A: Datasheet

Algorithm: microsoft_3

Developer: Microsoft

Submission Date: 2018_06_20

Template size: 1024 bytes

Template time (2.5 percentile): 379 msec

Template time (median): 399 msec

Template time (97.5 percentile): 449 msec

Investigation:

Frontal mugshot ranking 15 (out of 259) −− FNIR(1600000, 0, 1) = 0.0016 vs. lowest 0.0009 from sensetime_005

Mugshot webcam ranking 24 (out of 221) −− FNIR(1600000, 0, 1) = 0.0121 vs. lowest 0.0062 from sensetime_005

Immigration visa−border ranking 22 (out of 142) −− FNIR(1600000, 0, 1) = 0.0038 vs. lowest 0.0014 from visionlabs_009

Immigration visa−kiosk ranking 32 (out of 139) −− FNIR(1600000, 0, 1) = 0.1091 vs. lowest 0.0694 from cib_000

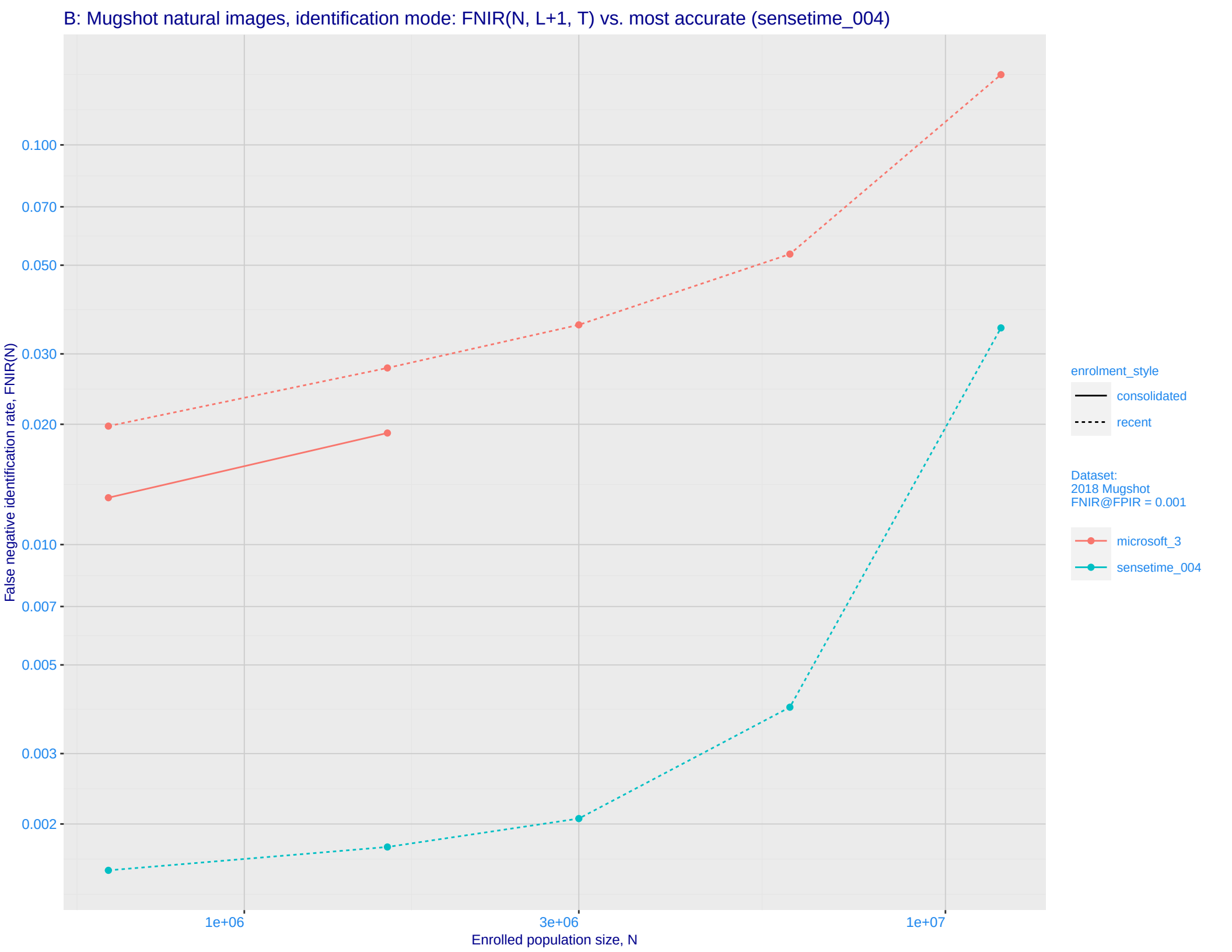
Identification:

Frontal mugshot ranking 47 (out of 259) −− FNIR(1600000, T, L+1) = 0.0277, FPIR=0.001000 vs. lowest 0.0018 from sensetime_004

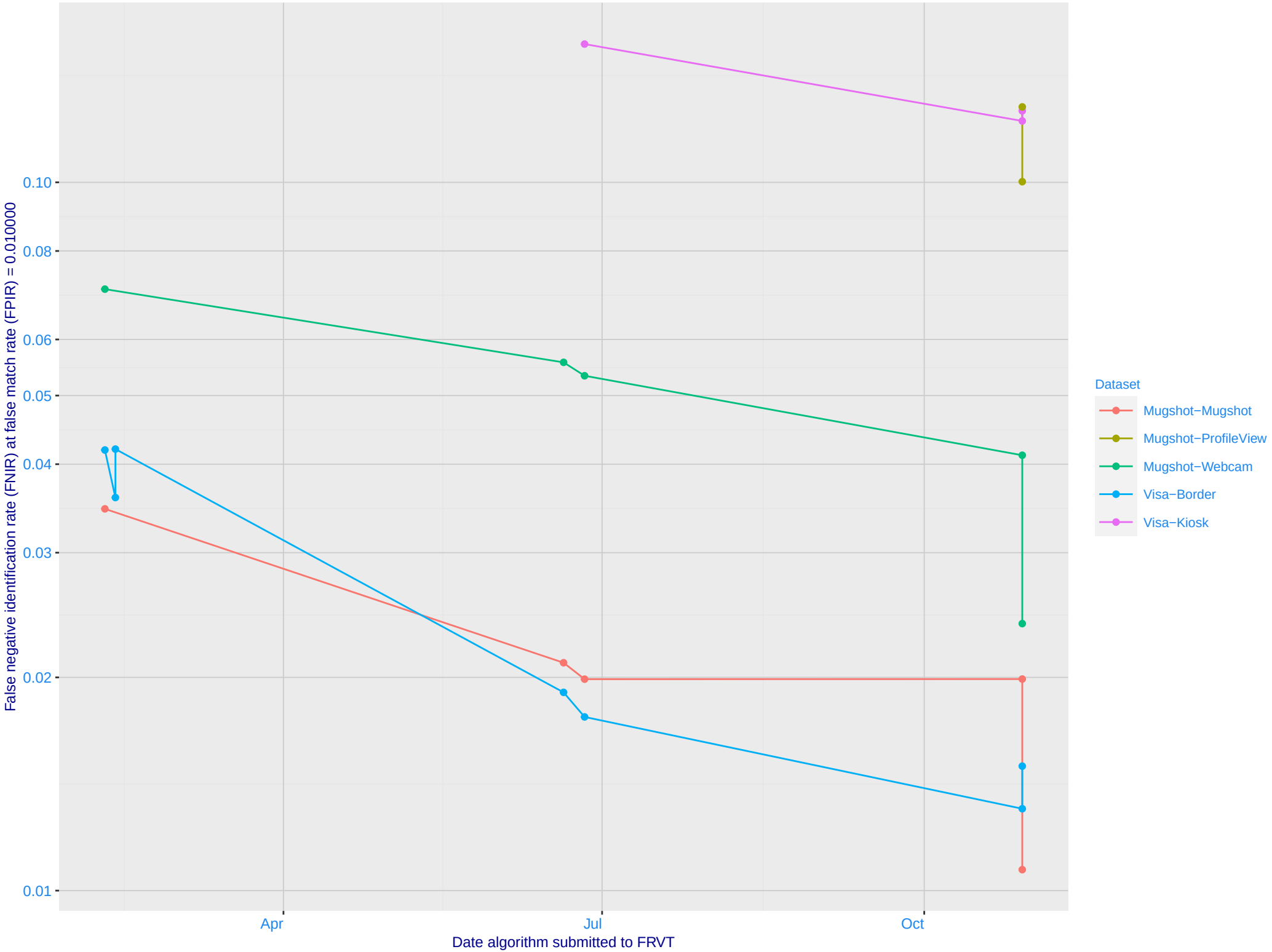
Mugshot webcam ranking 50 (out of 219) −− FNIR(1600000, T, L+1) = 0.0907, FPIR=0.001000 vs. lowest 0.0122 from sensetime_003

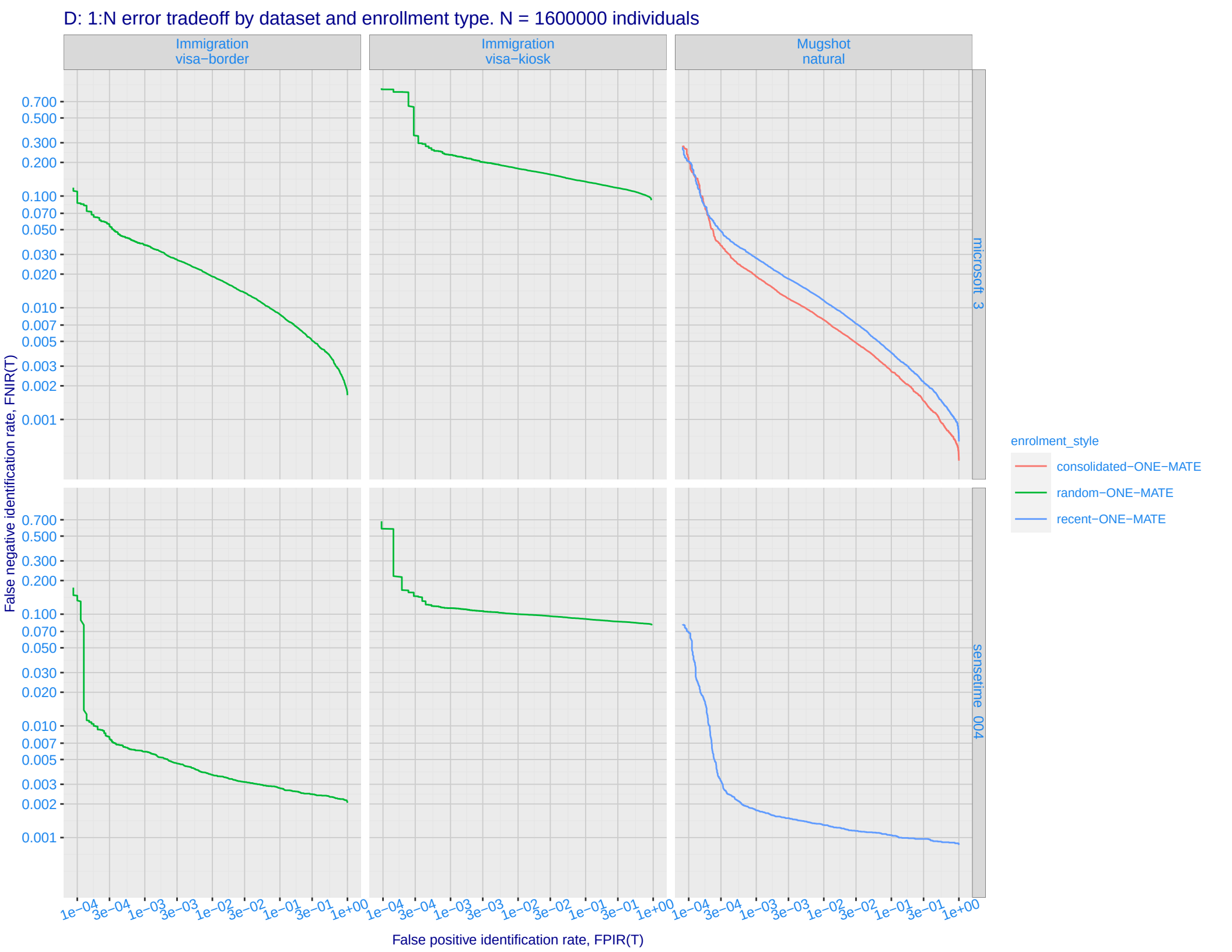
Immigration visa−border ranking 32 (out of 139) −− FNIR(1600000, T, L+1) = 0.0365, FPIR=0.001000 vs. lowest 0.0059 from sensetime_004

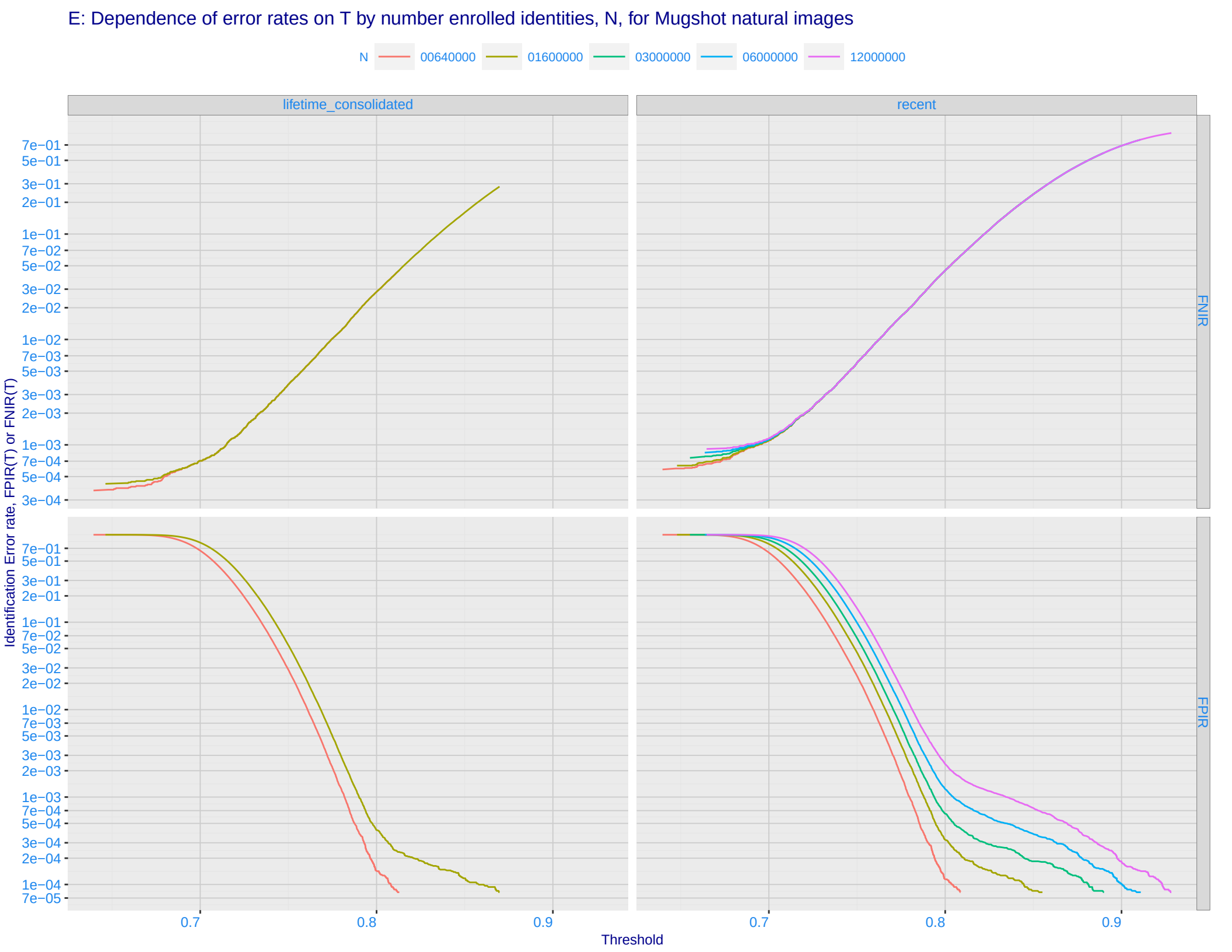
Immigration visa−kiosk ranking 23 (out of 134) −− FNIR(1600000, T, L+1) = 0.2336, FPIR=0.001000 vs. lowest 0.1048 from sensetime_005

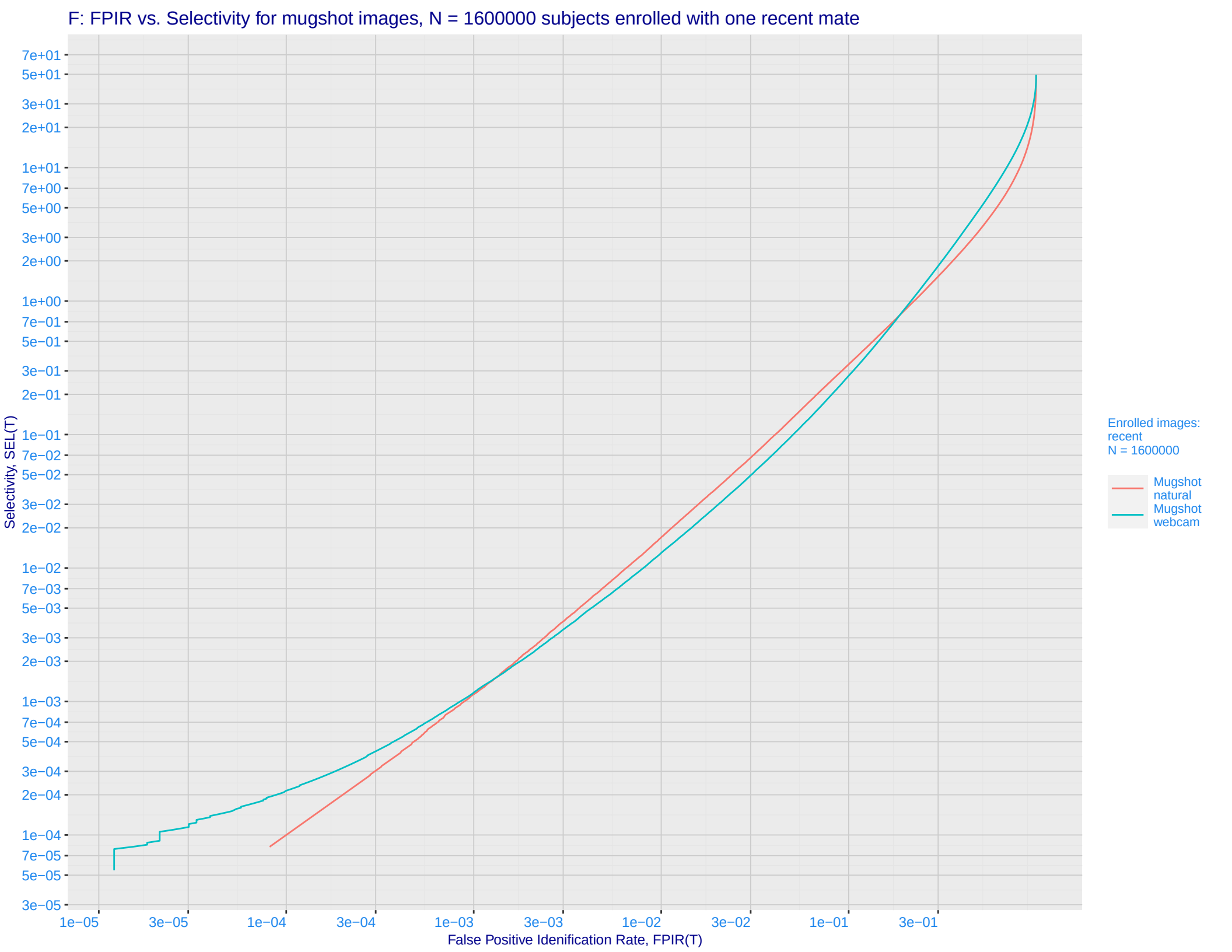

B: Mugshot natural images, identification mode: FNIR(N, L+1, T) vs. most accurate (sensetime_004)
False negative identification rate, FNIR(N)
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
1e+06
3e+06
1e+07
Enrolled population size, N
enrolment_style
consolidated
recent
Dataset:
2018 Mugshot
FNIR@FPIR = 0.001
microsoft_3
sensetime_004

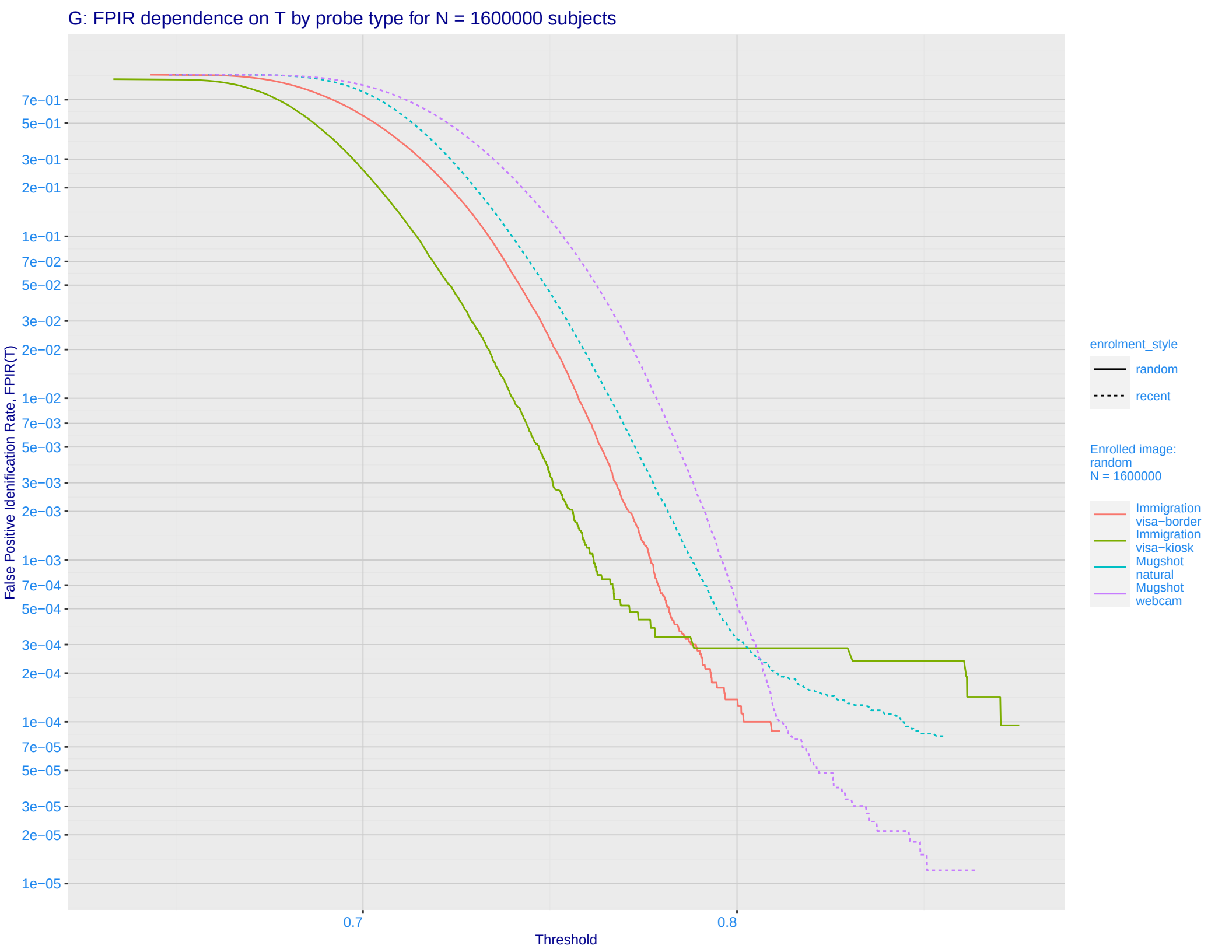
C: Evolution of accuracy for MICROSOFT algorithms on three datasets 2018 − present

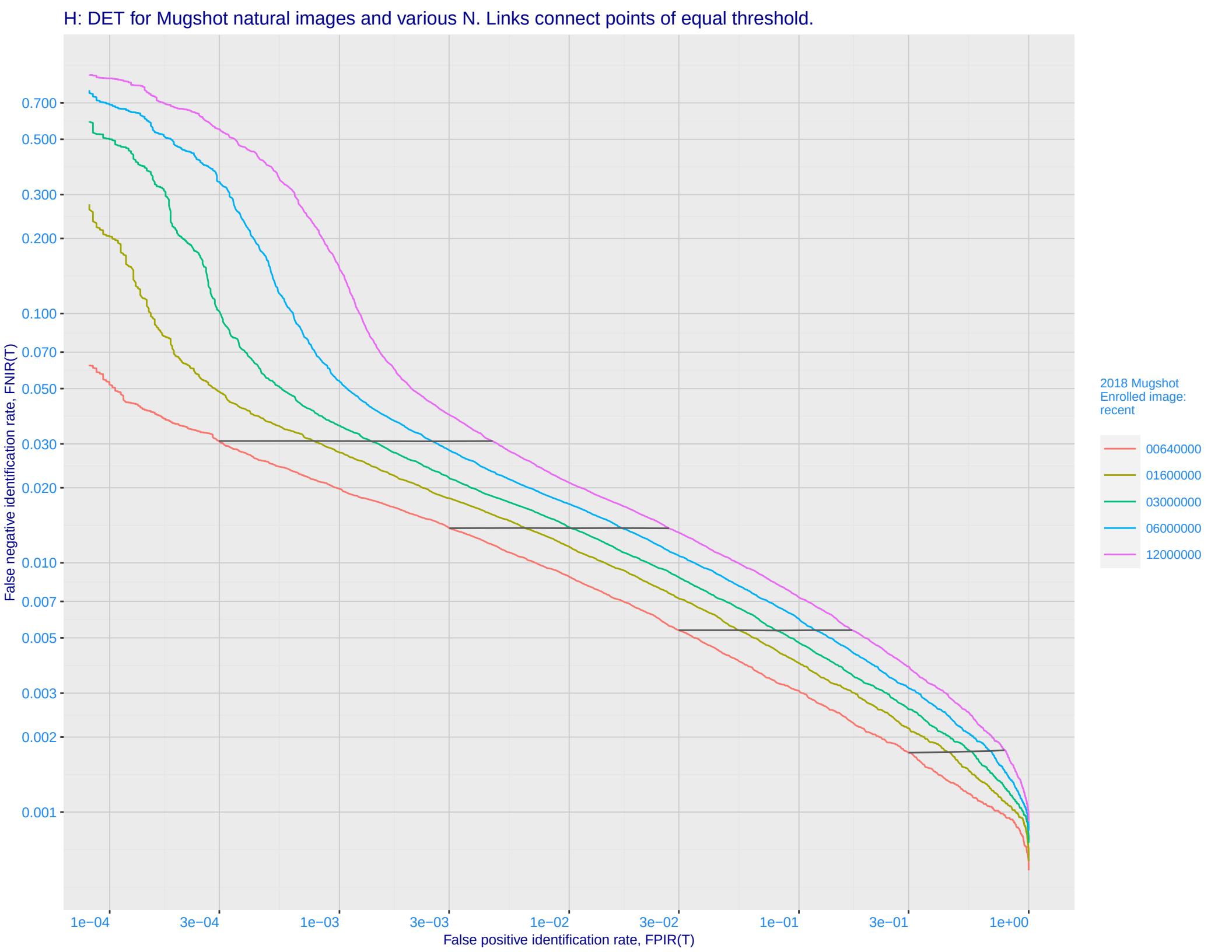


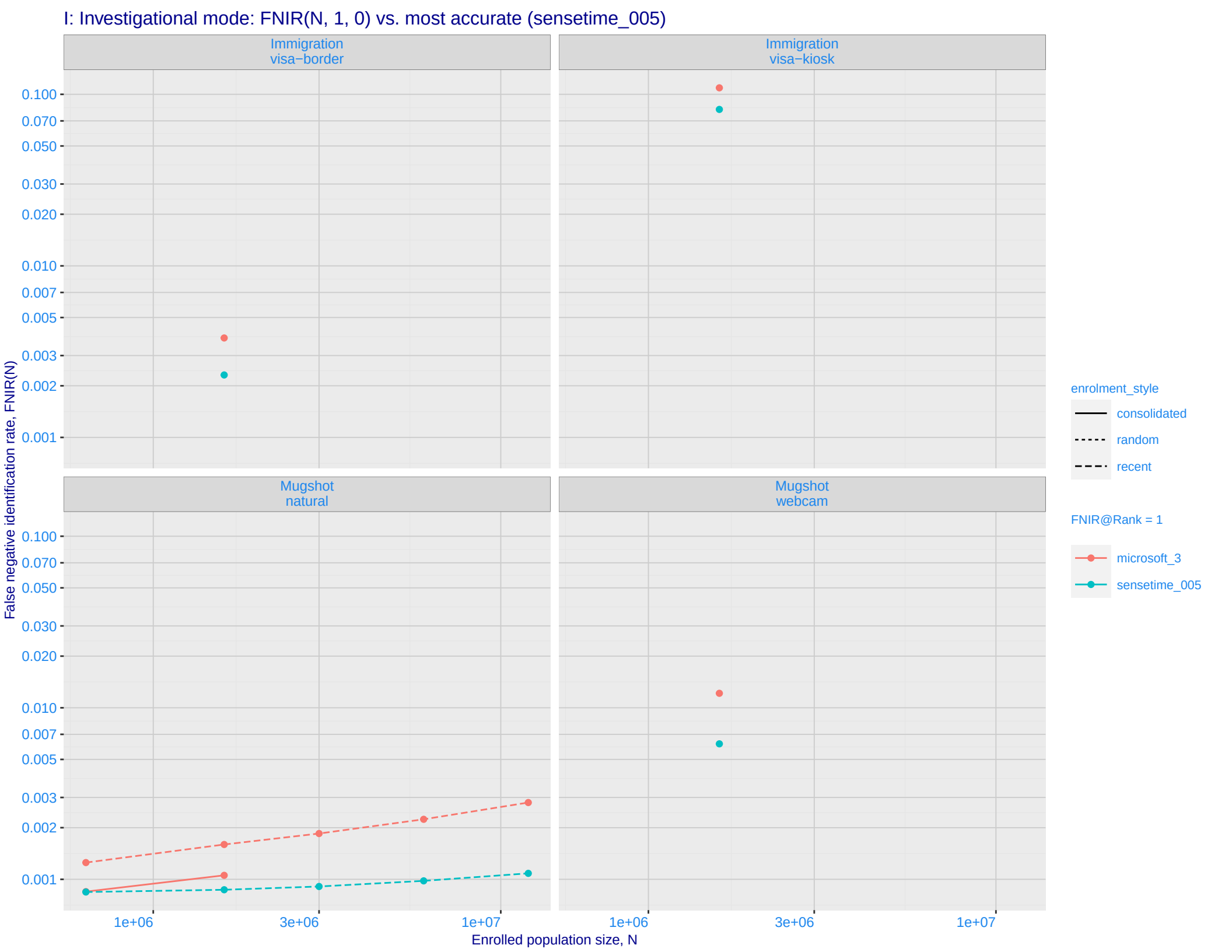

D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals
Immigration visa−border
Immigration visa−kiosk
Mugshot natural
microsoft_3
sensetime_004
False negative identification rate, FNIR(T)
0.700
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
0.001
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

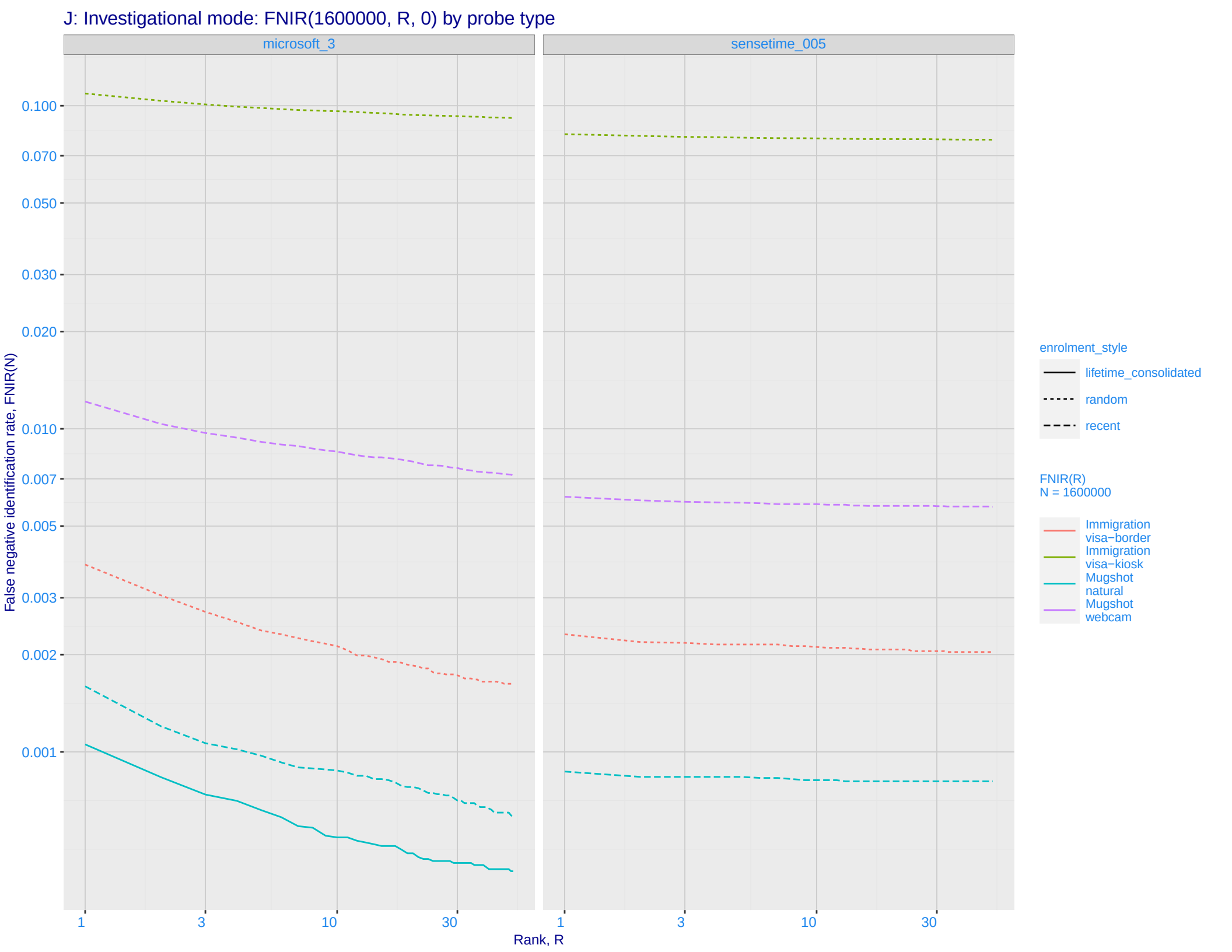

E: Dependence of error rates on T by number enrolled identities, N, for Mugshot natural images
N
00640000
01600000
03000000
06000000
12000000
lifetime_consolidated
recent
FNIR
FPIR
Identification Error rate, FPIR(T) or FNIR(T)
7e−01
5e−01
3e−01
2e−01
1e−01
7e−02
5e−02
3e−02
2e−02
1e−02
7e−03
5e−03
3e−03
2e−03
1e−03
7e−04
5e−04
3e−04
2e−04
1e−04
7e−05
0.7
0.8
0.9
Threshold

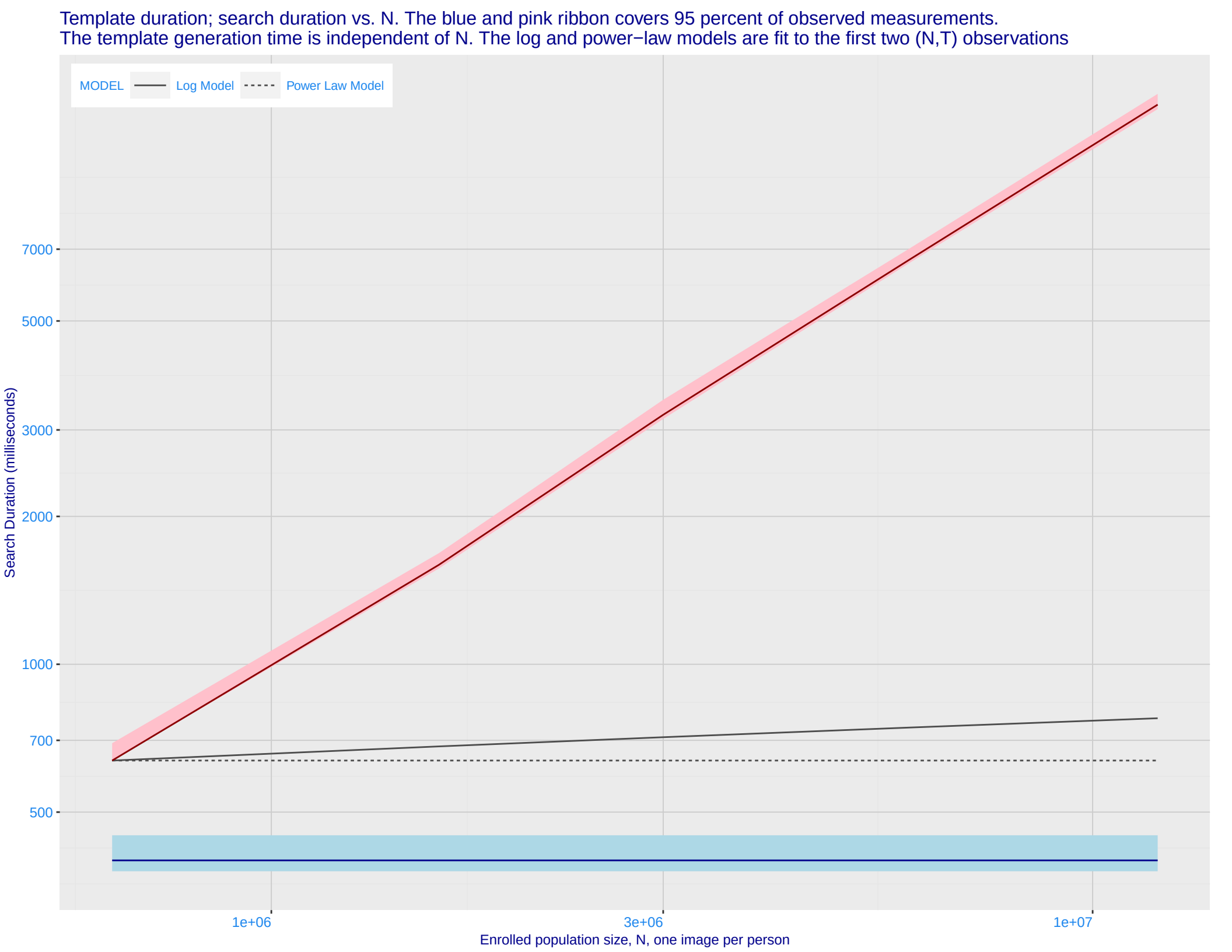

F: FPIR vs. Selectivity for mugshot images, N = 1600000 subjects enrolled with one recent mate
Selectivity, SEL(T)
7e+01
5e+01
3e+01
2e+01
1e+01
7e+00
5e+00
3e+00
2e+00
1e+00
7e−01
5e−01
3e−01
2e−01
1e−01
7e−02
5e−02
3e−02
2e−02
1e−02
7e−03
5e−03
3e−03
2e−03
1e−03
7e−04
5e−04
3e−04
2e−04
1e−04
7e−05
5e−05
3e−05
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
0.7
0.8
Threshold
enrolment_style
random
recent
Enrolled image:
random
N = 1600000
Immigration
visa−border
Immigration
visa−kiosk
Mugshot
natural
Mugshot
webcam

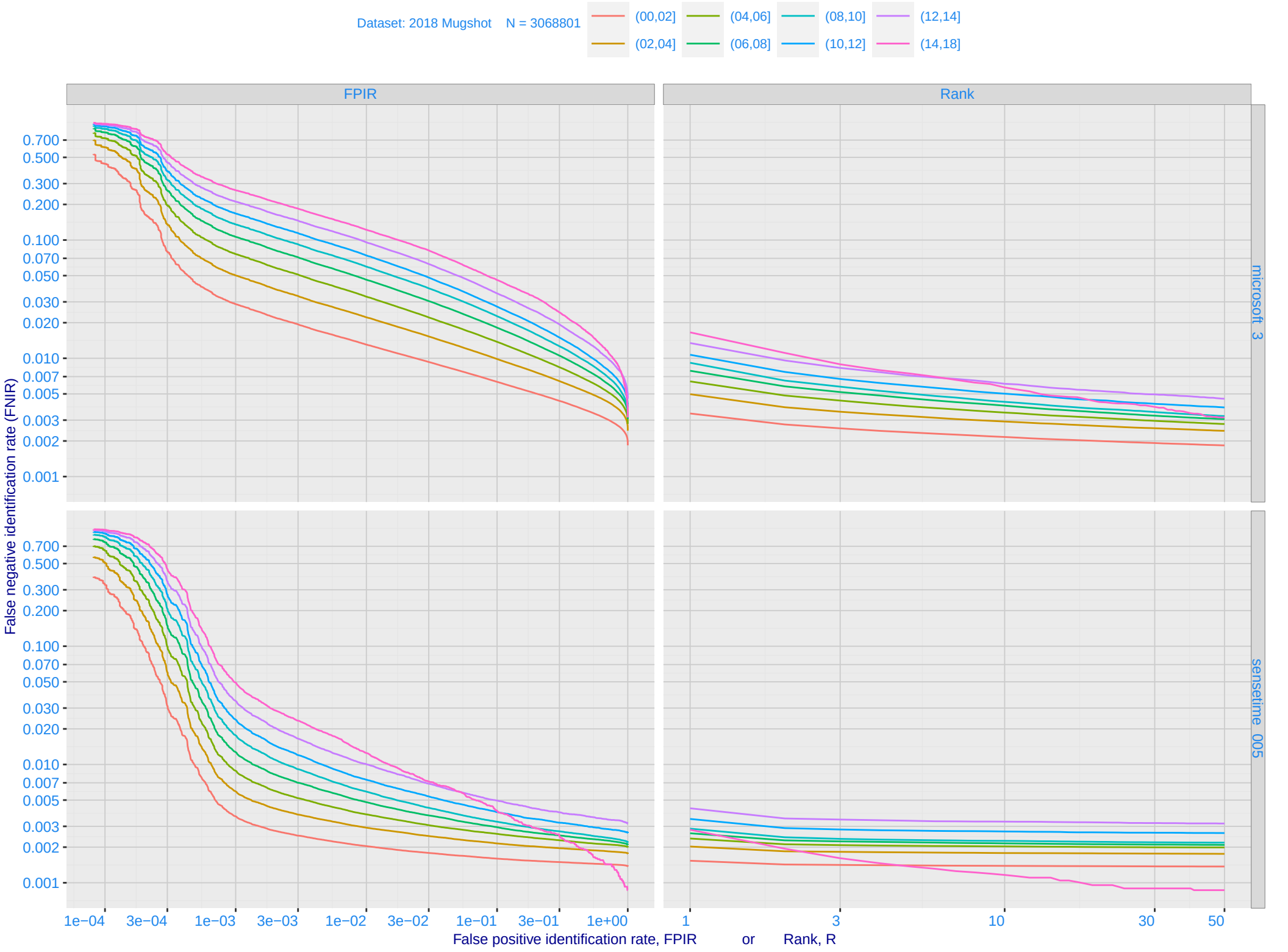

H: DET for Mugshot natural images and various N. Links connect points of equal threshold.
False negative identification rate, FNIR(T)
0.700
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
0.001
1e−04
3e−04
1e−03
3e−03
1e−02
3e−02
1e−01
3e−01
1e+00
False positive identification rate, FPIR(T)
2018 Mugshot
Enrolled image:
recent
00640000
01600000
03000000
06000000
12000000

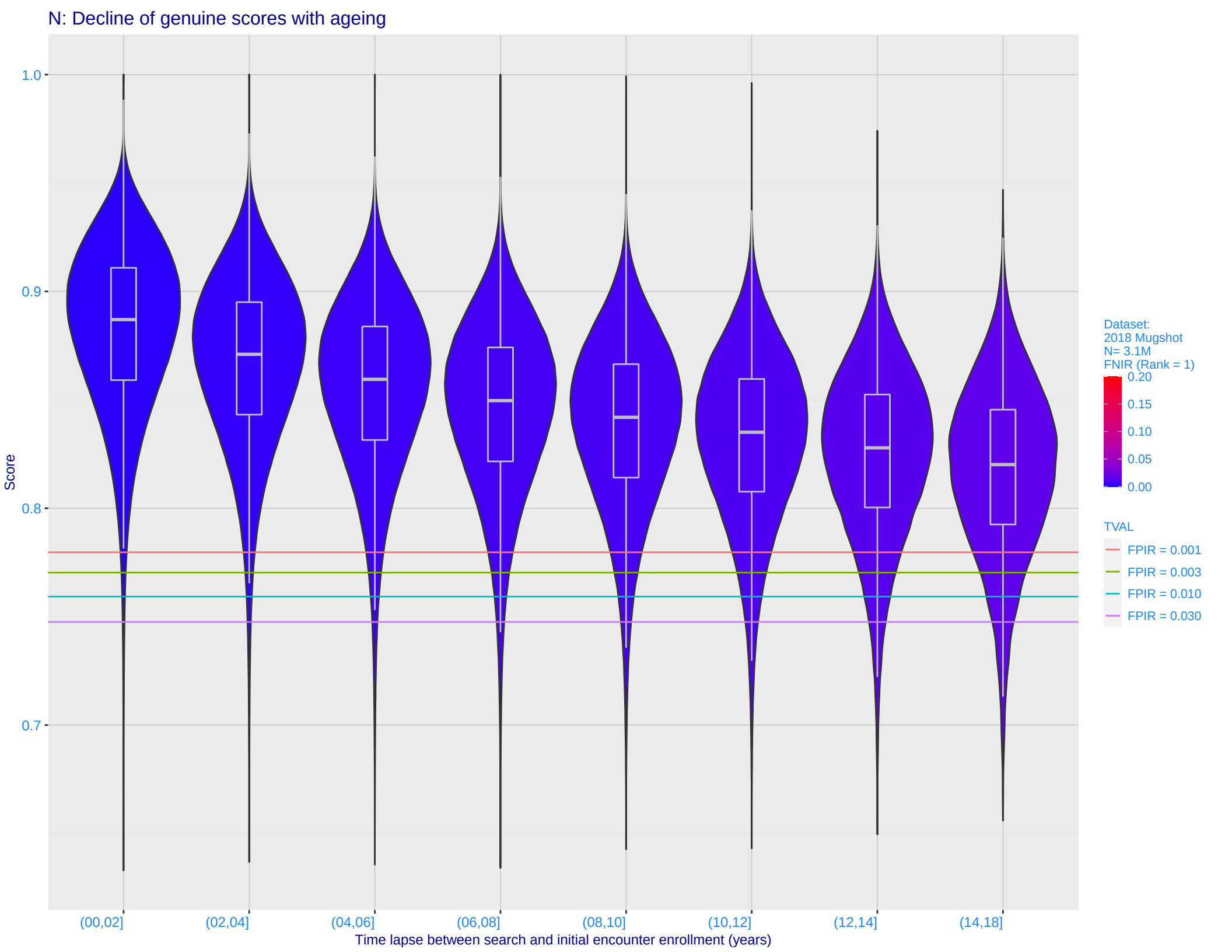

I: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime_005)
Immigration
visa−border
Immigration
visa−kiosk
Mugshot
natural
Mugshot
webcam
False negative identification rate, FNIR(N)
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
0.001
1e+06
3e+06
1e+07
Enrolled population size, N
enrolment_style
consolidated
random
recent
FNIR@Rank = 1
microsoft_3
sensetime_005


J: Investigational mode: FNIR(1600000, R, 0) by probe type
microsoft_3
sensetime_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
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
Search Duration (milliseconds)
7000
5000
3000
2000
1000
700
500
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
1.0
0.9
0.8
0.7
Score
(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