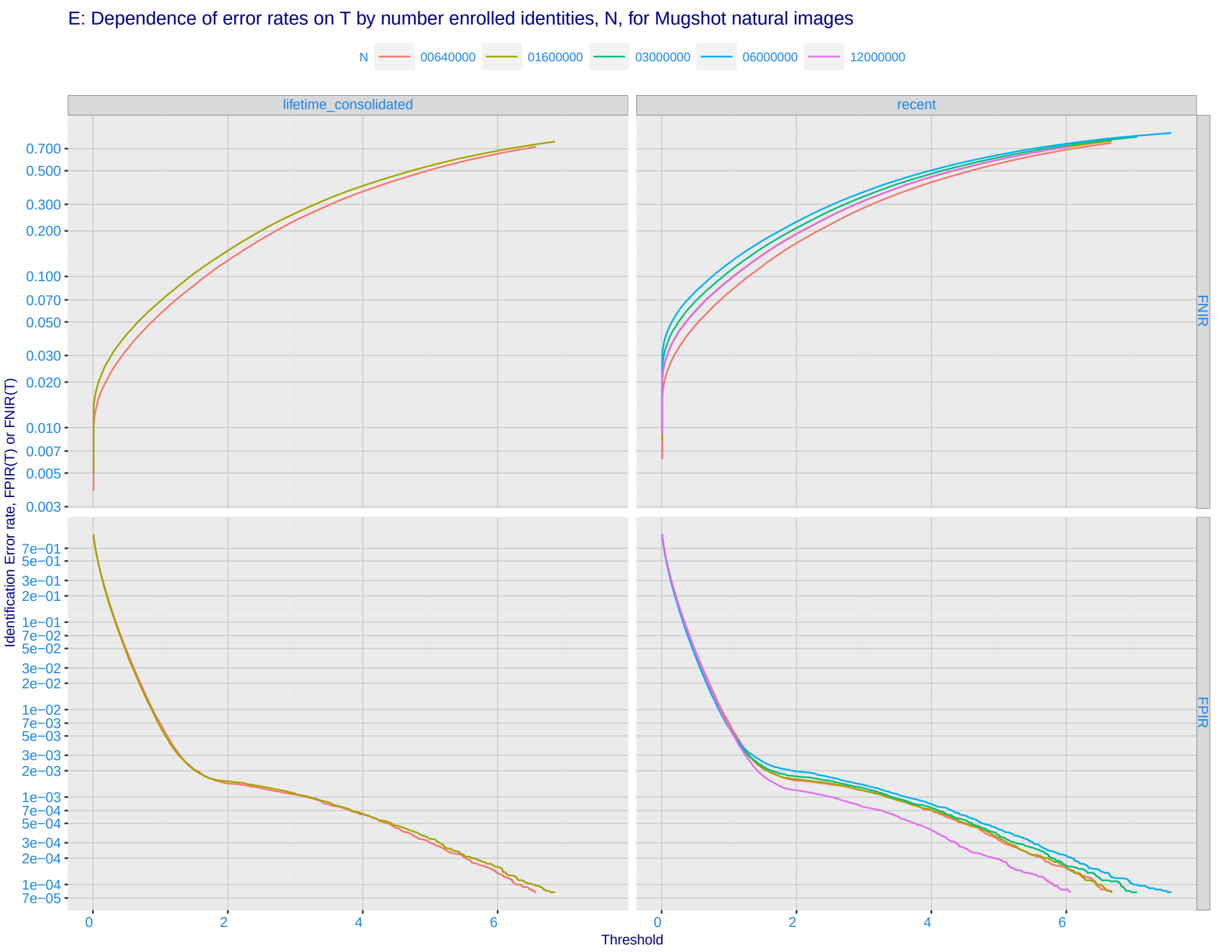
Immigration visa−kiosk ranking 105 (out of 141) −− FNIR(1600000, T, L+1) = 0.9202, FPIR=0.001000 vs. lowest 0.0996 from hr_000

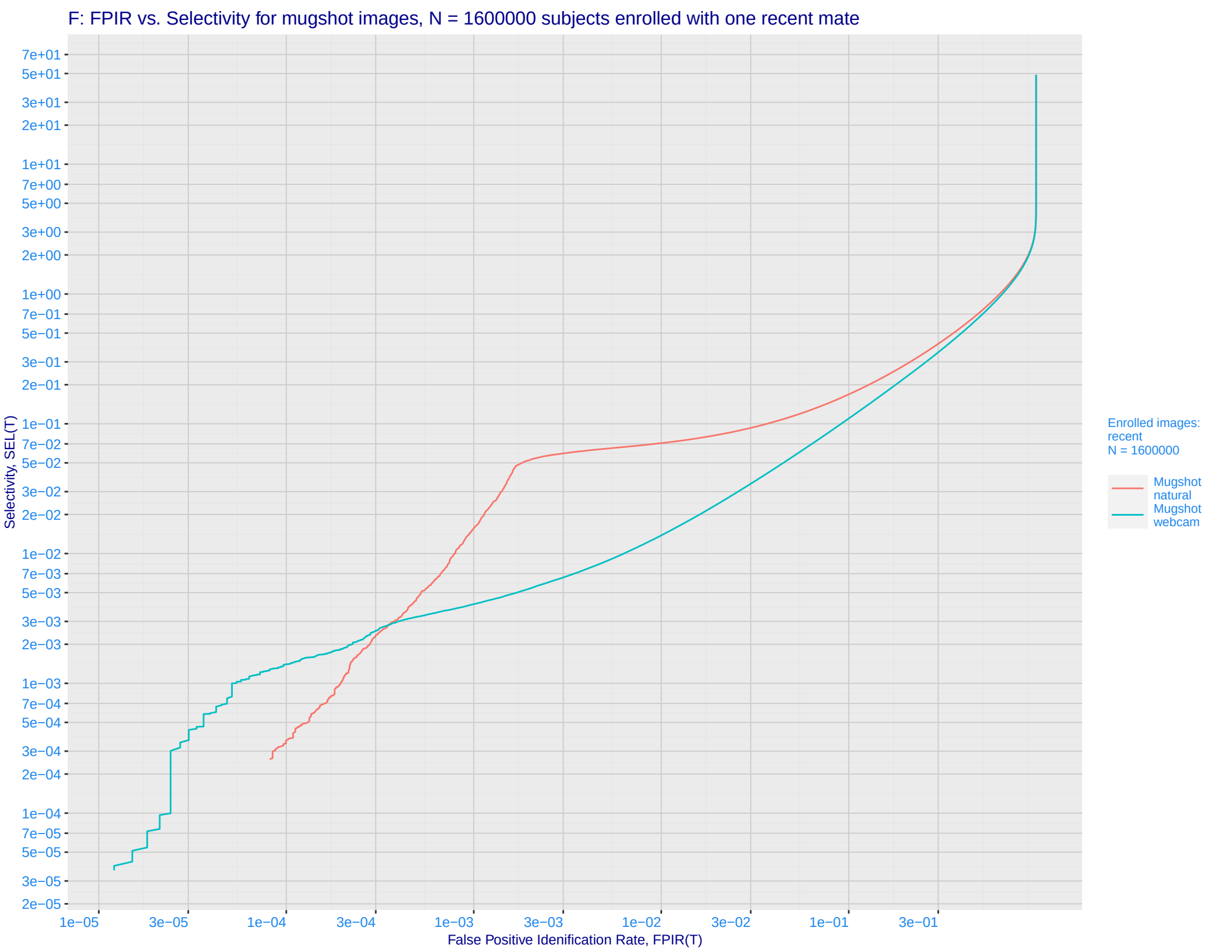

B: Mugshot natural images, identification mode: FNIR(N, L+1, T) vs. most accurate (sensetime_004)
False negative identification rate, FNIR(N)
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
1e+06
3e+06
1e+07
Enrolled population size, N
enrolment_style
consolidated
recent
Dataset:
2018 Mugshot
FNIR@FPIR = 0.001
aware_5
sensetime_004

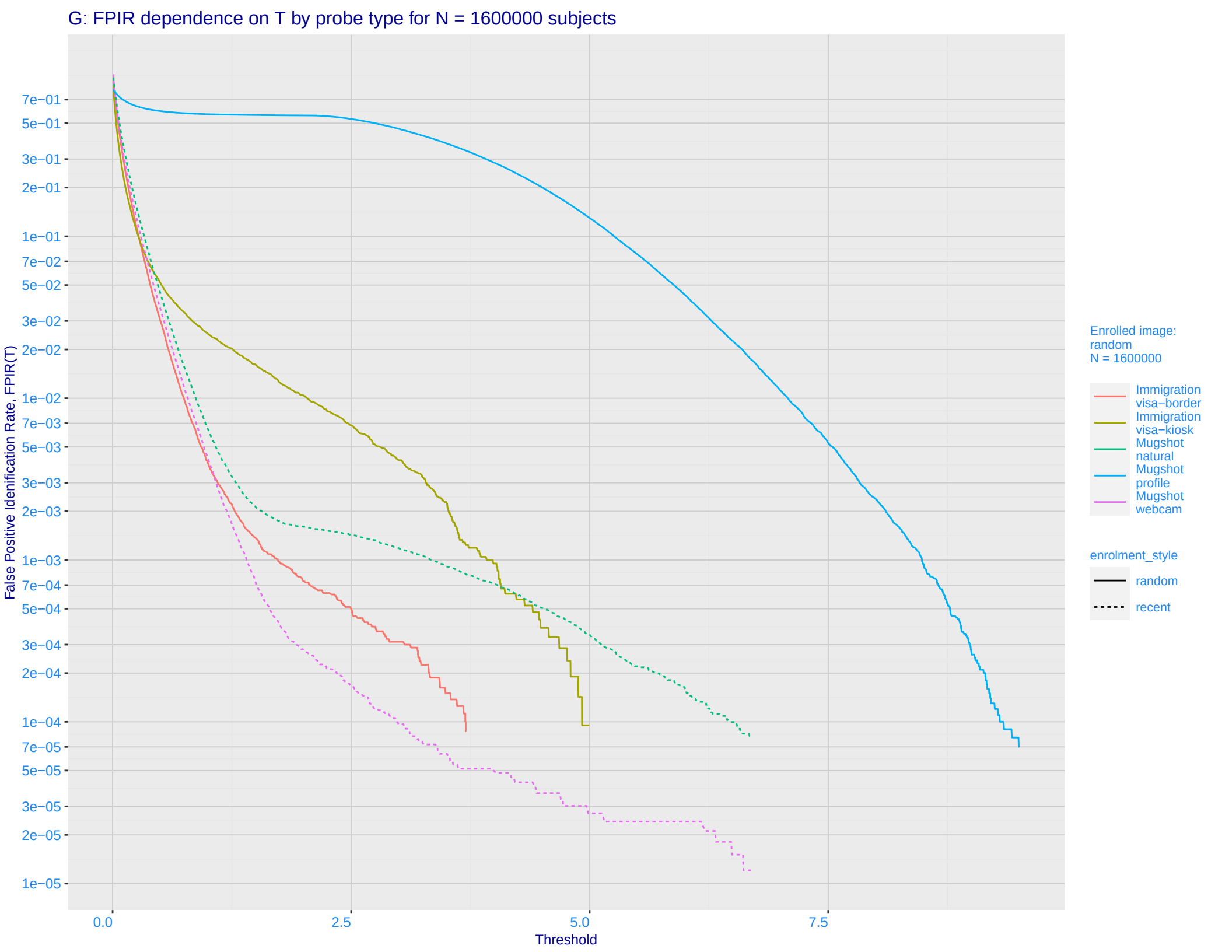
C: Evolution of accuracy for AWARE algorithms on three datasets 2018 − present

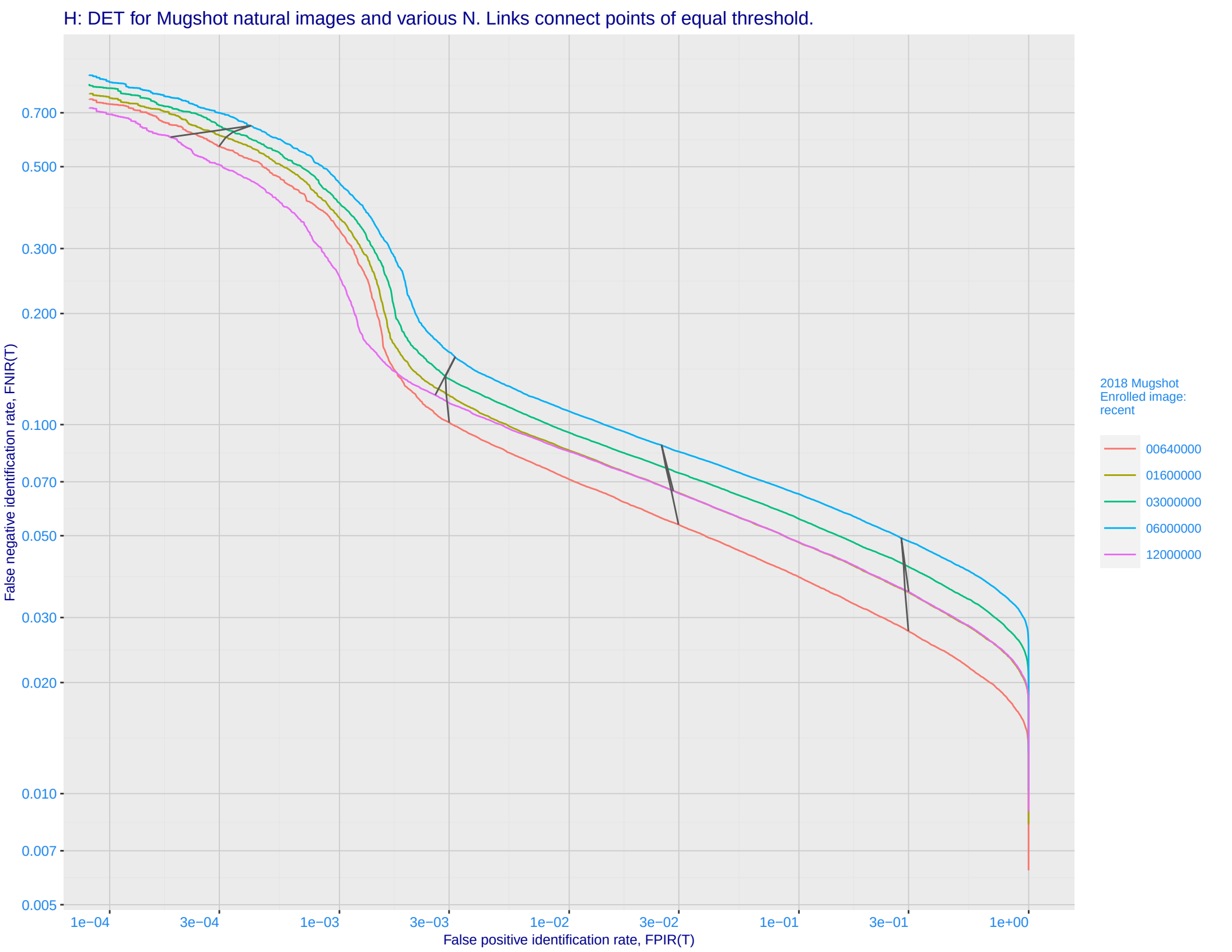


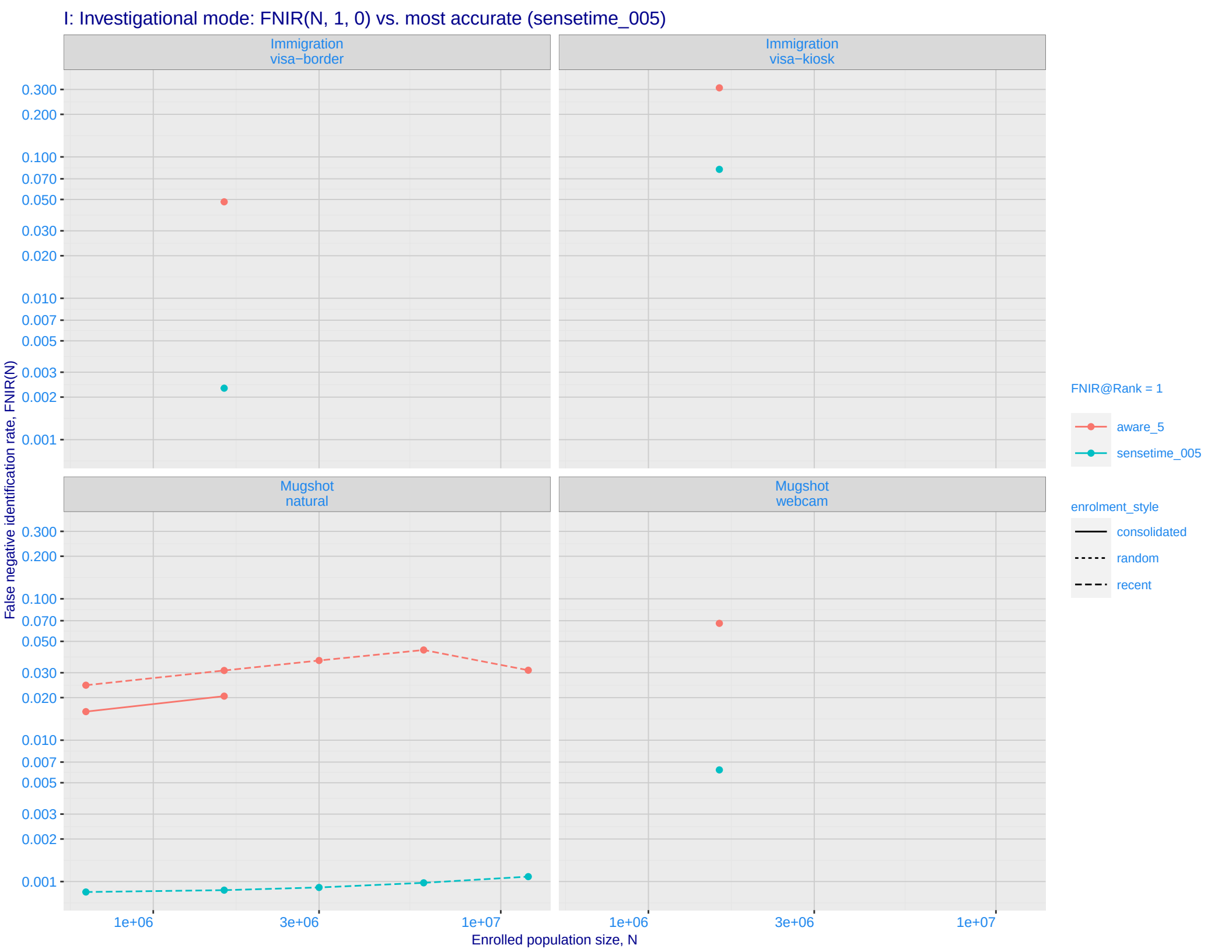

D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals
Immigration visa−border
Immigration visa−kiosk
Mugshot natural
aware 5
sensetime 004
False negative identification rate, FNIR(T)
0.700
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
0.001
1e−04
3e−04
1e−03
3e−03
1e−02
3e−02
1e−01
3e−01
1e+00
False positive identification rate, FPIR(T)
enrolment_style
consolidated−ONE−MATE
random−ONE−MATE
recent−ONE−MATE
unconsolidated−ALL−MATES
unconsolidated−ANY−MATE

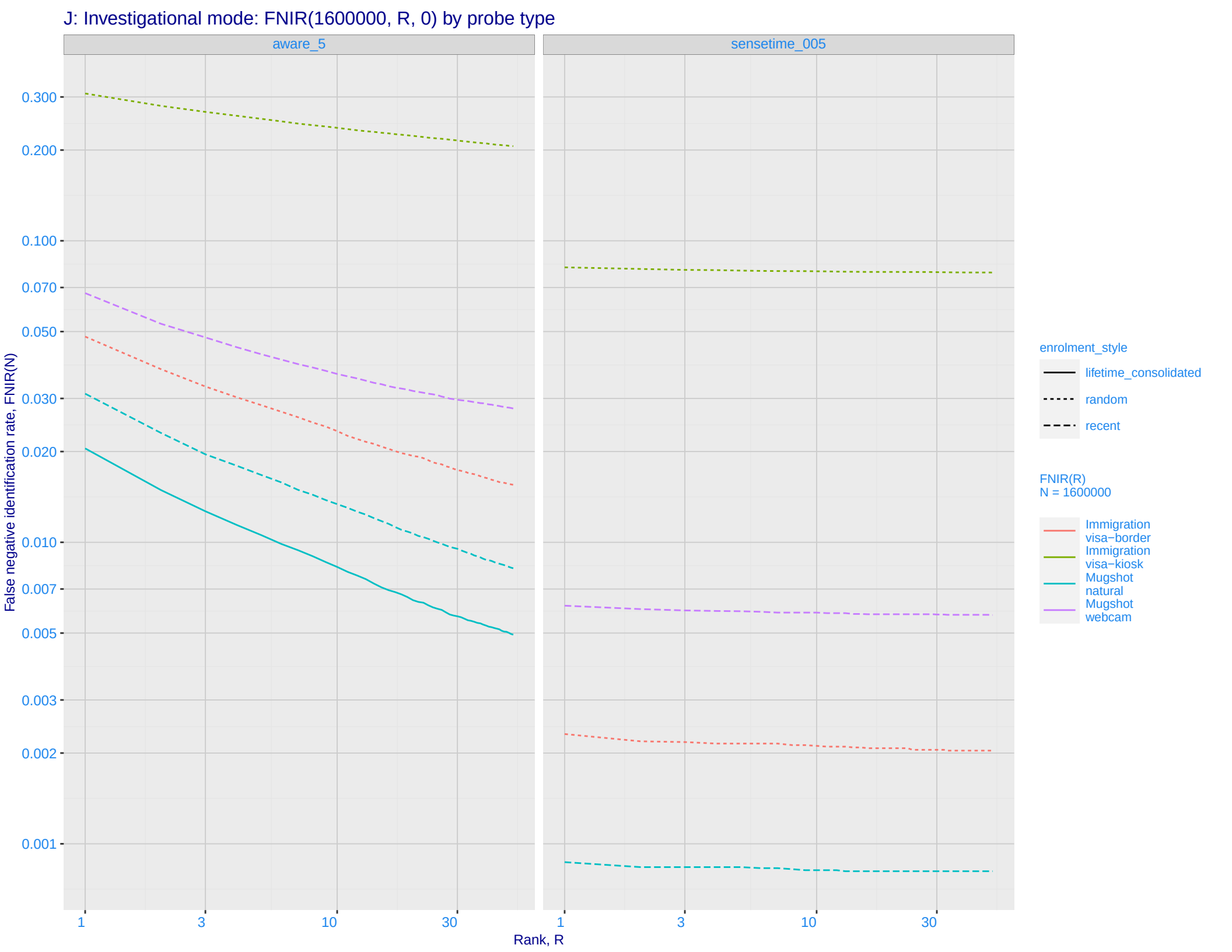

E: Dependence of error rates on T by number enrolled identities, N, for Mugshot natural images
N
00640000
01600000
03000000
06000000
12000000
lifetime_consolidated
recent
FNIR
FPIR
Identification Error rate, FPIR(T) or FNIR(T)
0.700
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
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
0
2
4
6
Threshold

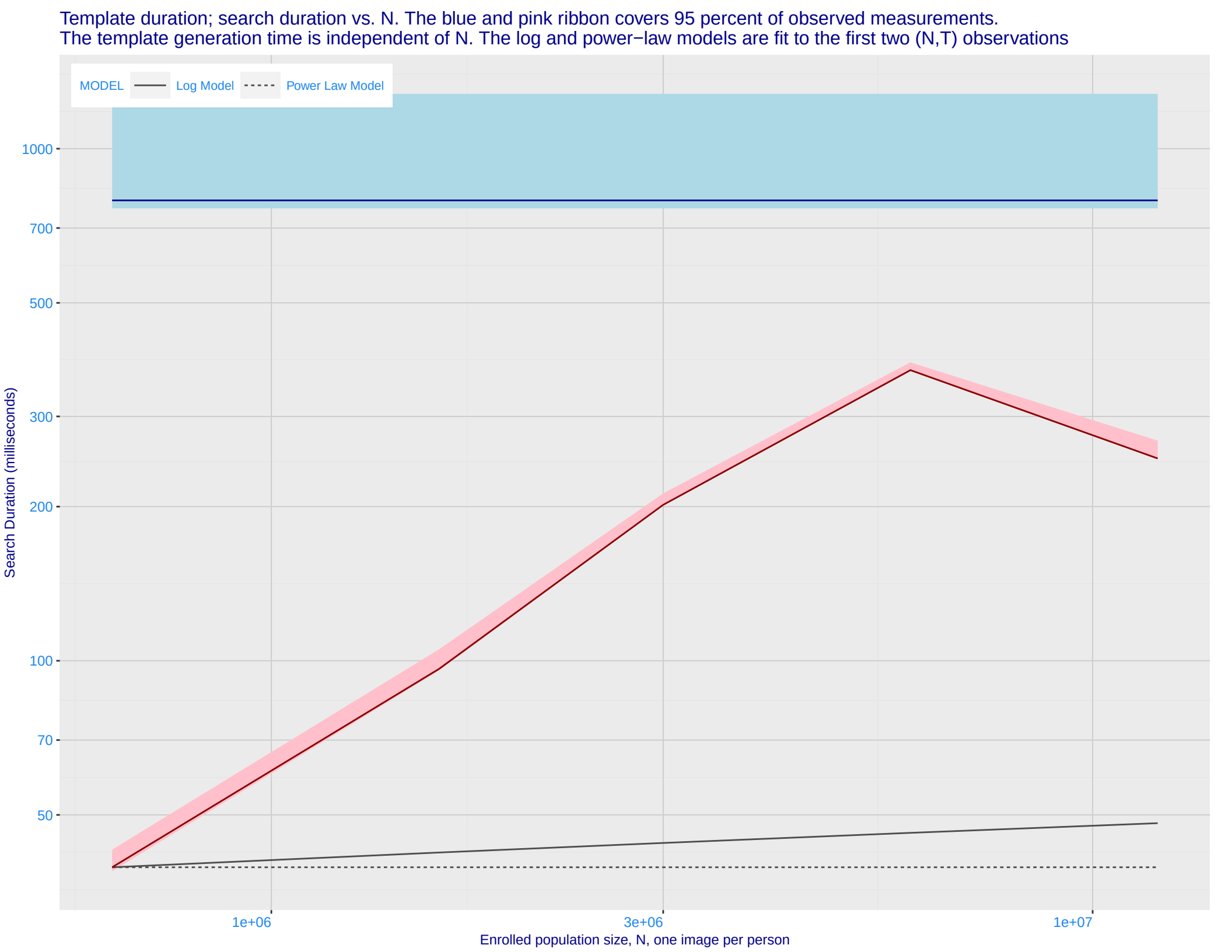

F: FPIR vs. Selectivity for mugshot images, N = 1600000 subjects enrolled with one recent mate
Selectivity, SEL(T)
7e+01
5e+01
3e+01
2e+01
1e+01
7e+00
5e+00
3e+00
2e+00
1e+00
7e−01
5e−01
3e−01
2e−01
1e−01
7e−02
5e−02
3e−02
2e−02
1e−02
7e−03
5e−03
3e−03
2e−03
1e−03
7e−04
5e−04
3e−04
2e−04
1e−04
7e−05
5e−05
3e−05
2e−05
1e−05
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
0.0
2.5
5.0
7.5
Threshold
Enrolled image:
random
N = 1600000
Immigration
visa−border
Immigration
visa−kiosk
Mugshot
natural
Mugshot
profile
Mugshot
webcam
enrolment_style
random
recent

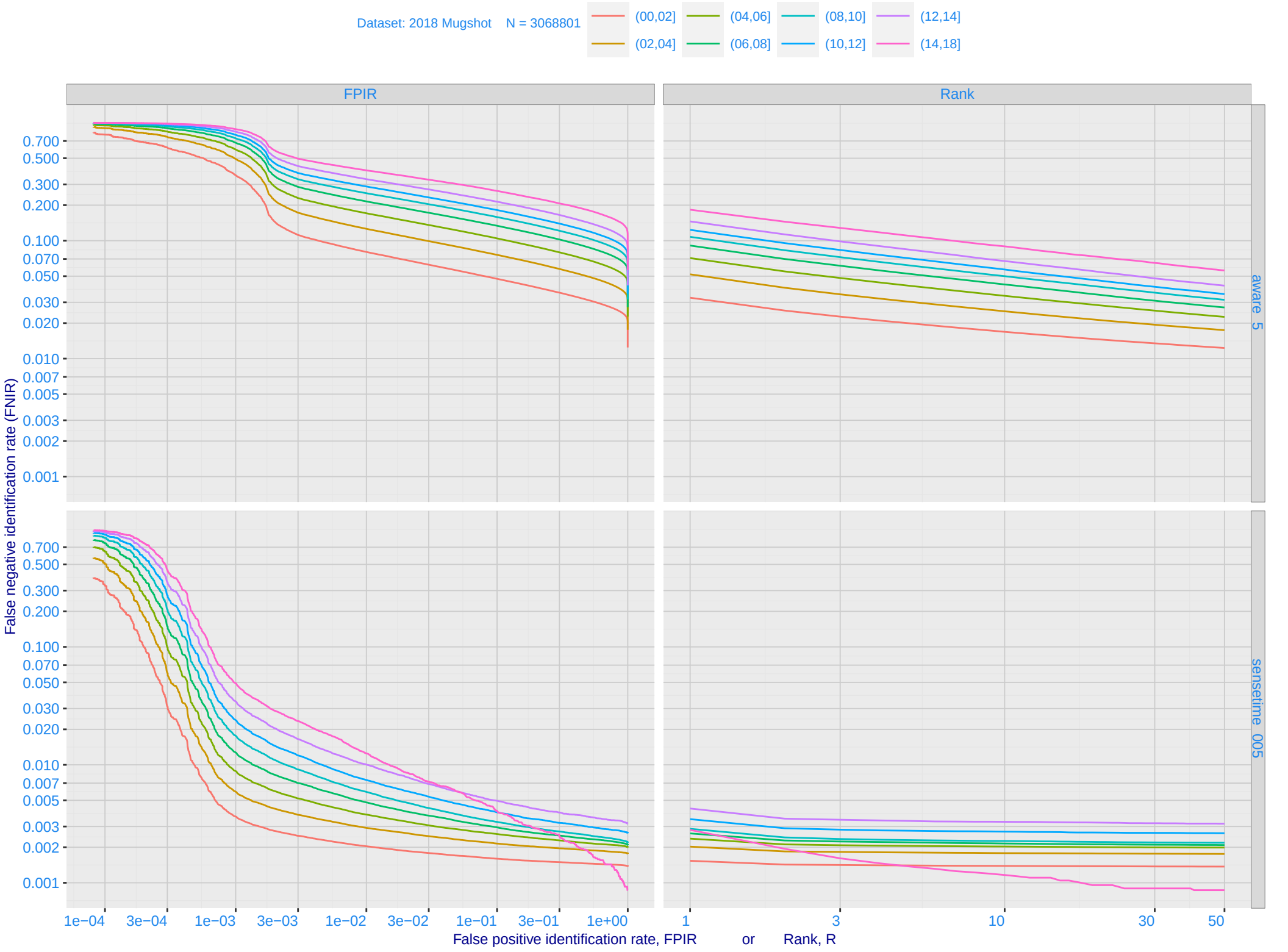

H: DET for Mugshot natural images and various N. Links connect points of equal threshold.
False negative identification rate, FNIR(T)
0.700
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
1e−04
3e−04
1e−03
3e−03
1e−02
3e−02
1e−01
3e−01
1e+00
False positive identification rate, FPIR(T)
2018 Mugshot
Enrolled image:
recent
00640000
01600000
03000000
06000000
12000000

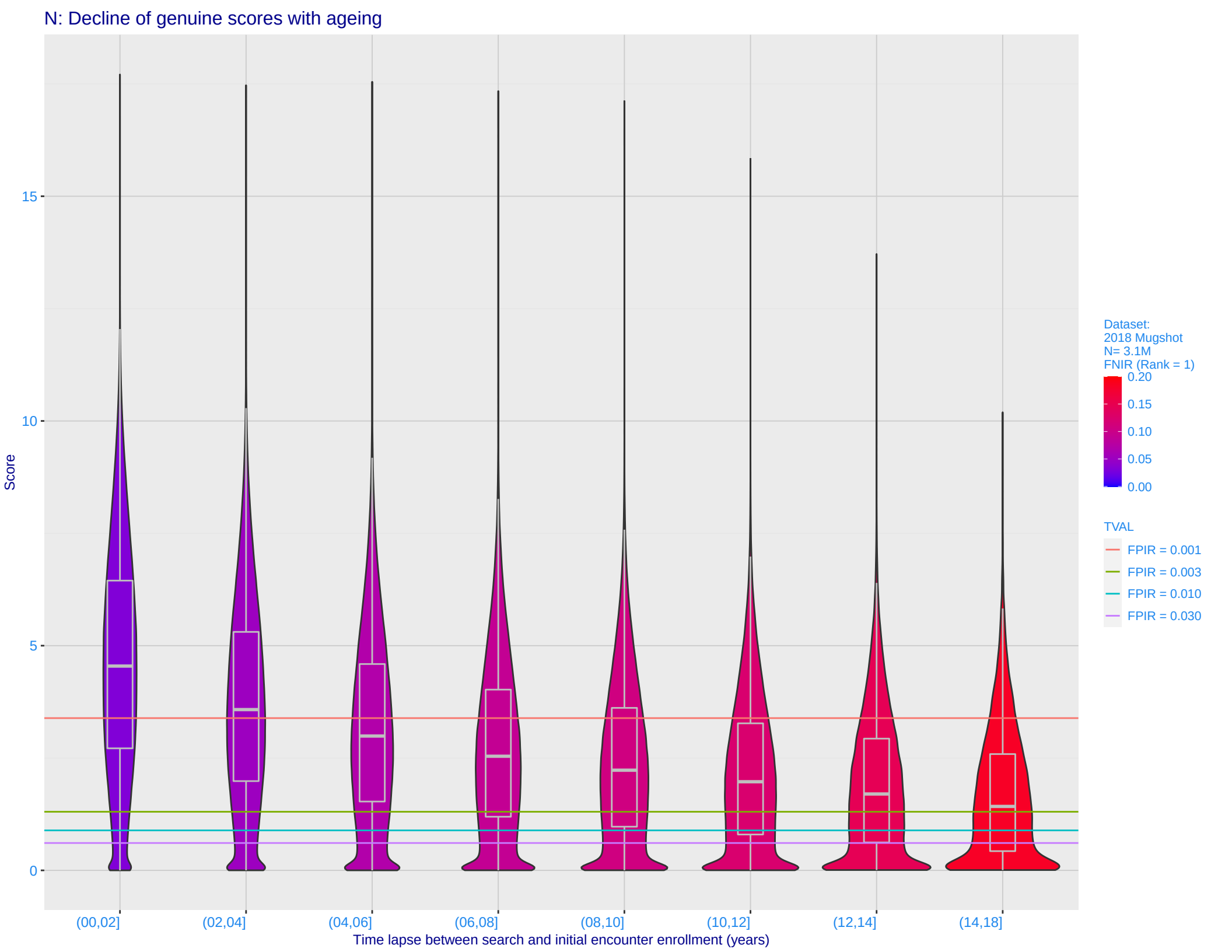

I: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime_005)
Immigration
visa−border
Immigration
visa−kiosk
Mugshot
natural
Mugshot
webcam
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
0.001
False negative identification rate, FNIR(N)
1e+06
3e+06
1e+07
Enrolled population size, N
FNIR@Rank = 1
aware_5
sensetime_005
enrolment_style
consolidated
random
recent


J: Investigational mode: FNIR(1600000, R, 0) by probe type
aware_5
sensetime_005
False negative identification rate, FNIR(N)
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
1
3
10
30
Rank, R
enrolment_style
lifetime_consolidated
random
recent
FNIR(R)
N = 1600000
Immigration visa−border
Immigration visa−kiosk
Mugshot natural
Mugshot webcam


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
MODEL
Log Model
Power Law Model
1000
700
500
300
200
100
70
50
Search Duration (milliseconds)
1e+06
3e+06
1e+07
Enrolled population size, N, one image per person

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




N: Decline of genuine scores with ageing
Score
15
10
5
0
(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)
Dataset:
2018 Mugshot
N= 3.1M
FNIR (Rank = 1)
0.20
0.15
0.10
0.05
0.00
TVAL
FPIR = 0.001
FPIR = 0.003
FPIR = 0.010
FPIR = 0.030