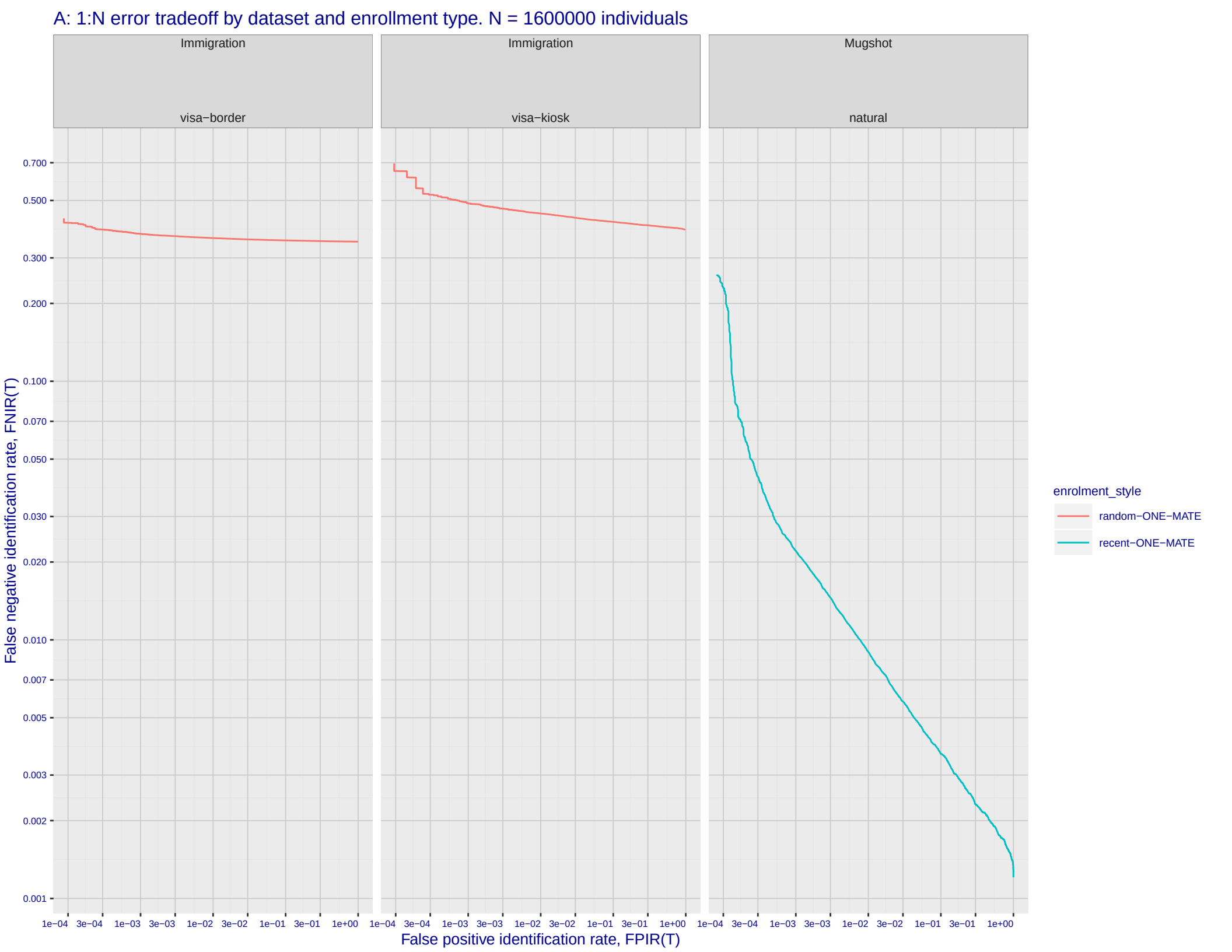
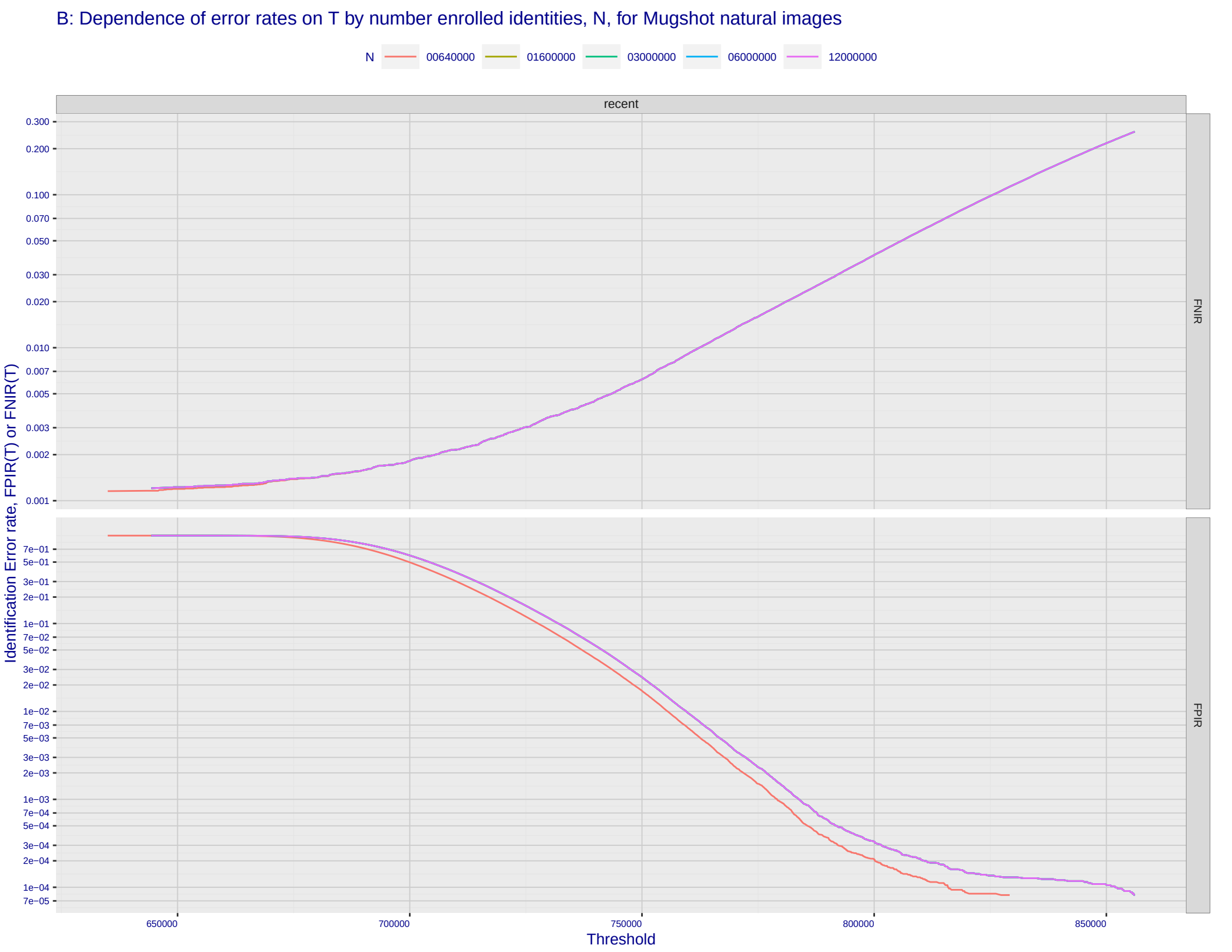
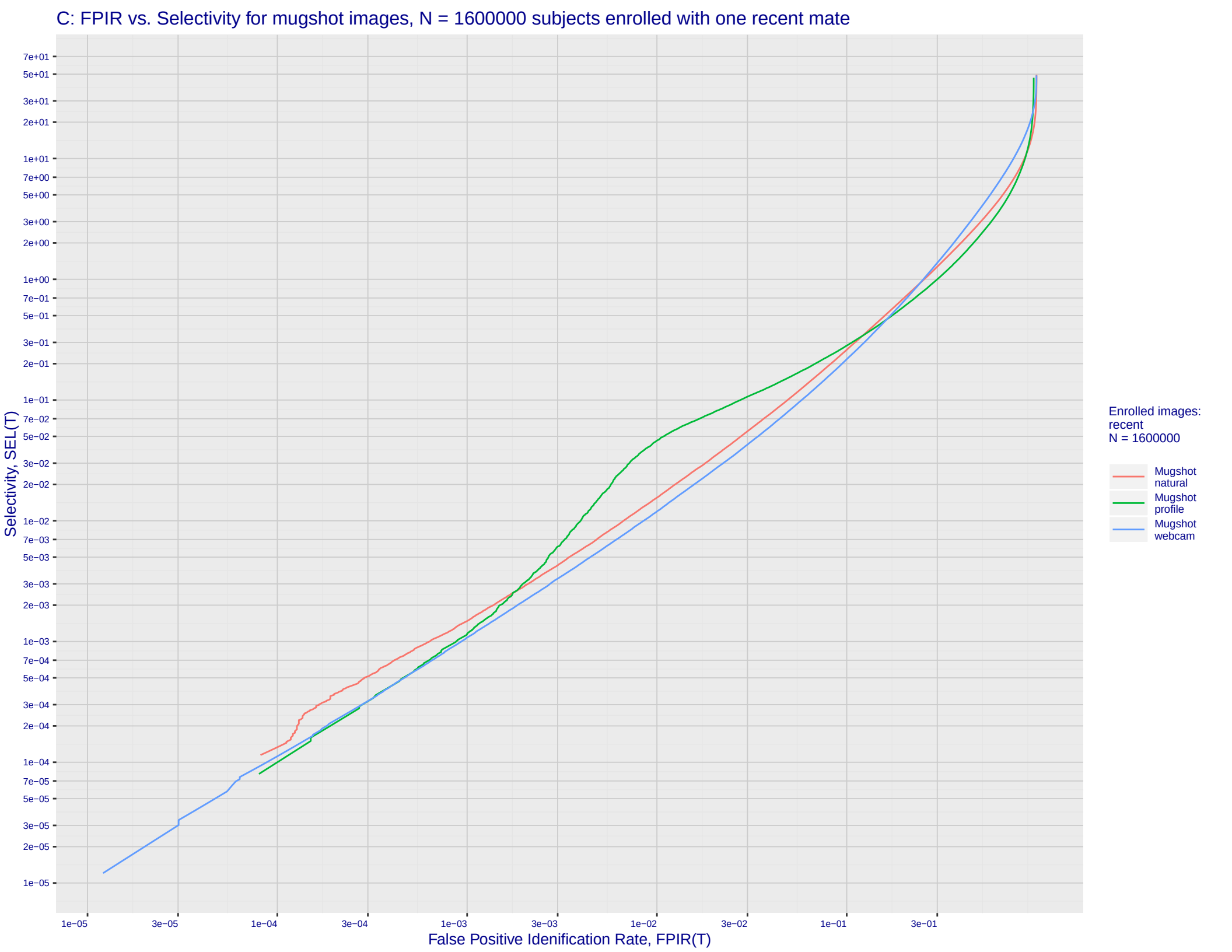
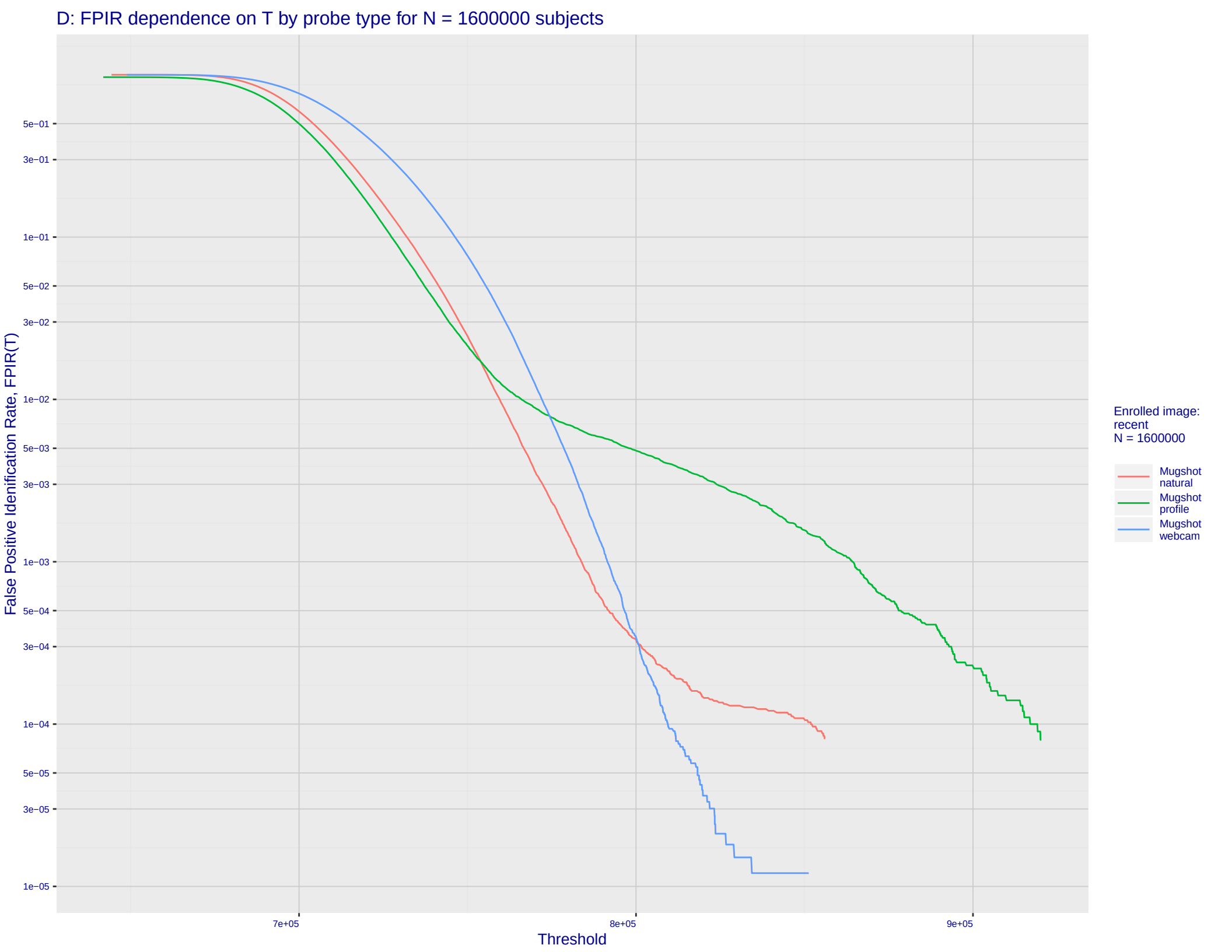
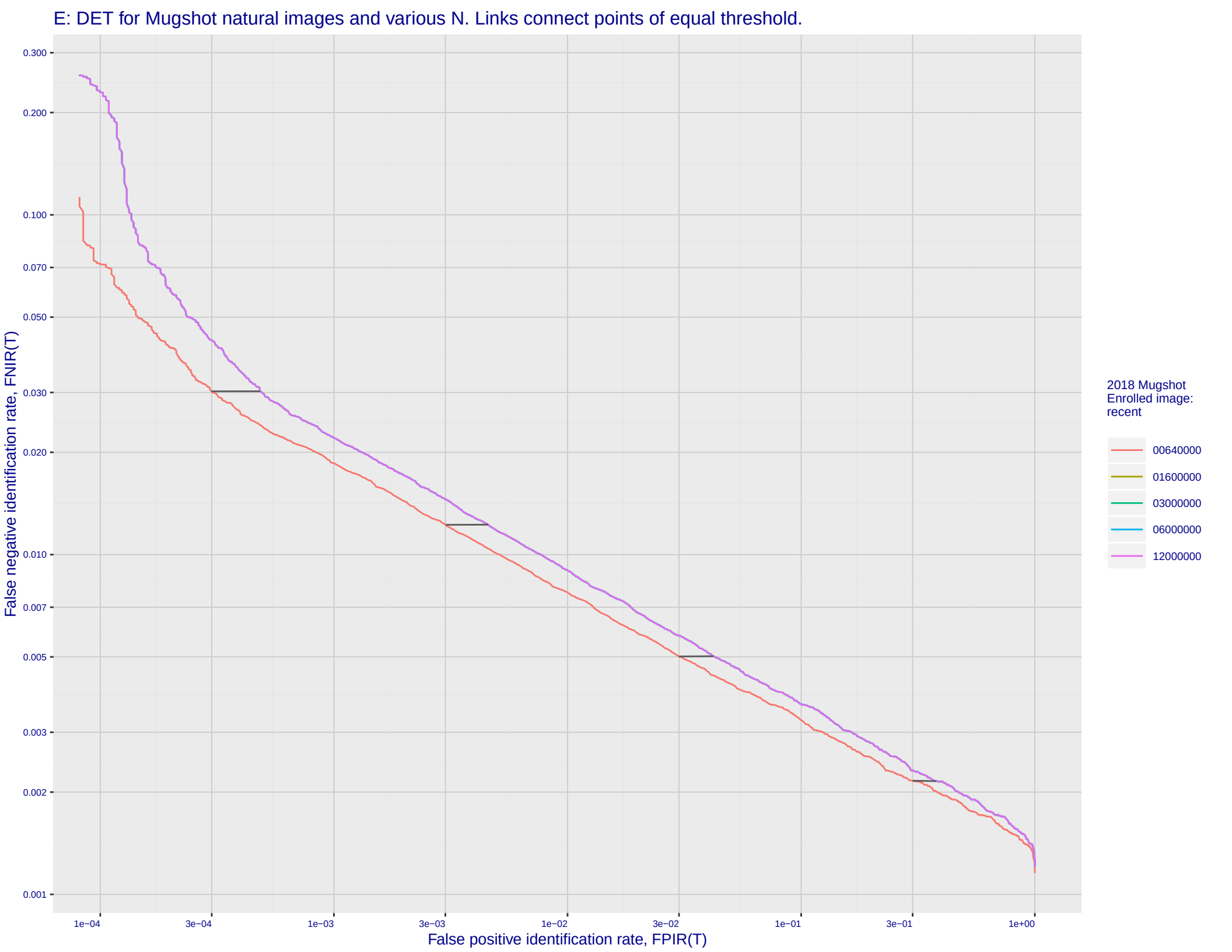
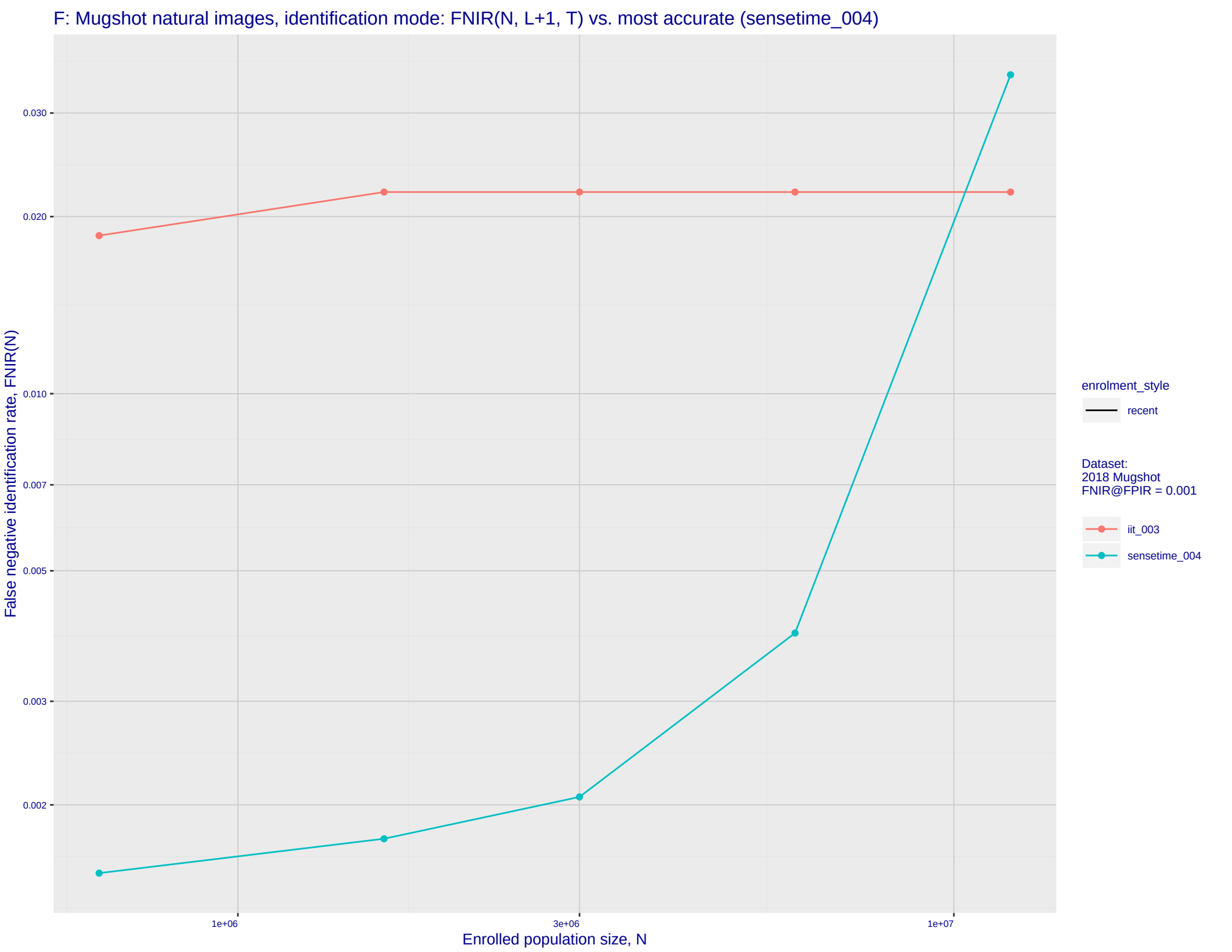

A: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals
Immigration
visa−border
Immigration
visa−kiosk
Mugshot
natural
False negative identification rate, FNIR(T)
0.700
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
0.001
1e−04
3e−04
1e−03
3e−03
1e−02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


B: 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)
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
0.001
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
650000
700000
750000
800000
850000
Threshold


C: 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
profile
Mugshot
webcam


D: FPIR dependence on T by probe type for N = 1600000 subjects
False Positive Idenification Rate, FPIR(T)
5e−01
3e−01
1e−01
5e−02
3e−02
1e−02
5e−03
3e−03
1e−03
5e−04
3e−04
1e−04
5e−05
3e−05
1e−05
7e+05
8e+05
9e+05
Threshold
Enrolled image:
recent
N = 1600000
Mugshot
natural
Mugshot
profile
Mugshot
webcam


E: DET for Mugshot natural images and various N. Links connect points of equal threshold.
False negative identification rate, FNIR(T)
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


F: Mugshot natural images, identification mode: FNIR(N, L+1, T) vs. most accurate (sensetime_004)
False negative identification rate, FNIR(N)
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
iit_003
sensetime_004

G: Datasheet

Algorithm: iit_003

Developer: Institute of Information Technologies

Submission Date: 2020_12_01

Template size: 2048 bytes

Template time (2.5 percentile): 485 msec

Template time (median): 486 msec

Template time (97.5 percentile): 489 msec

Frontal mugshot investigation rank 25 −− FNIR(1600000, 0, 1) = 0.0021 vs. lowest 0.0010 from sensetime_004

natural investigation rank 194 −− FNIR(1600000, 0, 1) = 0.3573 vs. lowest 0.0067 from sensetime_003

natural investigation rank 21 −− FNIR(1600000, 0, 1) = 0.1150 vs. lowest 0.0492 from paravision_005

natural investigation rank 21 −− FNIR(1600000, 0, 1) = 0.1150 vs. lowest 0.0492 from paravision_005

natural investigation rank 90 −− FNIR(1600000, 0, 1) = 0.3482 vs. lowest 0.0014 from visionlabs_009

natural investigation rank 89 −− FNIR(1600000, 0, 1) = 0.3999 vs. lowest 0.0694 from cib_000

Frontal mugshot identification rank 31 −− FNIR(1600000, T, L+1) = 0.0220 vs. lowest 0.0018 from sensetime_004

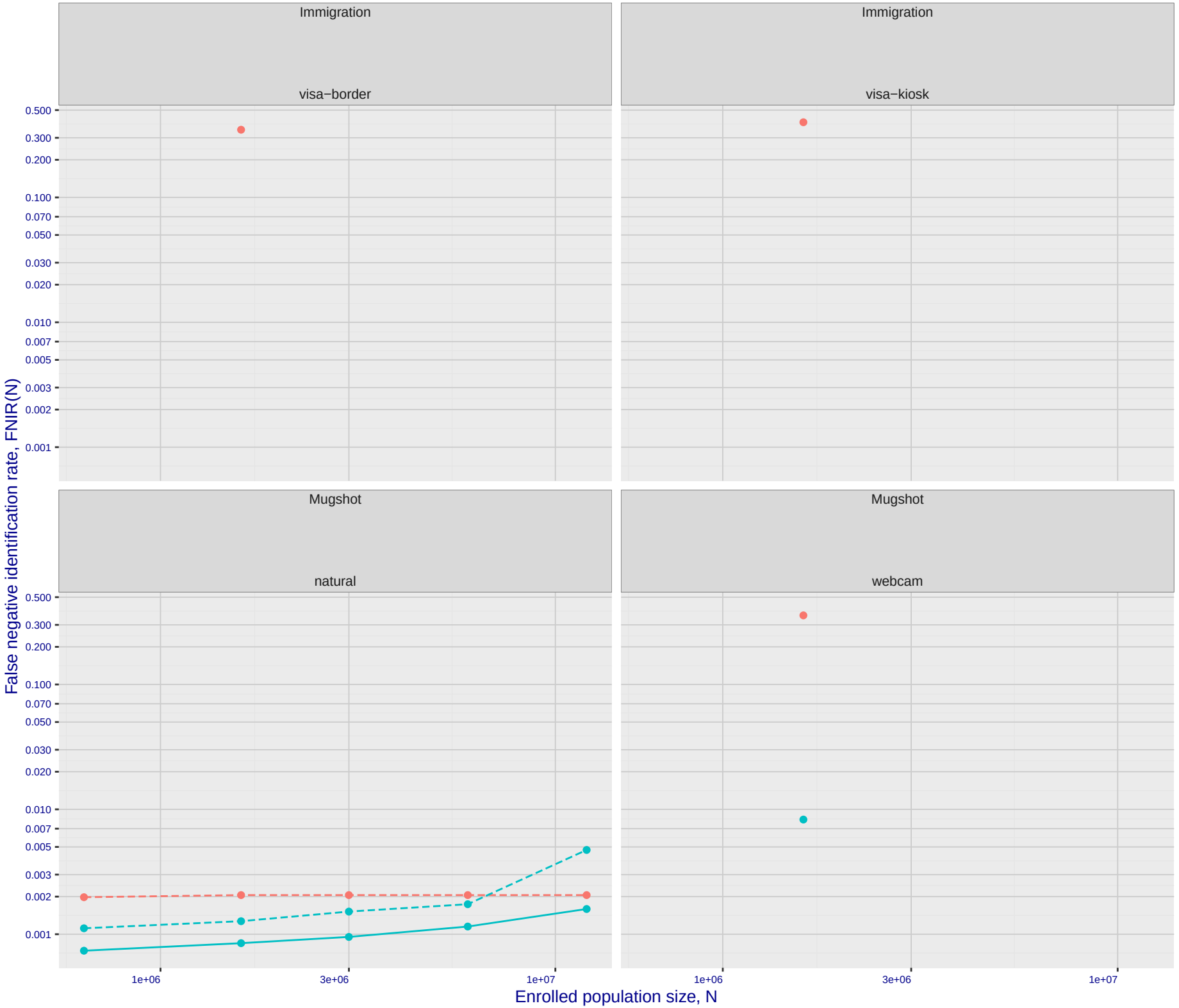
natural identification rank 158 −− FNIR(1600000, T, L+1) = 0.3960 vs. lowest 0.0122 from sensetime_003

natural identification rank 46 −− FNIR(1600000, T, L+1) = 0.9491 vs. lowest 0.1020 from sensetime_004

natural identification rank 72 −− FNIR(1600000, T, L+1) = 0.3716 vs. lowest 0.0059 from sensetime_004

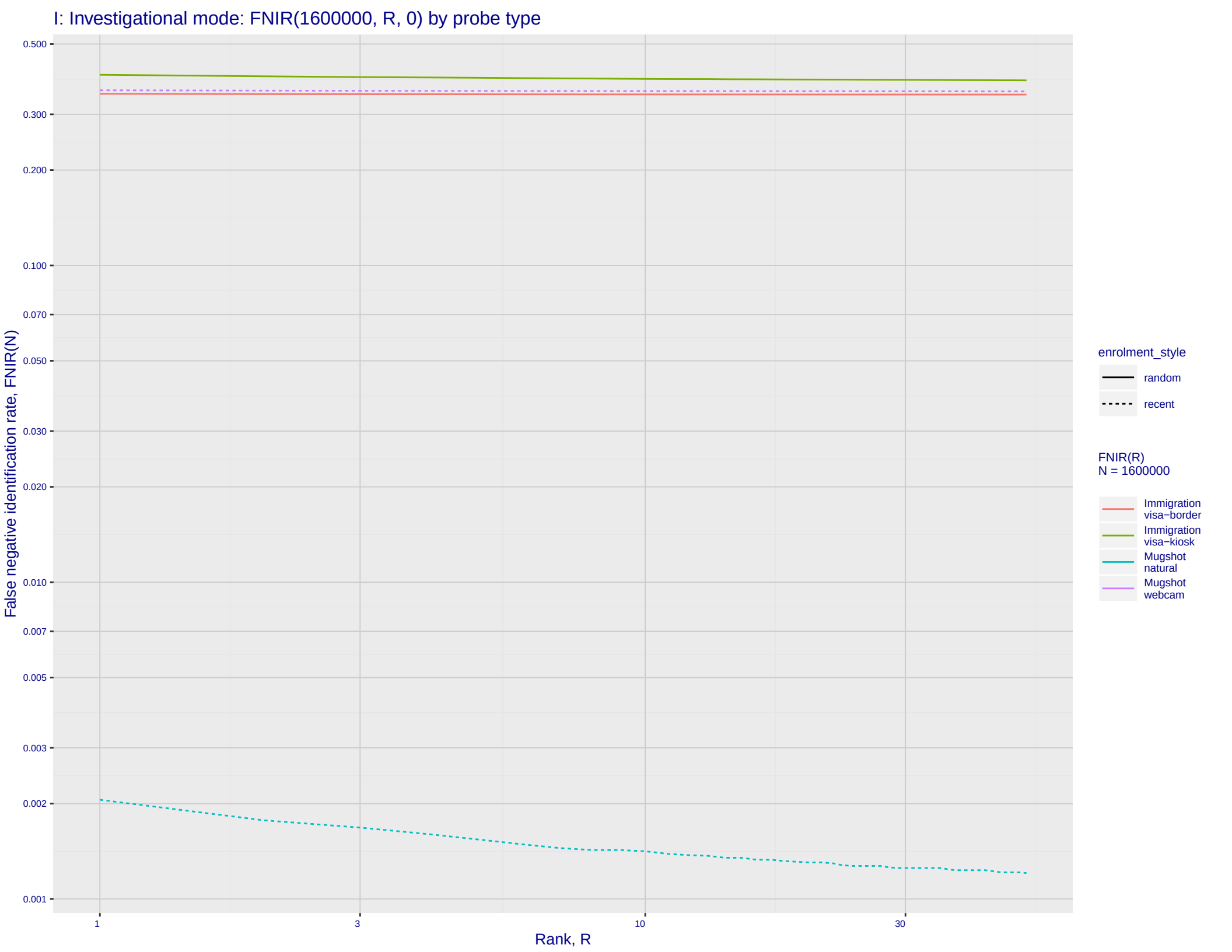
natural identification rank 47 −− FNIR(1600000, T, L+1) = 0.4883 vs. lowest 0.1129 from visionlabs_009

H: Investigational mode: FNIR(N, 1, 0) vs. most accurate (yitu_4)

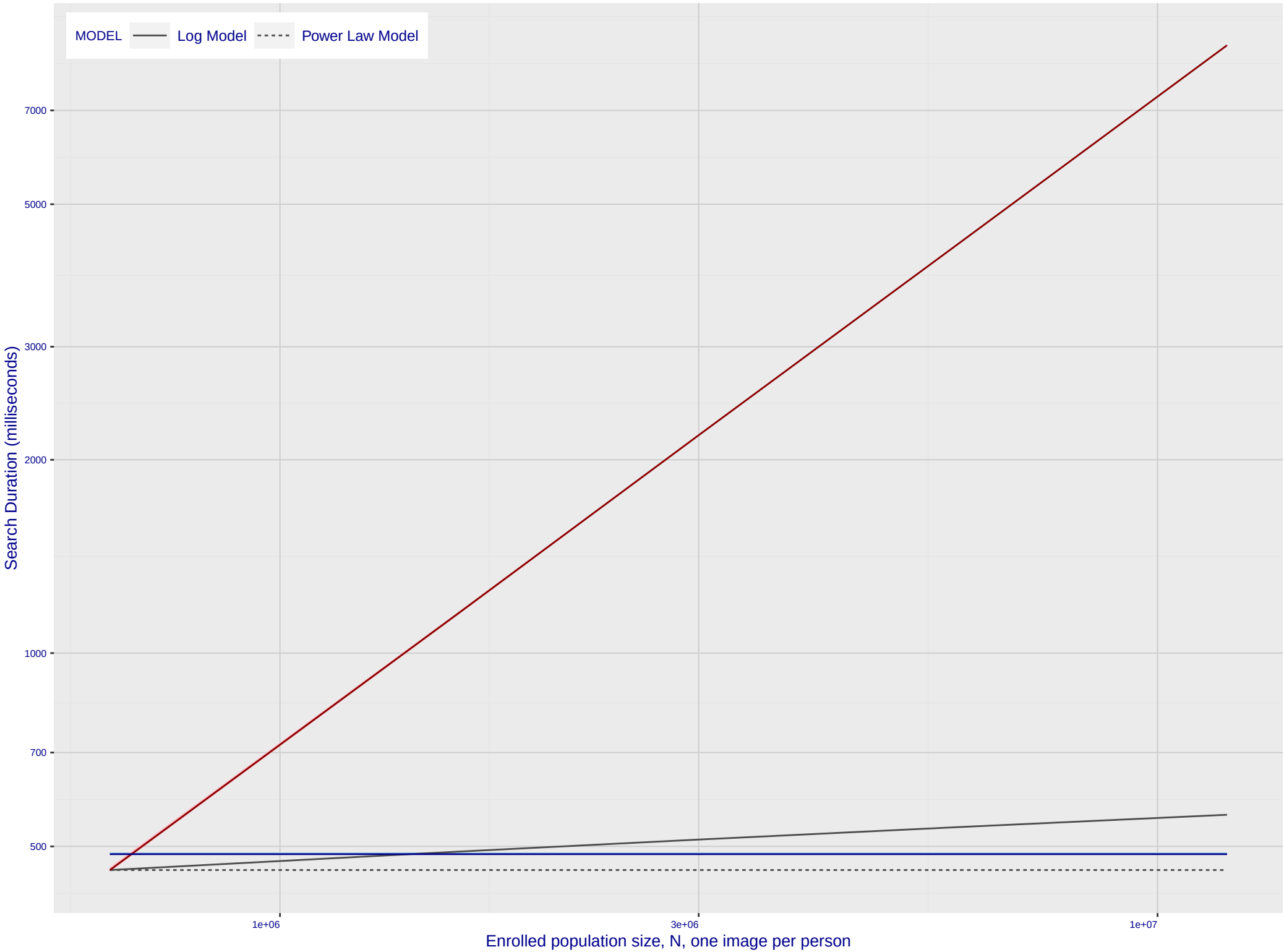


enrolment_style
- consolidated
- random
- recent

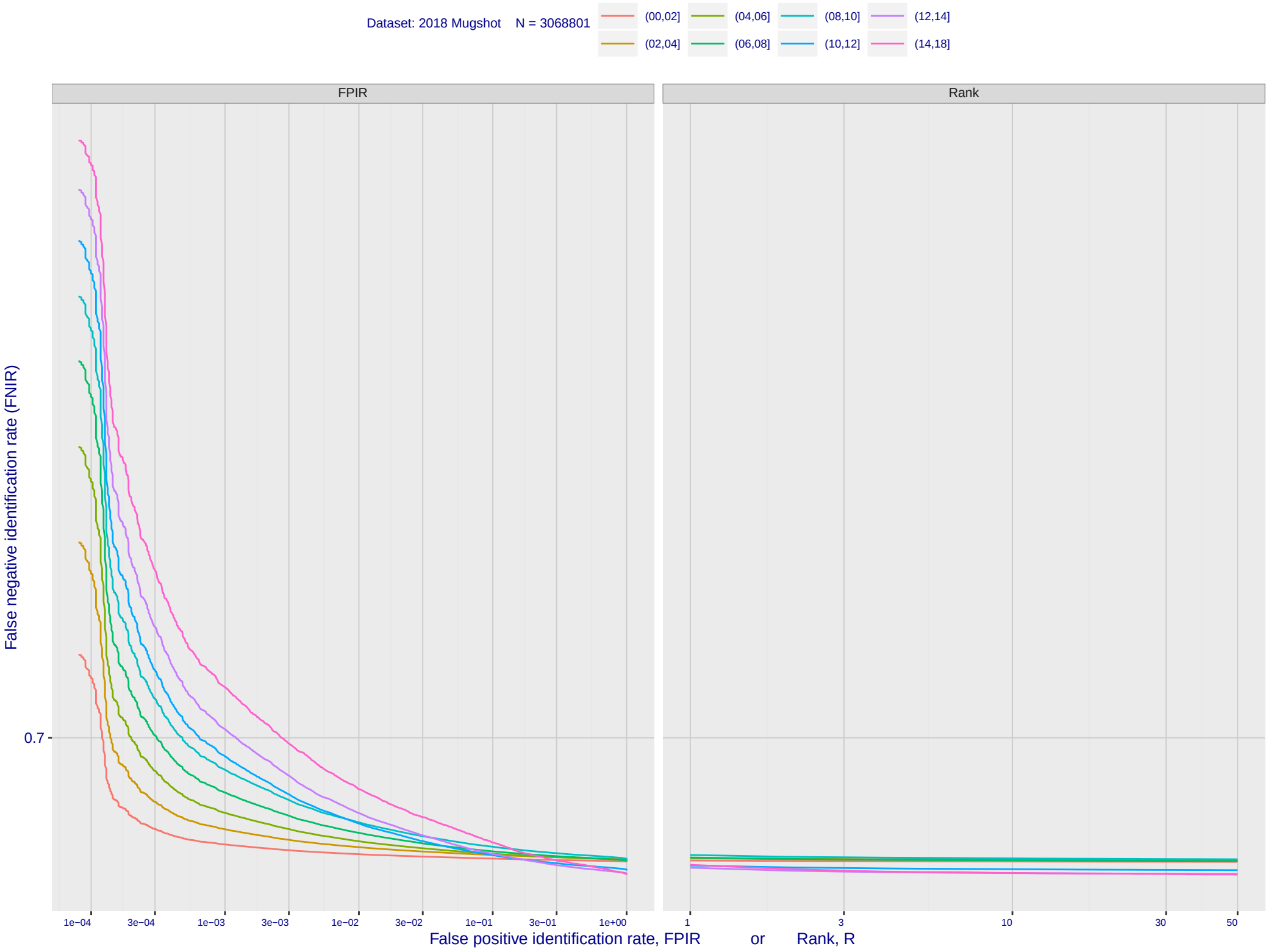
FNIR@Rank = 1
- iit_003
- yitu_4

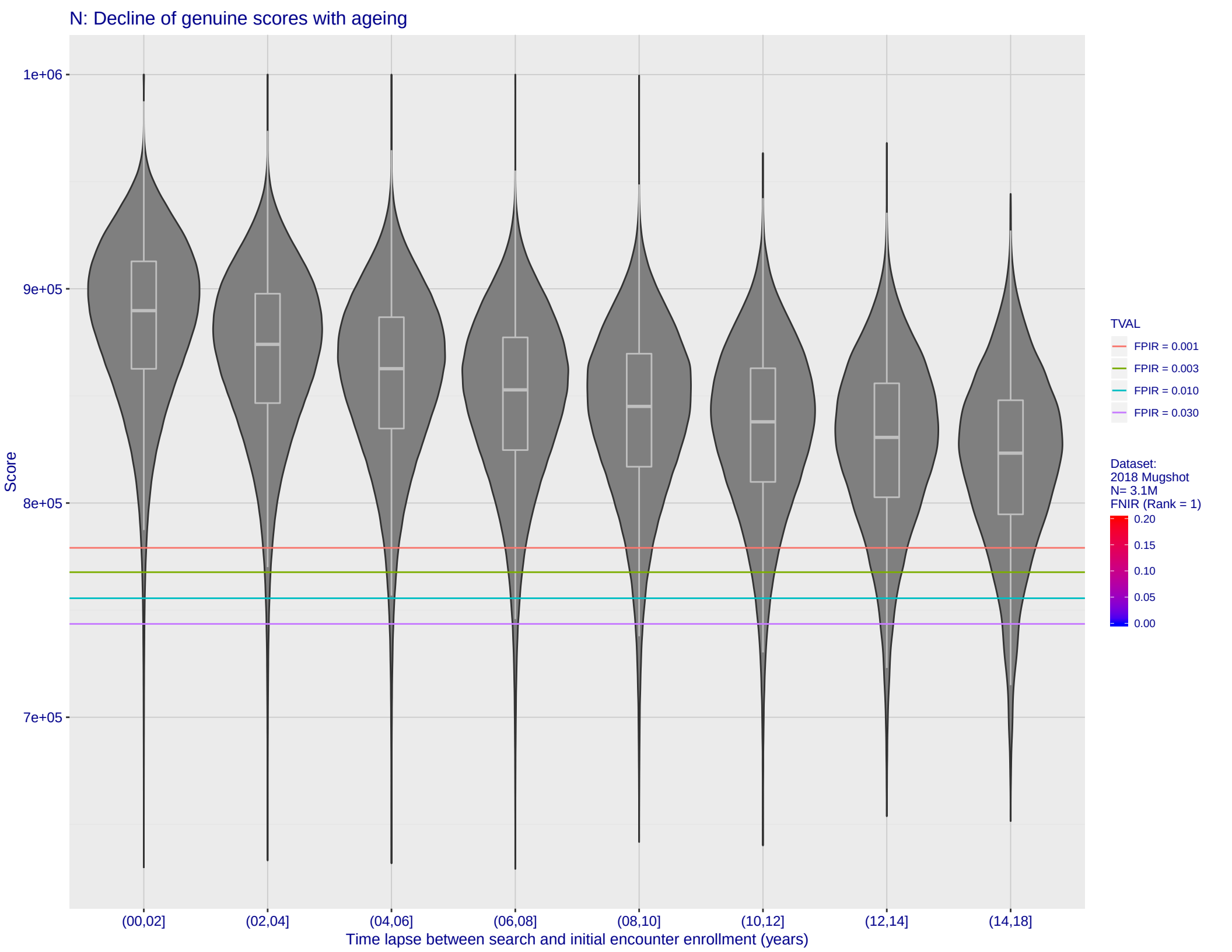

I: Investigational mode: FNIR(1600000, R, 0) by probe type
False negative identification rate, FNIR(N)
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
0.001
1
3
10
30
Rank, R
enrolment_style
random
recent
FNIR(R)
N = 1600000
Immigration visa−border
Immigration visa−kiosk
Mugshot natural
Mugshot webcam

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



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




N: Decline of genuine scores with ageing
1e+06
9e+05
8e+05
7e+05
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)
TVAL
FPIR = 0.001
FPIR = 0.003
FPIR = 0.010
FPIR = 0.030
Dataset:
2018 Mugshot
N= 3.1M
FNIR (Rank = 1)
0.20
0.15
0.10
0.05
0.00