A: Datasheet

Algorithm: eyedea_2

Developer: Eyedea Recognition

Submission Date: 2018_02_16

Template size: 1036 bytes

Template time (2.5 percentile): 353 msec

Template time (median): 426 msec

Template time (97.5 percentile): 520 msec

Investigation:

Frontal mugshot ranking 238 (out of 265) −− FNIR(1600000, 0, 1) = 0.1979 vs. lowest 0.0009 from sensetime_005

Mugshot profile ranking 127 (out of 196) −− FNIR(1600000, 0, 1) = 0.9343 vs. lowest 0.0591 from sensetime_005

Immigration visa−border ranking 119 (out of 148) −− FNIR(1600000, 0, 1) = 0.2298 vs. lowest 0.0013 from visionlabs_010

Immigration visa−kiosk ranking 121 (out of 145) −− FNIR(1600000, 0, 1) = 0.4965 vs. lowest 0.0568 from hr_000

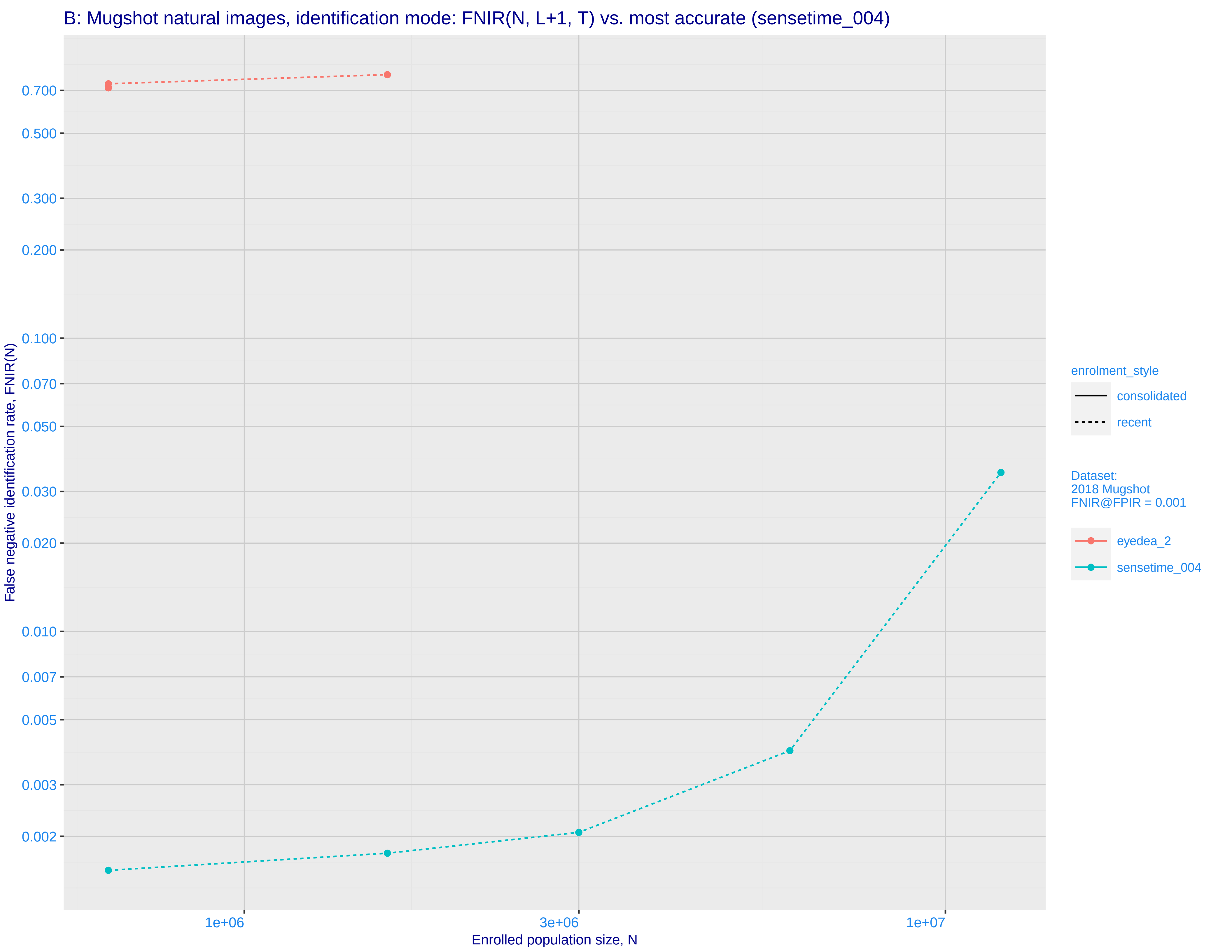
Identification:

Frontal mugshot ranking 241 (out of 265) −− FNIR(1600000, T, L+1) = 0.7926, FPIR=0.001000 vs. lowest 0.0018 from sensetime_004

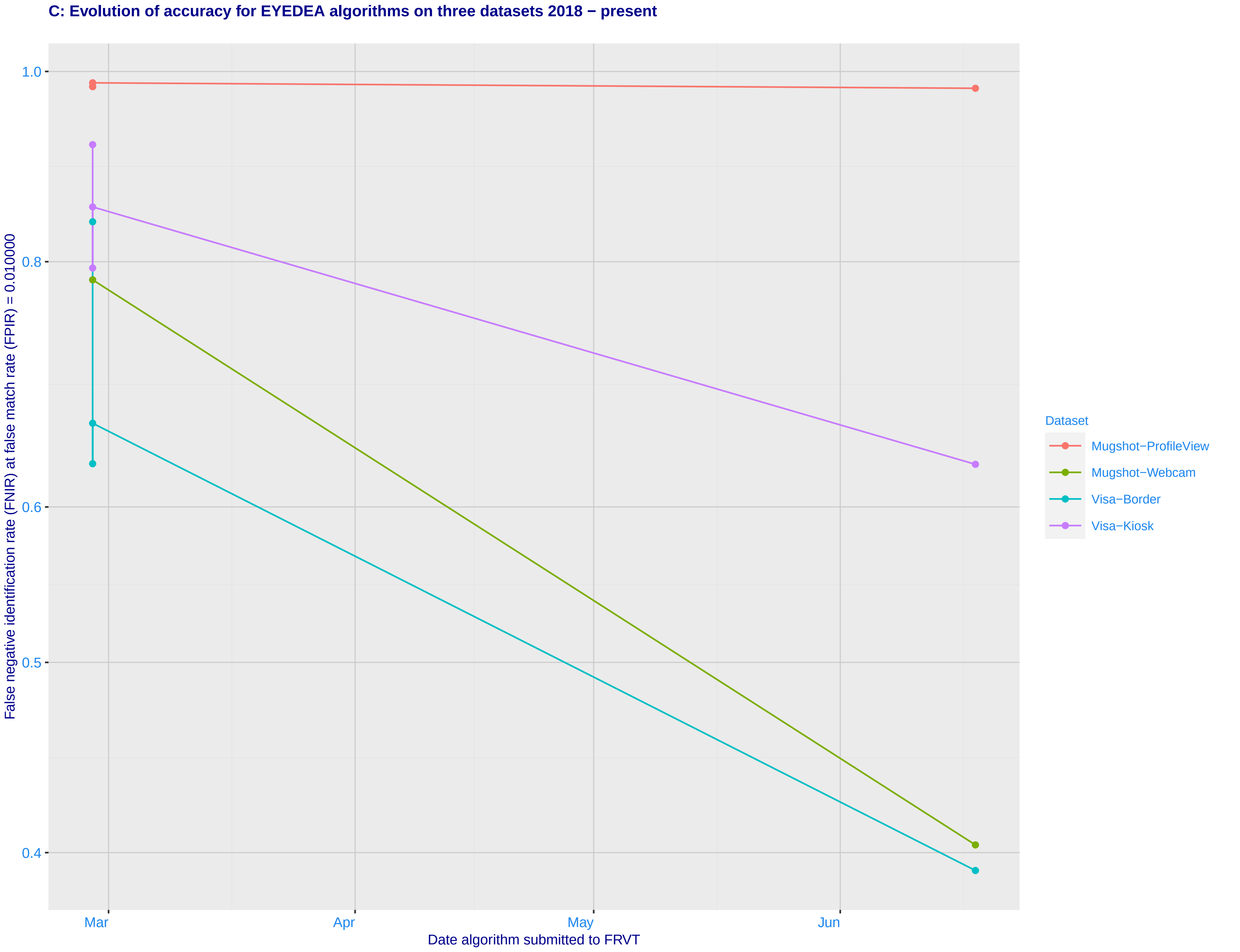
Mugshot profile ranking 142 (out of 195) −− FNIR(1600000, T, L+1) = 0.9994, FPIR=0.001000 vs. lowest 0.1331 from hr_000

Immigration visa−border ranking 120 (out of 146) −− FNIR(1600000, T, L+1) = 0.8351, FPIR=0.001000 vs. lowest 0.0049 from hr_000

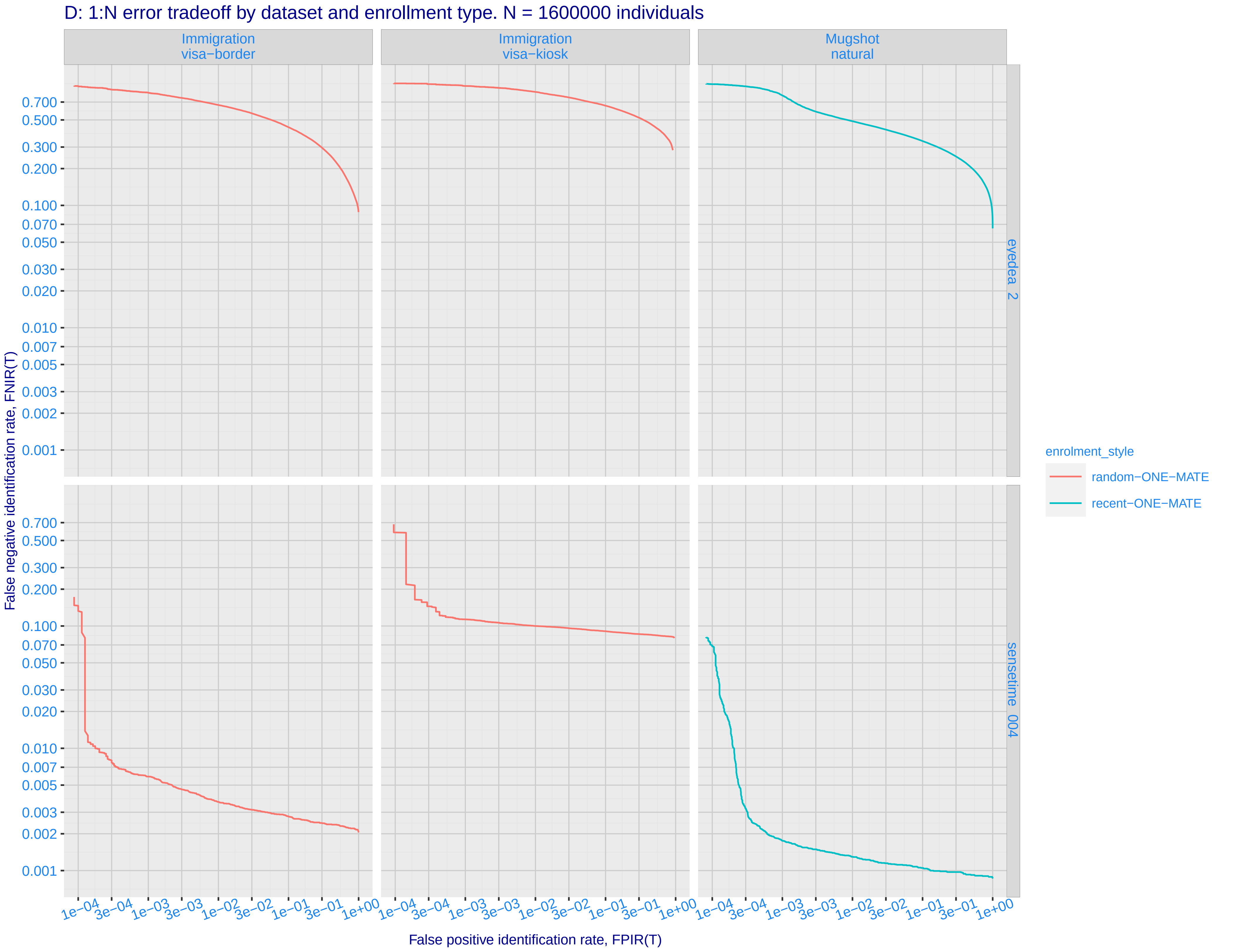
Immigration visa−kiosk ranking 112 (out of 141) −− FNIR(1600000, T, L+1) = 0.9471, FPIR=0.001000 vs. lowest 0.0996 from hr_000



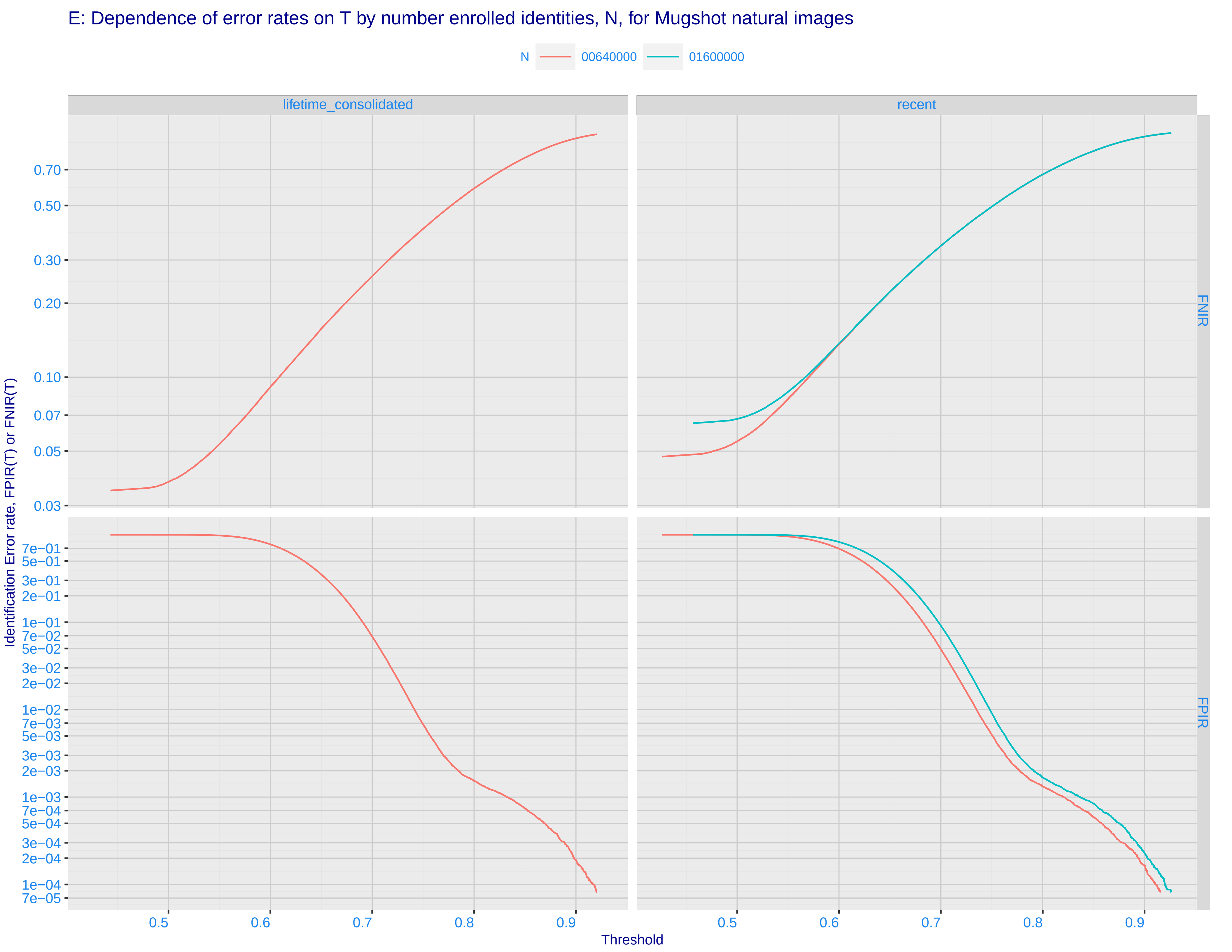
B: Mugshot natural images, identification mode: FNIR(N, L+1, T) vs. most accurate (sensetime_004)
0.700
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
False negative identification rate, FNIR(N)
1e+06
3e+06
1e+07
Enrolled population size, N
enrolment_style
consolidated
recent
Dataset:
2018 Mugshot
FNIR@FPIR = 0.001
eyedea_2
sensetime_004



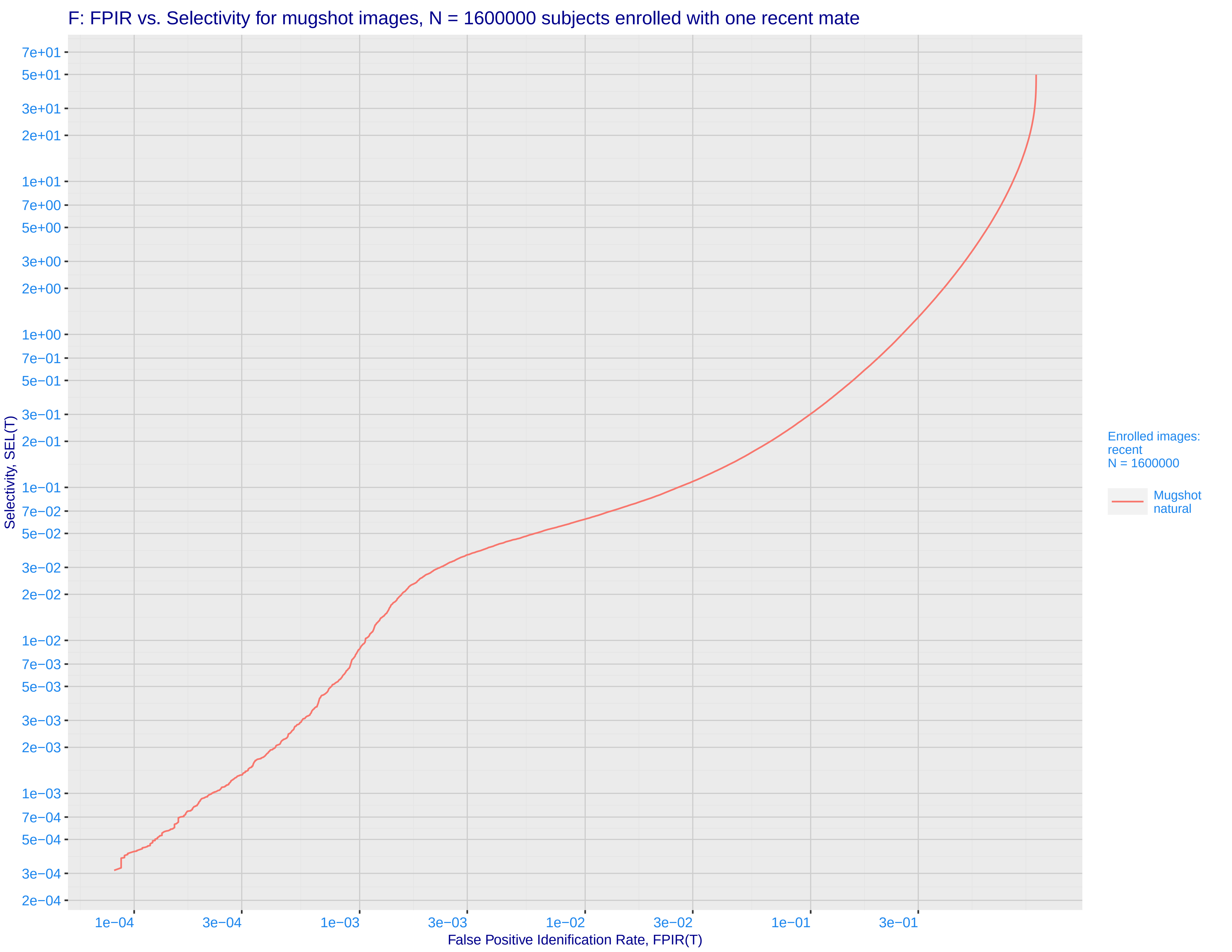
C: Evolution of accuracy for EYEDEA algorithms on three datasets 2018 − present
False negative identification rate (FNIR) at false match rate (FPIR) = 0.010000
1.0
0.8
0.6
0.5
0.4
Mar
Apr
May
Jun
Date algorithm submitted to FRVT
Dataset
Mugshot−ProfileView
Mugshot−Webcam
Visa−Border
Visa−Kiosk

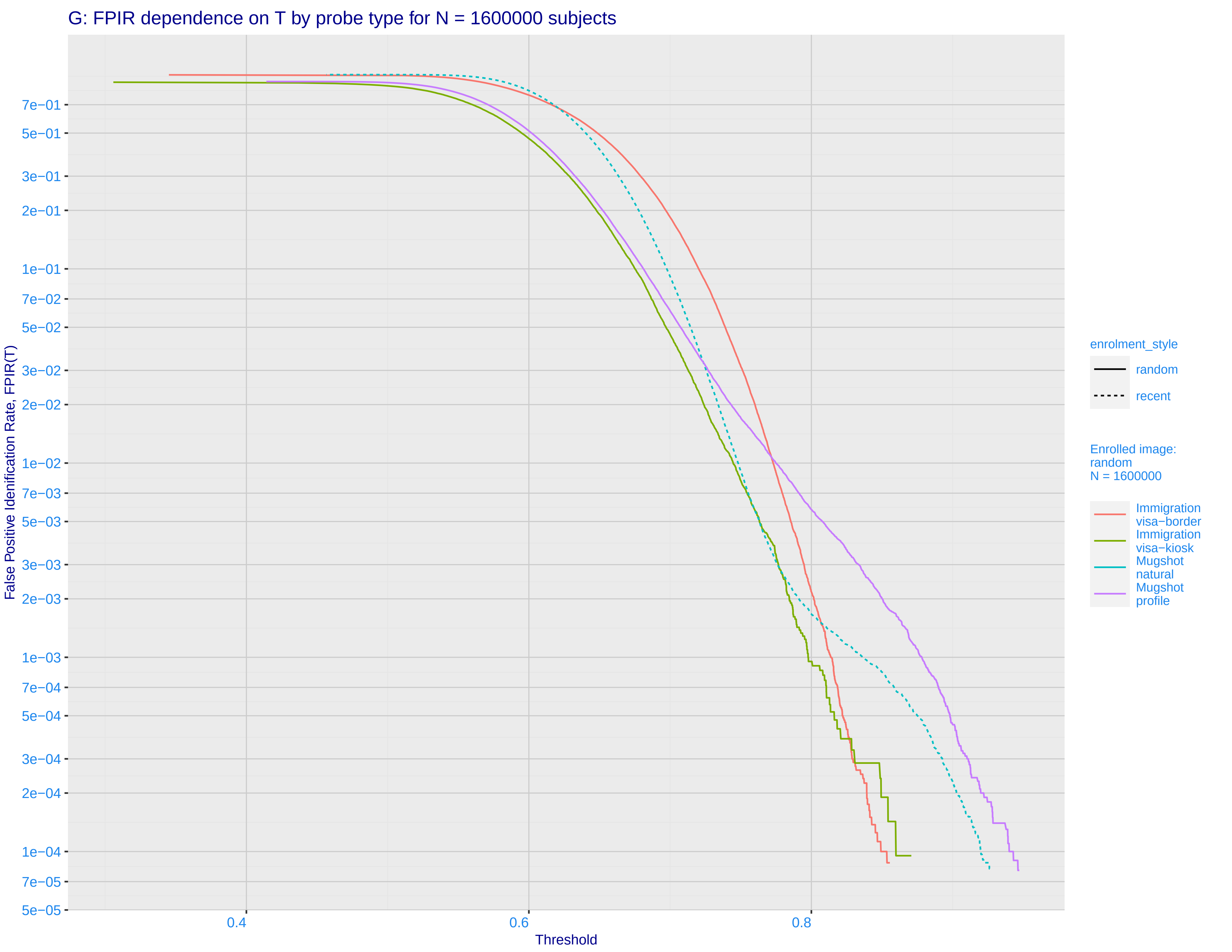


D: 1:N error tradeoff by dataset and enrollment type. N = 1600000 individuals
Immigration
visa−border
Immigration
visa−kiosk
Mugshot
natural
eyedea_2
sensetime_004
False negative identification rate, FNIR(T)
False positive identification rate, FPIR(T)
0.700
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
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
enrolment_style
random−ONE−MATE
recent−ONE−MATE

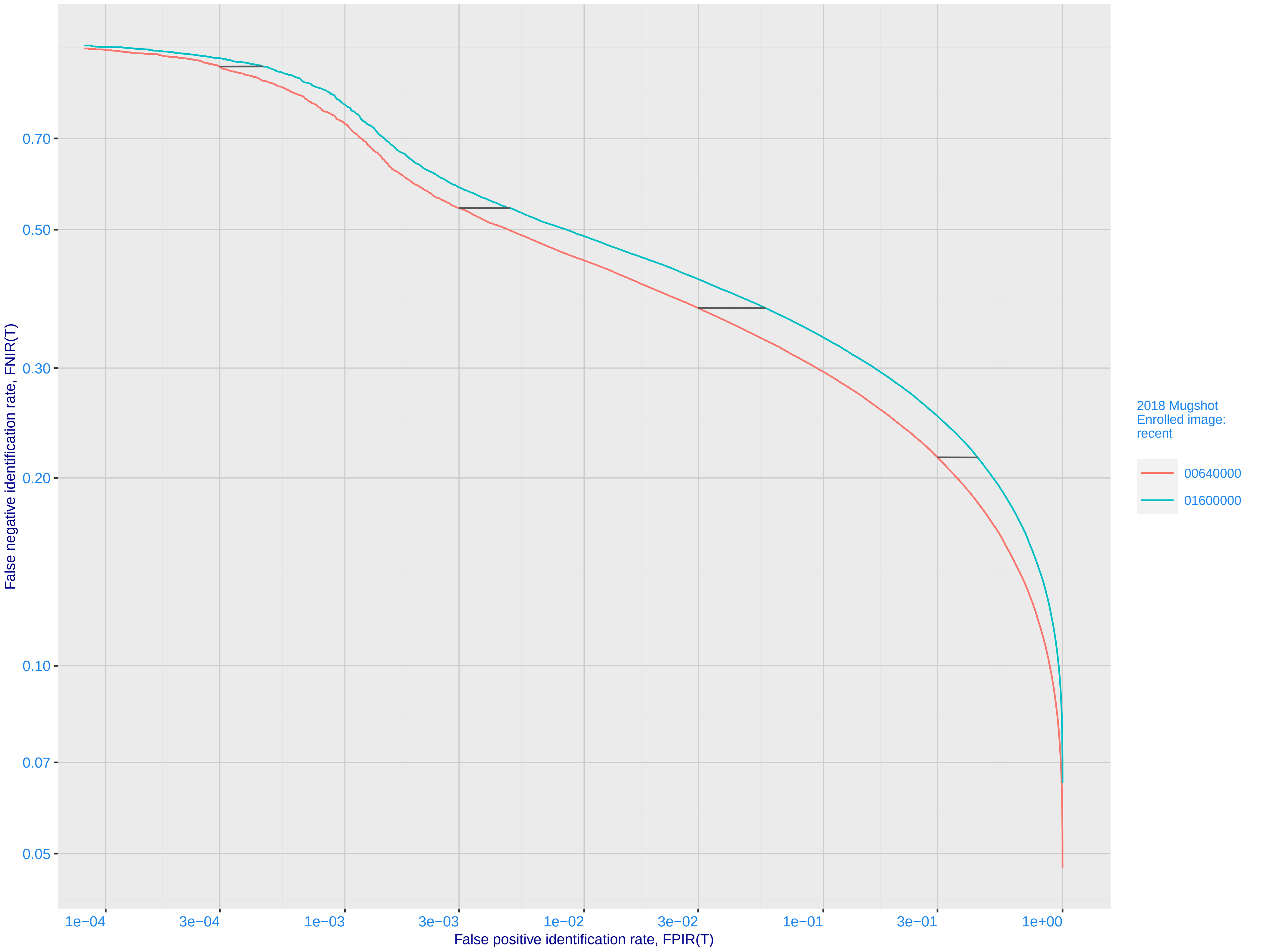


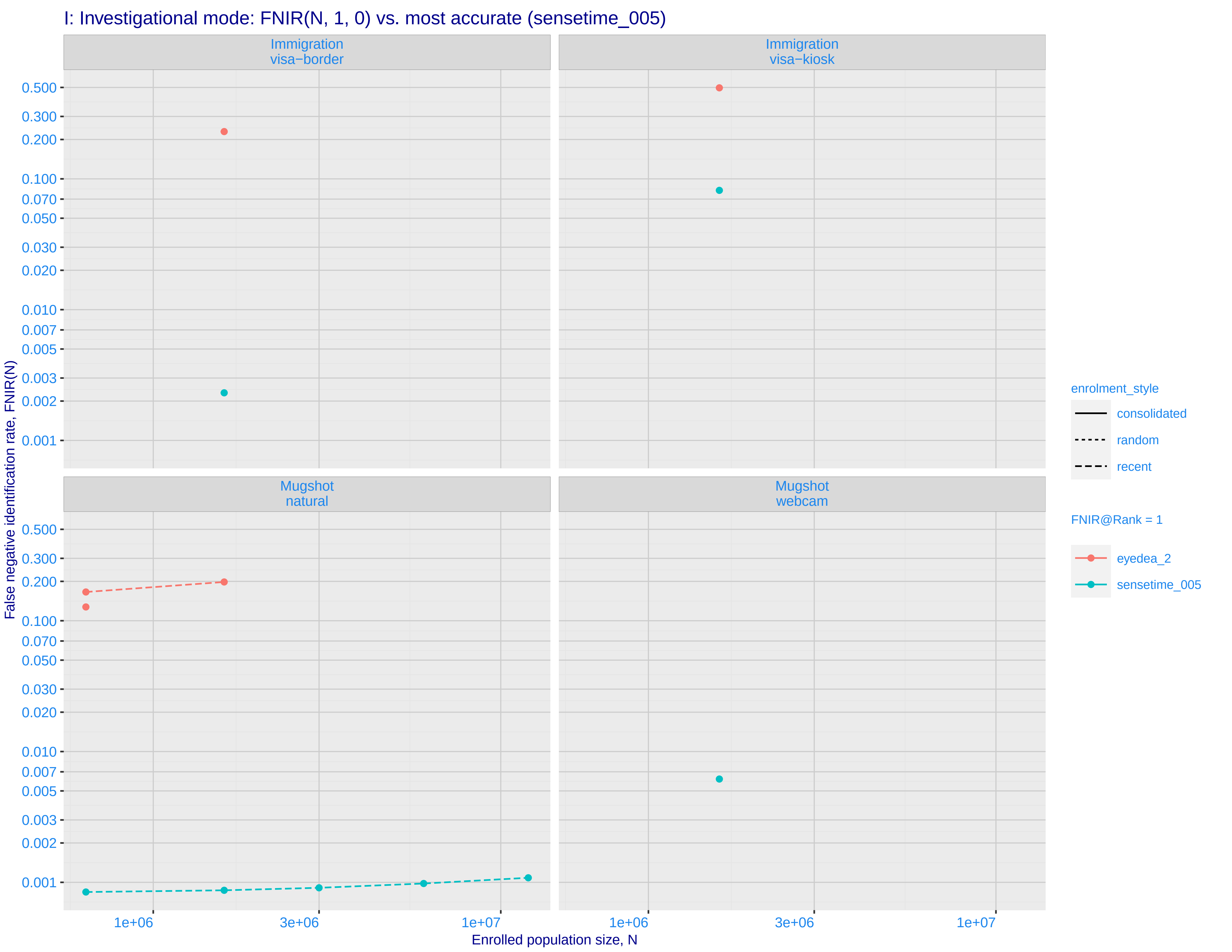
E: Dependence of error rates on T by number enrolled identities, N, for Mugshot natural images
N
00640000
01600000
lifetime_consolidated
recent
FNIR
FPIR
Identification Error rate, FPIR(T) or FNIR(T)
Threshold
0.03
0.05
0.07
0.10
0.20
0.30
0.50
0.70
7e−05
1e−04
2e−04
3e−04
5e−04
7e−04
1e−03
2e−03
3e−03
5e−03
7e−03
1e−02
2e−02
3e−02
5e−02
7e−02
1e−01
2e−01
3e−01
5e−01
7e−01
0.5
0.6
0.7
0.8
0.9

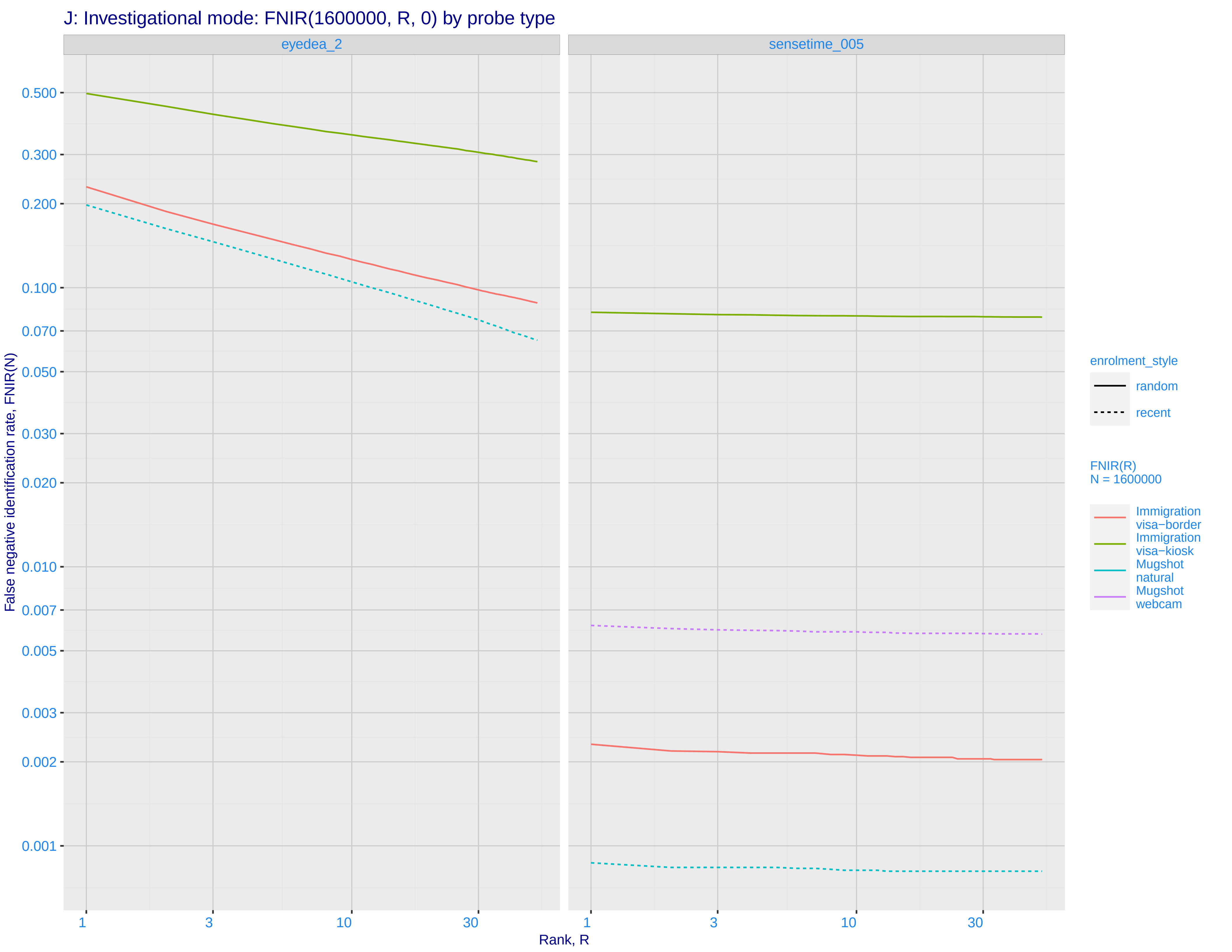

F: FPIR vs. Selectivity for mugshot images, N = 1600000 subjects enrolled with one recent mate
Selectivity, SEL(T)
7e+01
5e+01
3e+01
2e+01
1e+01
7e+00
5e+00
3e+00
2e+00
1e+00
7e−01
5e−01
3e−01
2e−01
1e−01
7e−02
5e−02
3e−02
2e−02
1e−02
7e−03
5e−03
3e−03
2e−03
1e−03
7e−04
5e−04
3e−04
2e−04
1e−04
3e−04
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


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
0.4
0.6
0.8
Threshold
enrolment_style
random
recent
Enrolled image:
random
N = 1600000
Immigration visa−border
Immigration visa−kiosk
Mugshot natural
Mugshot profile

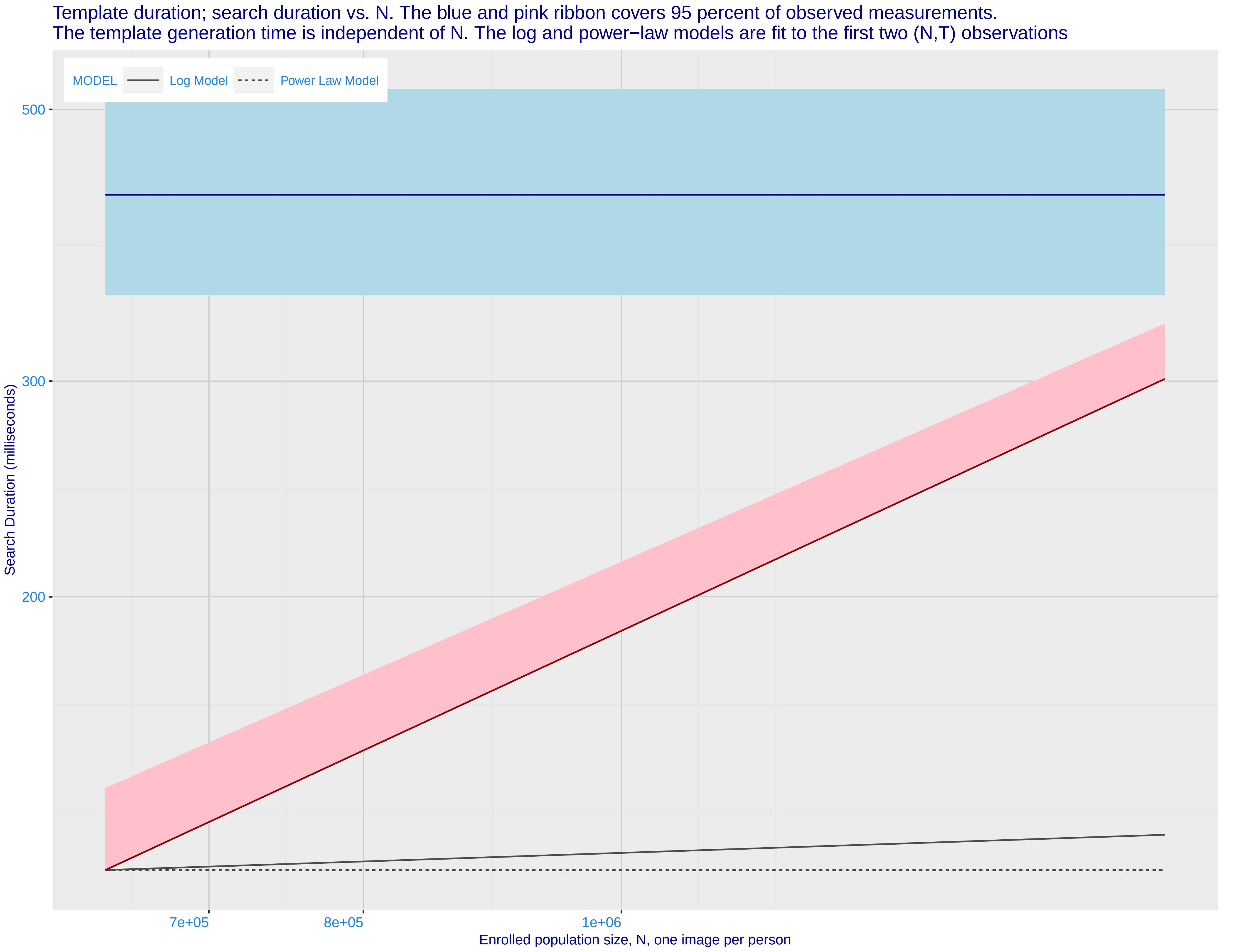
H: DET for Mugshot natural images and various N. Links connect points of equal threshold.

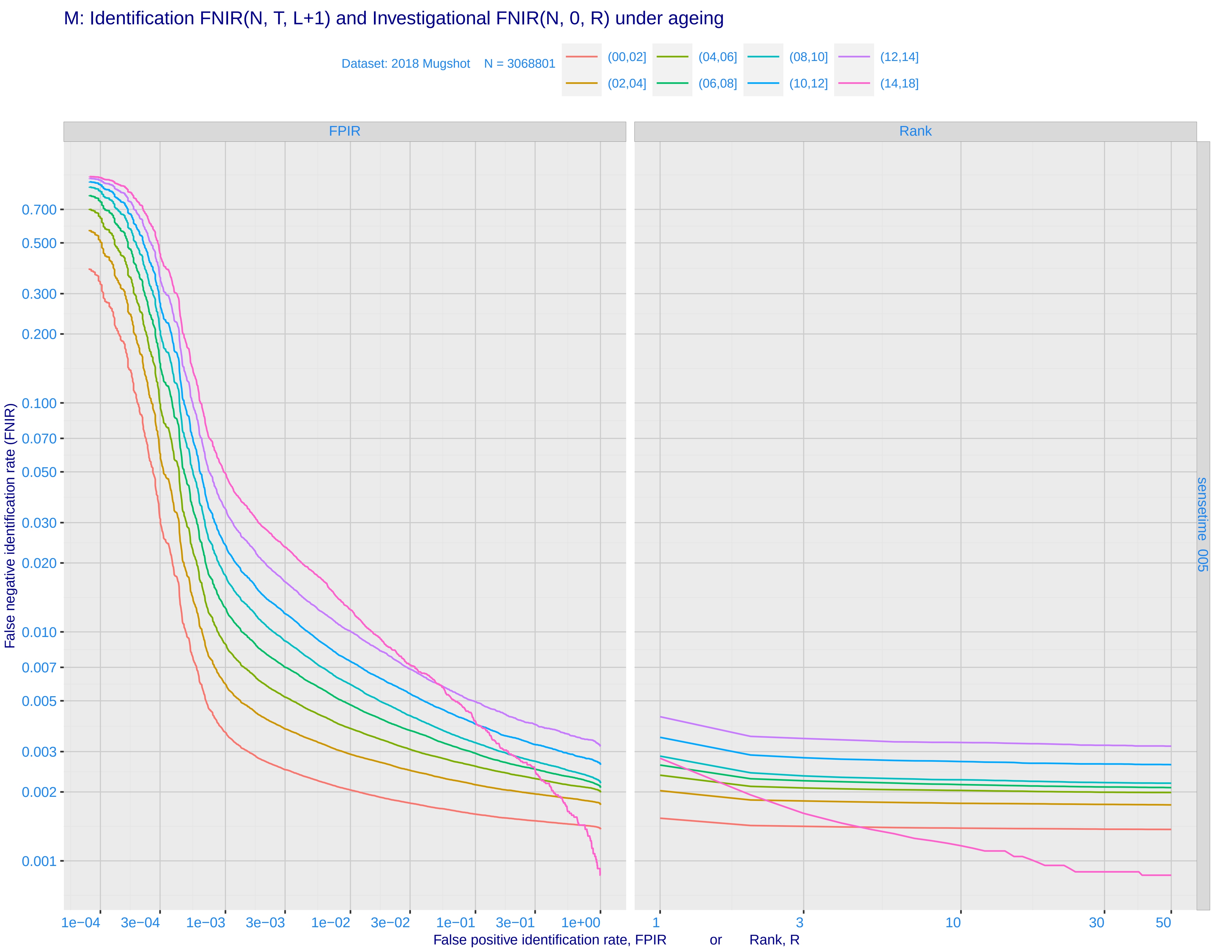



I: Investigational mode: FNIR(N, 1, 0) vs. most accurate (sensetime_005)
Immigration
visa−border
Immigration
visa−kiosk
Mugshot
natural
Mugshot
webcam
0.500
0.300
0.200
0.100
0.070
0.050
0.030
0.020
0.010
0.007
0.005
0.003
0.002
0.001
1e+06
3e+06
1e+07
False negative identification rate, FNIR(N)
Enrolled population size, N
enrolment_style
consolidated
random
recent
FNIR@Rank = 1
eyedea_2
sensetime_005



J: Investigational mode: FNIR(1600000, R, 0) by probe type
eyedea_2
sensetime_005
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
False negative identification rate, FNIR(N)
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
MODEL
Log Model
Power Law Model
500
300
200
Search Duration (milliseconds)
7e+05
8e+05
1e+06
Enrolled population size, N, one image per person


M: 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
sensetime_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