A: Datasheet

Algorithm: intsysmsu_000

Developer: Lomonosov Moscow State University

Submission Date: 2019_08_19

Template size: 2048 bytes

Template time (2.5 percentile): 611 msec

Template time (median): 615 msec

Template time (97.5 percentile): 1057 msec

Investigation:

Frontal mugshot ranking 290 (out of 329) −− FNIR(1600000, 0, 1) = 0.1457 vs. lowest 0.0009 from sensetime_006

Mugshot webcam ranking 151 (out of 291) −− FNIR(1600000, 0, 1) = 0.0234 vs. lowest 0.0057 from sensetime_006

Mugshot profile ranking 111 (out of 260) −− FNIR(1600000, 0, 1) = 0.5624 vs. lowest 0.0550 from sensetime_006

Immigration visa−border ranking 166 (out of 218) −− FNIR(1600000, 0, 1) = 0.0717 vs. lowest 0.0009 from sensetime_006

Immigration visa−kiosk ranking 102 (out of 215) −− FNIR(1600000, 0, 1) = 0.1317 vs. lowest 0.0487 from cubox_000

Identification:

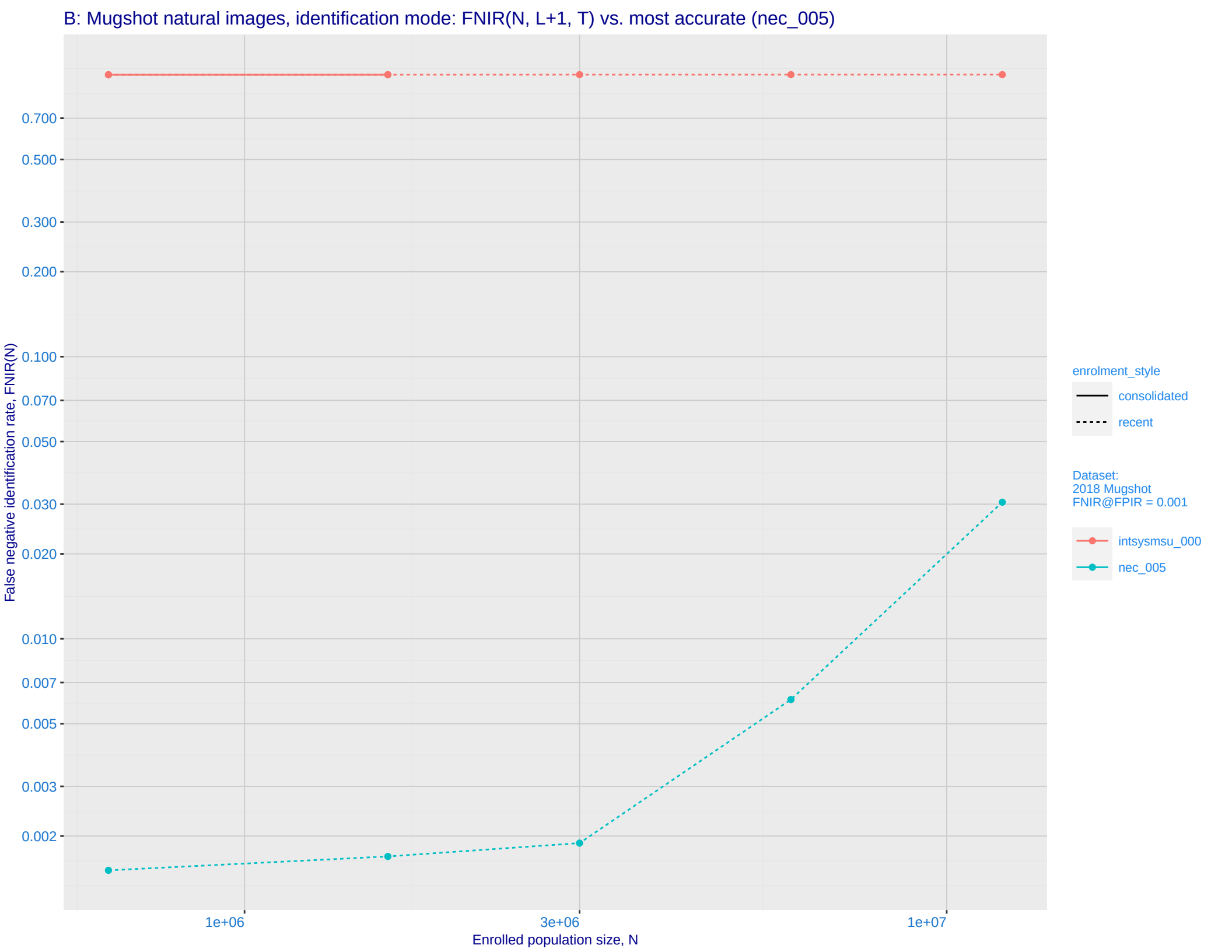
Frontal mugshot ranking 323 (out of 329) −− FNIR(1600000, T, L+1) = 0.9983, FPIR=0.001000 vs. lowest 0.0017 from nec_005

Mugshot webcam ranking 283 (out of 289) −− FNIR(1600000, T, L+1) = 0.9997, FPIR=0.001000 vs. lowest 0.0120 from nec_005

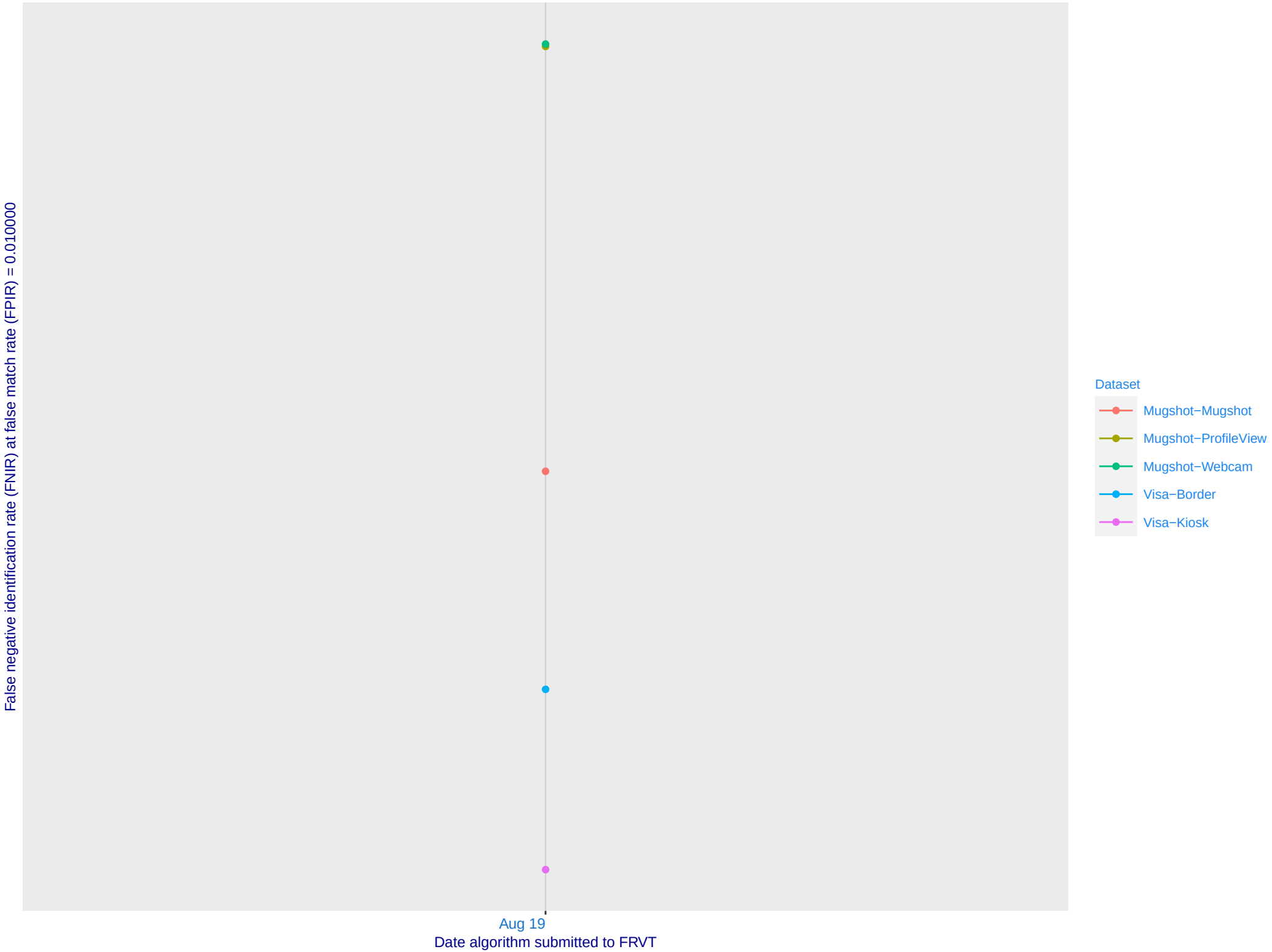
Mugshot profile ranking 196 (out of 259) −− FNIR(1600000, T, L+1) = 0.9996, FPIR=0.001000 vs. lowest 0.1331 from cloudwalk_hr_000

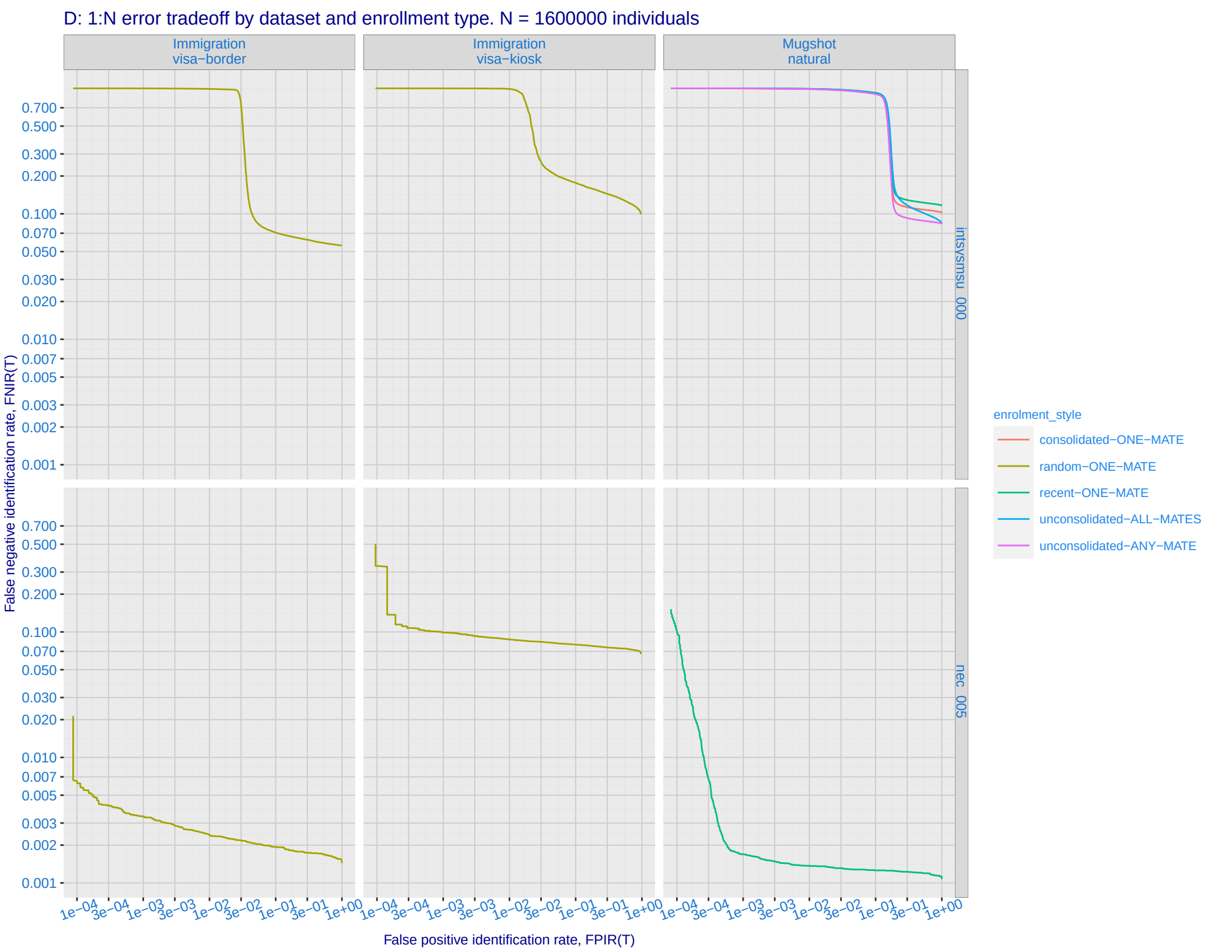
Immigration visa−border ranking 205 (out of 217) −− FNIR(1600000, T, L+1) = 0.9988, FPIR=0.001000 vs. lowest 0.0032 from paravision_009

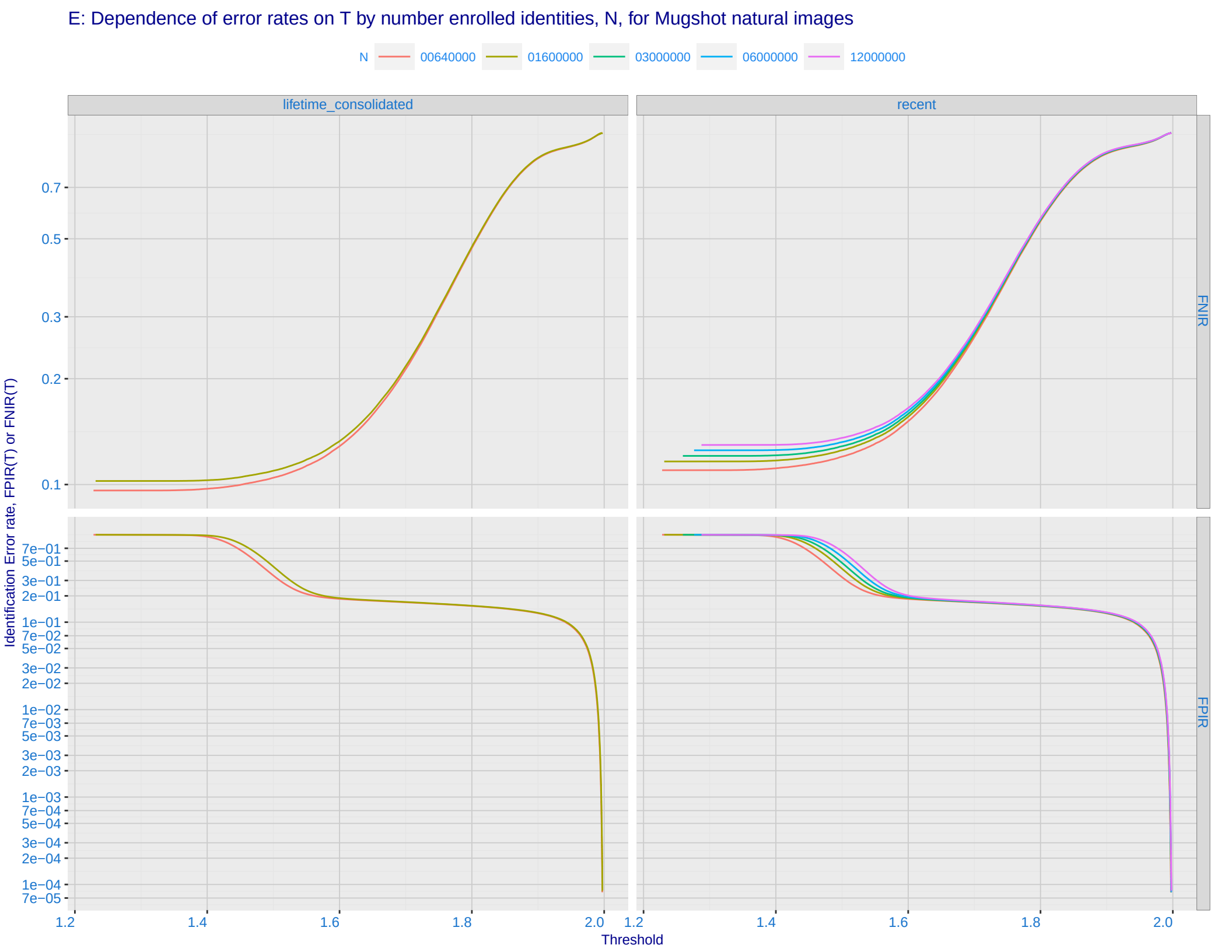
Immigration visa−kiosk ranking 191 (out of 212) −− FNIR(1600000, T, L+1) = 0.9990, FPIR=0.001000 vs. lowest 0.0728 from paravision_009

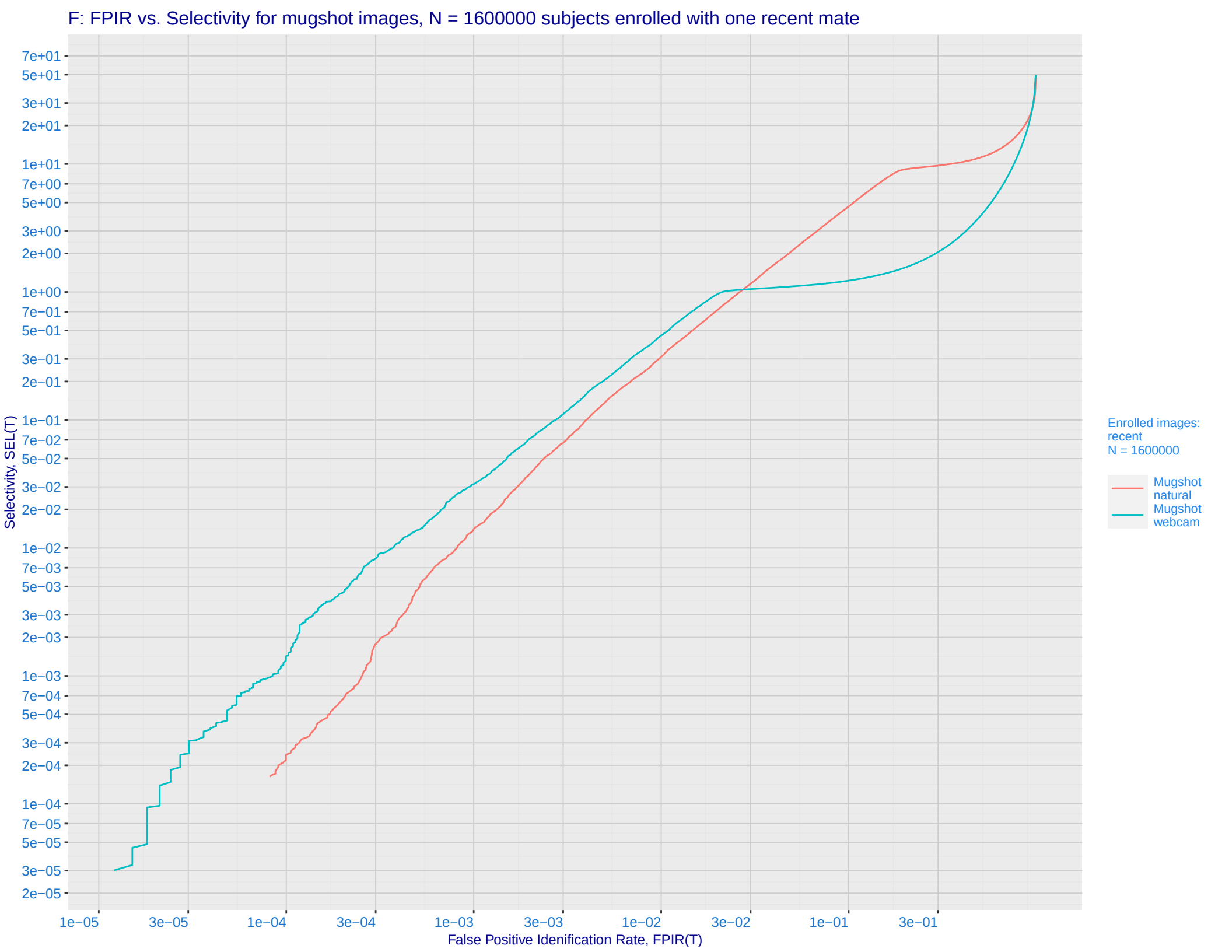

B: Mugshot natural images, identification mode: FNIR(N, L+1, T) vs. most accurate (nec_005)
False negative identification rate, FNIR(N)
0.700
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
1e+06
3e+06
1e+07
Enrolled population size, N
enrolment_style
consolidated
recent
Dataset:
2018 Mugshot
FNIR@FPIR = 0.001
intsysmsu_000
nec_005

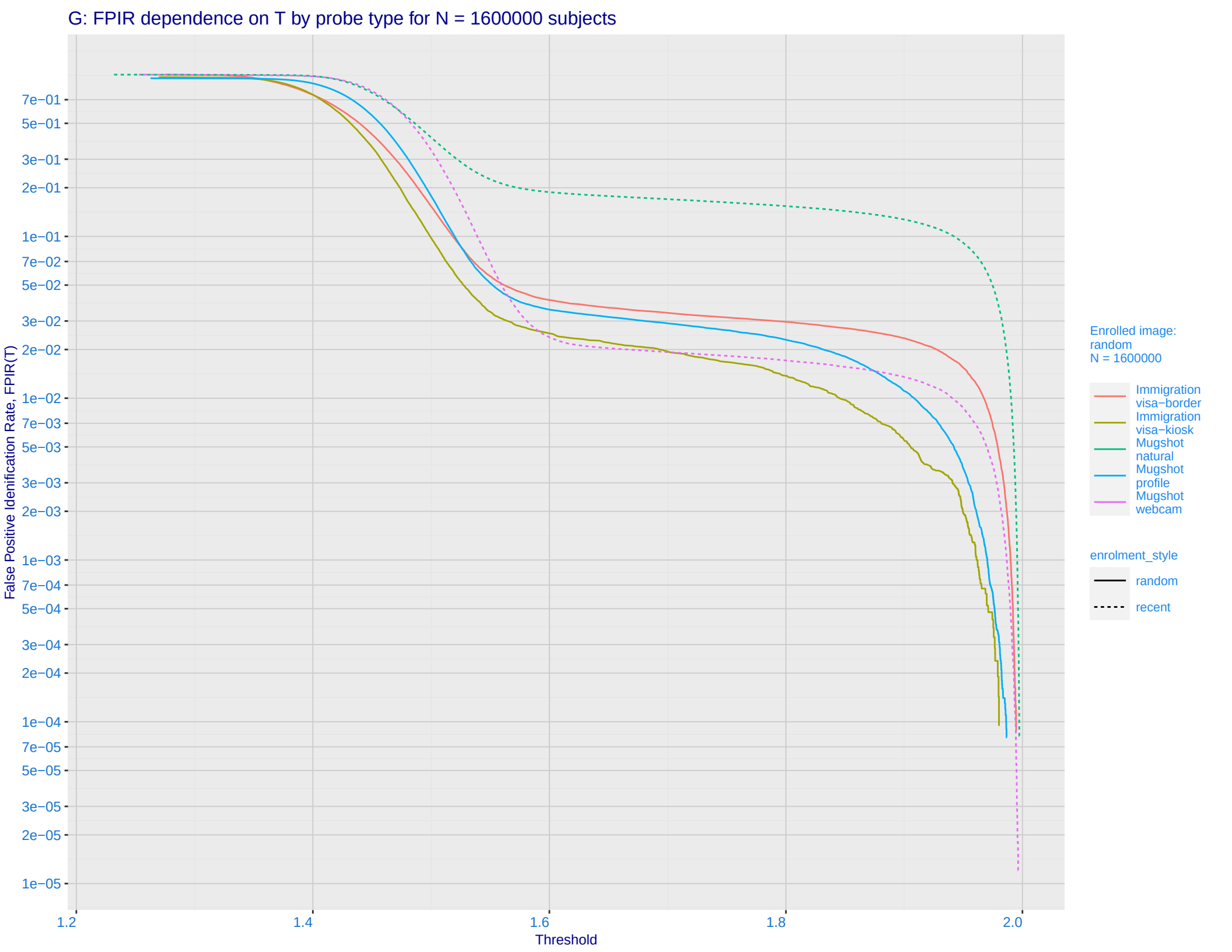
C: Evolution of accuracy for INTSYSMSU algorithms on three datasets 2018 − present

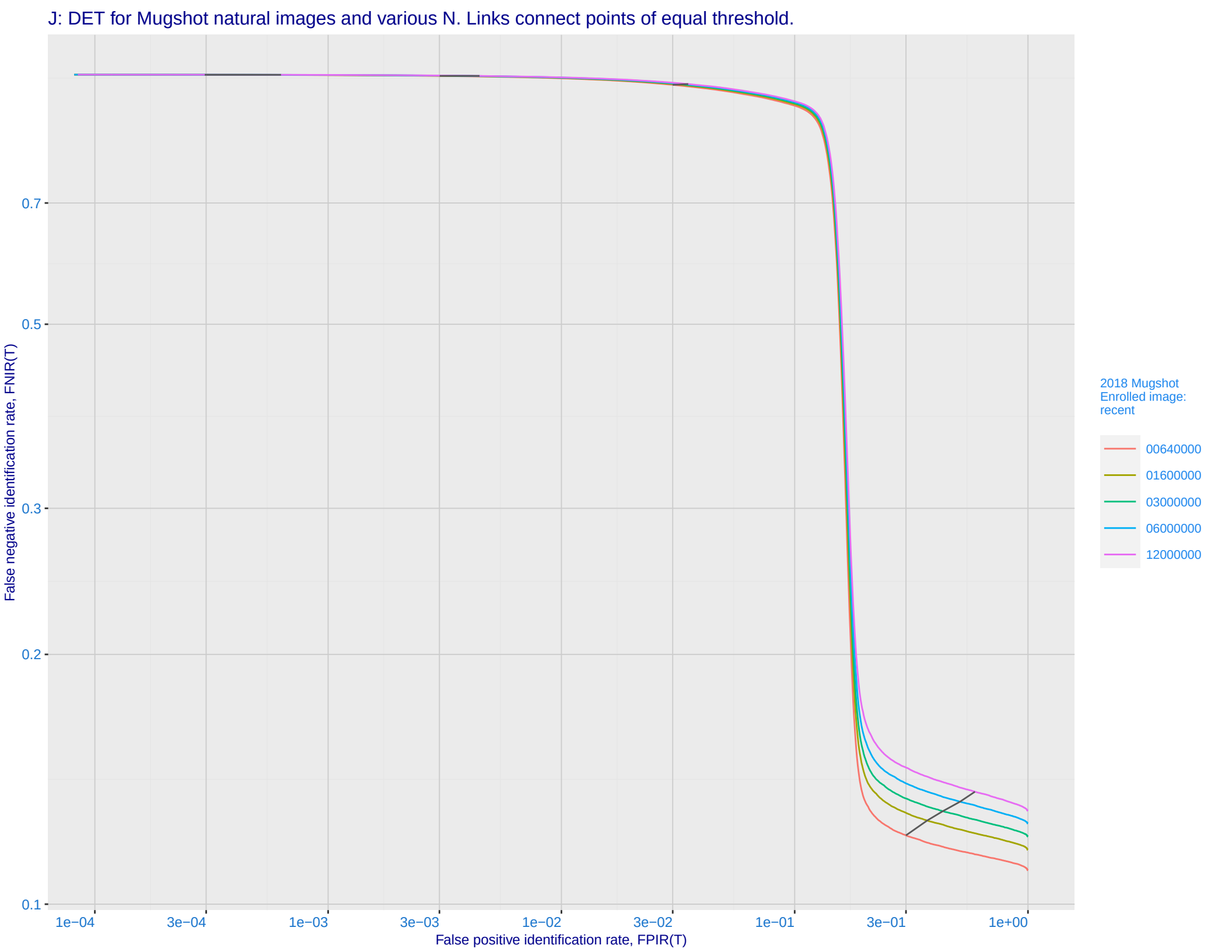


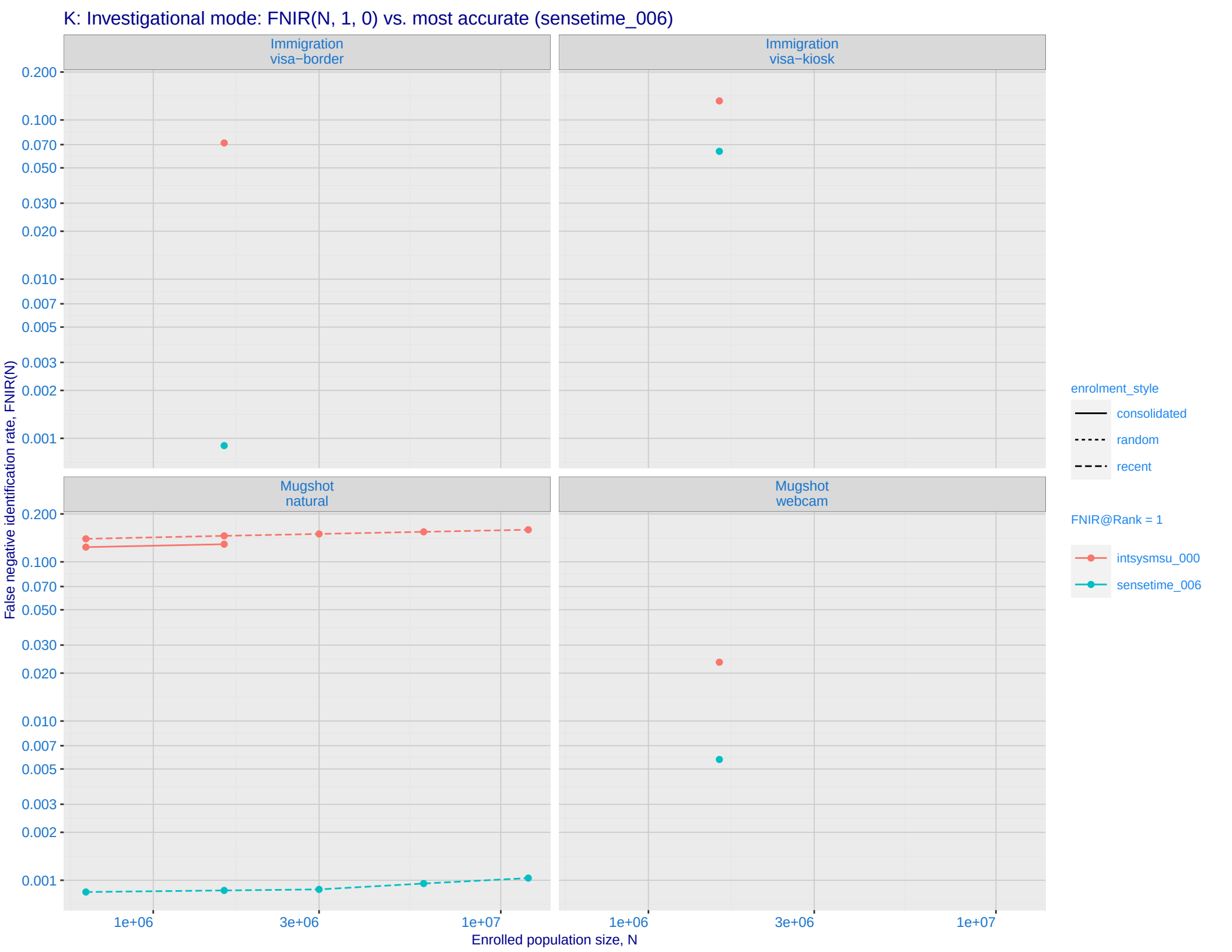

D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals
Immigration visa−border
Immigration visa−kiosk
Mugshot natural
intsysmsu_000
nec_005
False negative identification rate, FNIR(T)
0.700
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
0.001
1e−04
3e−04
1e−03
3e−03
1e−02
3e−02
1e−01
3e−01
1e+00
False positive identification rate, FPIR(T)
enrolment_style
consolidated−ONE−MATE
random−ONE−MATE
recent−ONE−MATE
unconsolidated−ALL−MATES
unconsolidated−ANY−MATE

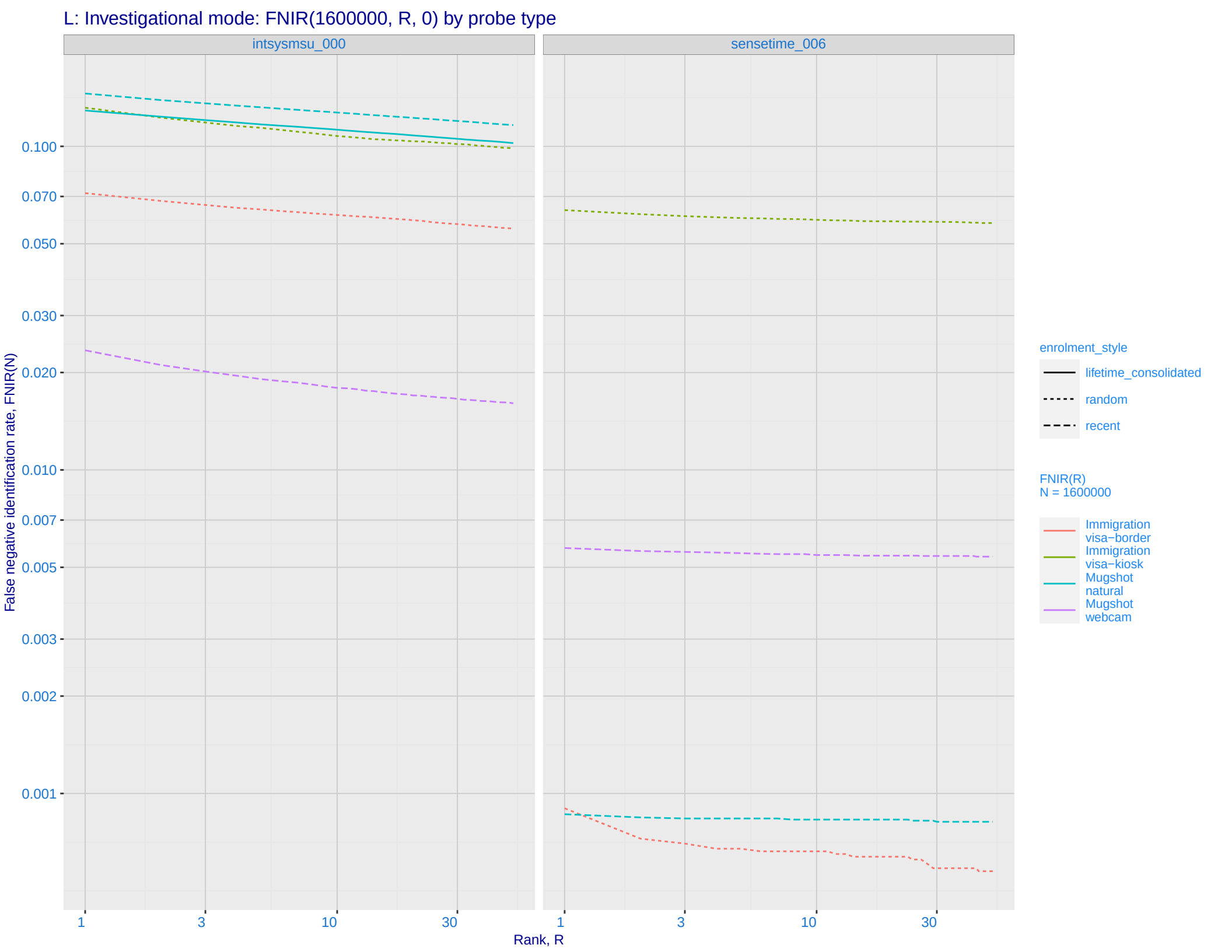

E: Dependence of error rates on T by number enrolled identities, N, for Mugshot natural images
N
00640000
01600000
03000000
06000000
12000000
lifetime_consolidated
recent
FNIR
FPIR
Identification Error rate, FPIR(T) or FNIR(T)
0.7
0.5
0.3
0.2
0.1
7e−01
5e−01
3e−01
2e−01
1e−01
7e−02
5e−02
3e−02
2e−02
1e−02
7e−03
5e−03
3e−03
2e−03
1e−03
7e−04
5e−04
3e−04
2e−04
1e−04
7e−05
1.2
1.4
1.6
1.8
2.0
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

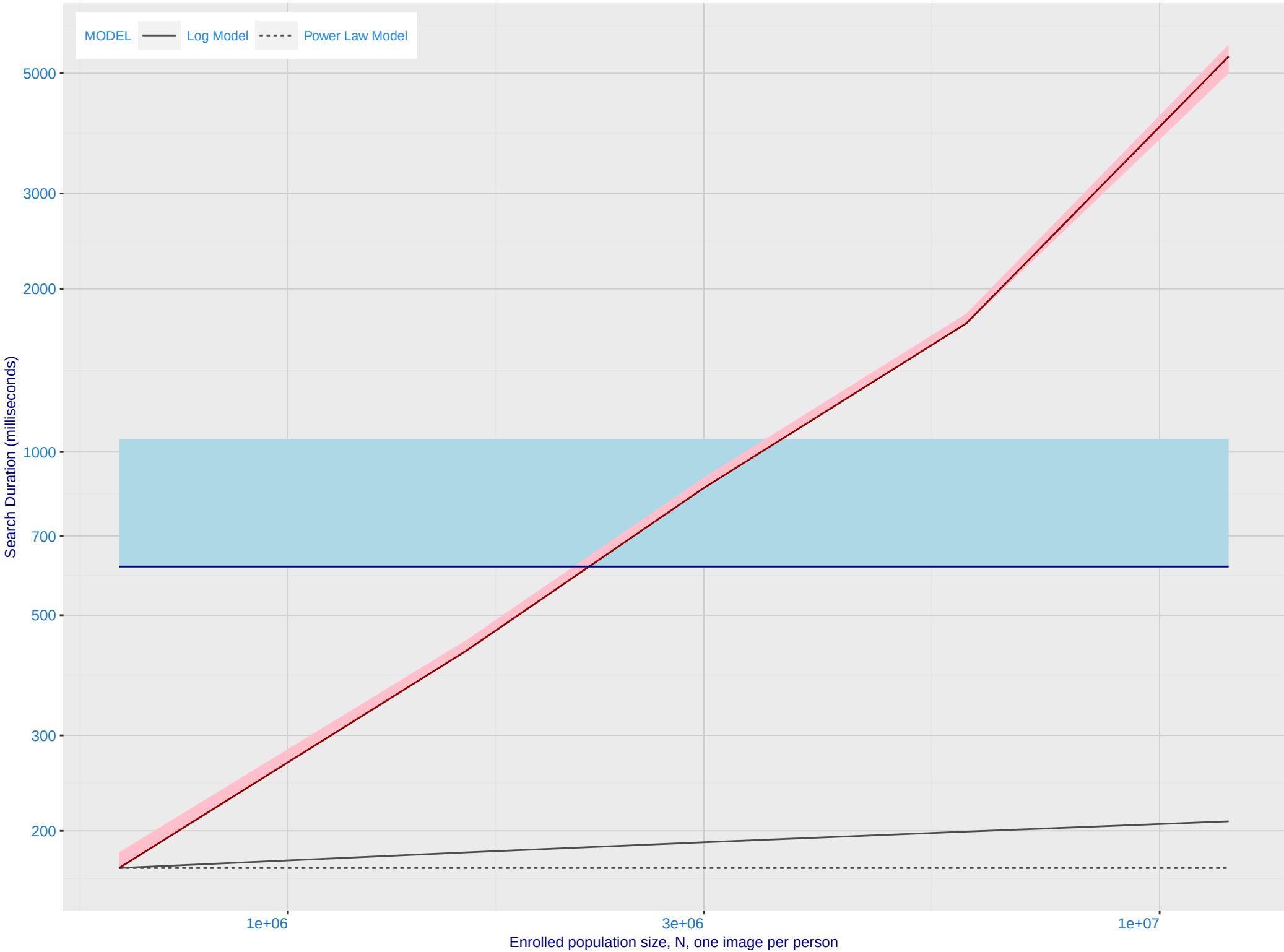

G: FPIR dependence on T by probe type for N = 1600000 subjects
False Positive Idenification Rate, FPIR(T)
7e−01
5e−01
3e−01
2e−01
1e−01
7e−02
5e−02
3e−02
2e−02
1e−02
7e−03
5e−03
3e−03
2e−03
1e−03
7e−04
5e−04
3e−04
2e−04
1e−04
7e−05
5e−05
3e−05
2e−05
1e−05
1.2
1.4
1.6
1.8
2.0
Threshold
Enrolled image:
random
N = 1600000
Immigration
visa−border
Immigration
visa−kiosk
Mugshot
natural
Mugshot
profile
Mugshot
webcam
enrolment_style
random
recent

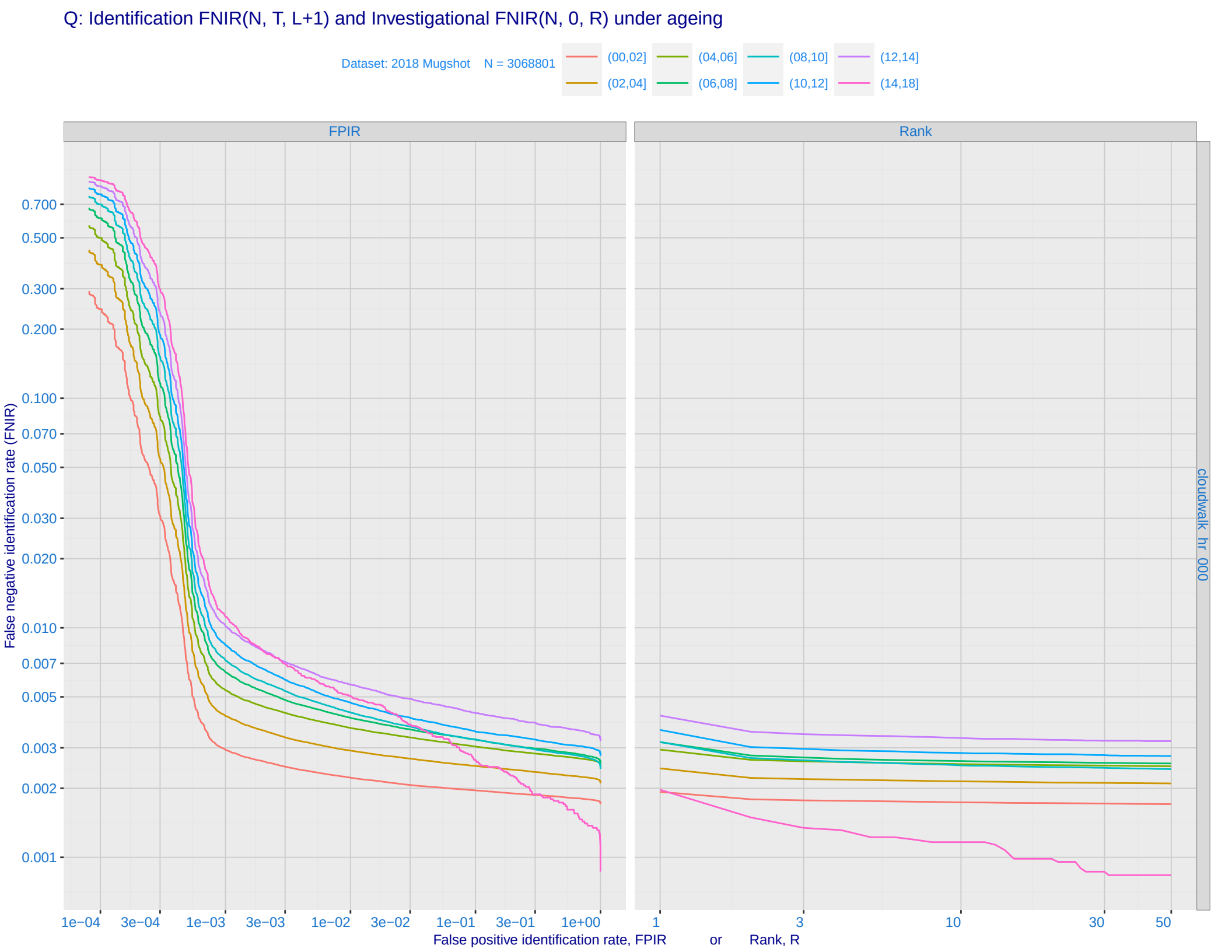

J: DET for Mugshot natural images and various N. Links connect points of equal threshold.
False negative identification rate, FNIR(T)
0.7
0.5
0.3
0.2
0.1
1e−04
3e−04
1e−03
3e−03
1e−02
3e−02
1e−01
3e−01
1e+00
False positive identification rate, FPIR(T)
2018 Mugshot
Enrolled image:
recent
00640000
01600000
03000000
06000000
12000000


K: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime_006)
Immigration visa−border
Immigration visa−kiosk
Mugshot natural
Mugshot webcam
False negative identification rate, FNIR(N)
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+06
3e+06
1e+07
Enrolled population size, N
enrolment_style
consolidated
random
recent
FNIR@Rank = 1
intsysmsu_000
sensetime_006


L: Investigational mode: FNIR(1600000, R, 0) by probe type
intsysmsu_000
sensetime_006
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
lifetime_consolidated
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
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
cloudwalk hr 000