main parameter:

index.nprobe = 128

nlist = 4000 # nlist-means (k-means)

k = 10 # K-NN

time: ms

I: results' index

D: distance

CPU:

IVF

train time: 405.455498

IndexIVFFlat::add\_core: added 1000000 / 1000000 vectors

time: 0.066355

I=

0 925316 684032 789264 991387 938115 363475 485941 385880 566286

1 489271 494733 333760 981203 884381 248066 228951 116297 550197

2 689572 240041 107052 94320 362378 463489 279861 216321 782966

3 747208 440436 657856 177369 260816 515338 276494 269858 955105

4 251139 459569 930338 790017 716018 520041 966050 810186 488455

5 589891 420060 227299 941682 656499 881344 411276 252146 199600

6 372964 729344 729673 170836 611268 835883 101767 326279 189582

7 24101 868943 9923 271689 126861 333824 929301 649284 848740

8 933928 529800 45483 155721 120791 242161 599919 936385 575792

9 560423 533361 698441 791094 559527 370445 919865 884799 957268

D=

4.84059e-08 91673 96497.7 99978.6 101646 104424 109626 111667 111829 112417

1.67563e-07 26171.5 28759.3 30141 31313.9 31563.6 32896.7 32943.6 32996.9 33199.4

2.39321e-08 20317.5 22564.5 23182.7 24695.9 25934.2 26075.7 26711.4 27062.6 27454

2.27272e-07 11294.5 14901.5 21785 26519.5 30319.2 32262.5 36021.3 41823.5 42020.5

2.26478e-07 18967.2 19481.3 20684.4 30599 31075.8 56669.4 58612.9 58928.1 60597.2

8.63145e-07 25296.5 28774.6 36526.4 37313.7 40603.7 42771.8 49700.6 50156.4 50842

6.63104e-08 22466.5 23013.8 33814.6 34212 38570.5 45389.5 45648.5 46613.9 48030.5

8.46333e-07 44151.5 56035.6 66047 66150.4 68174.1 68712.8 69802.3 70374.5 70454.4

5.56319e-08 1979.67 9658.84 10799.9 10887.7 10907.2 11155.7 11334.3 12326.5 12710.3

1.48273e-07 2772.89 4894.51 4896.35 5971.23 7371.82 9018.92 40647.2 49300.3 54119.4

IVFPQ:

m = 64

time: 966.468

add\_core times: 36939.070 38282.244 526.144

time: 0.031315

I=

0 938115 274999 485941 588715 658871 965305 210963 845292 660441

1 494733 718040 209752 998598 713540 595592 25236 618441 661903

2 689572 240041 107052 279861 782966 81135 216321 32739 709232

3 747208 440436 657856 177369 260816 515338 276494 651068 269858

4 456122 966050 678731 836989 867107 681548 533649 47126 756834

5 420060 589891 227299 656499 941682 881344 411276 578077 79847

6 372964 729344 170836 611268 729673 189582 547289 514576 298047

7 929301 828779 738351 471504 137705 366044 63529 589796 212911

8 933928 529800 45483 122685 51677 502738 692044 458291 120791

9 560423 533361 698441 791094 559527 370445 919865 884799 957268

D=

29068.1 110172 112000 112817 118126 119527 119593 121873 123581 124524

6464.97 29625.3 40411.3 40698.9 42343.8 42540.5 45225.1 45345.2 46396.1 46927.3

6488.11 22411.8 24644.7 24782.1 27297.6 28864.1 28884.6 29136.3 29813.4 30084.8

9254.74 17285.3 20358.8 26798.9 30284.3 30999.3 32546.1 35567 41758.2 44729.7

11957.3 62194.9 64882.1 66828 70380.7 71417.9 72083.4 73251.1 74811.3 76693.1

8900.21 30354.3 30455.2 38366.7 42032.2 42321.6 44608.2 49530.6 50128.6 51753.9

7402.83 26576.4 27591.2 33970.4 37160.3 37342.5 44667.2 45827.2 46721.4 47642.7

11587.1 65213 66054.2 74824.5 77637.5 79481.6 81014.5 82373.6 83248.3 84366.2

2752.75 4475.24 9679.21 12714.7 12811.8 13264.4 13554.6 13577.4 13620.5 13673.7

10428.6 12643.4 13756.2 13895 15195.3 16464.1 18068.3 37924.1 48633 52263

nprobe = 1024

time: 504.383

add\_core times: 25260.858 64832.071 378.067

time: 0.076698

I=

0 925316 991387 684032 789264 938115 274999 465534 485941 385880

1 494733 333760 489271 418198 228951 481641 884381 116297 44210

2 689572 240041 107052 362378 94320 279861 463489 782966 81135

3 747208 440436 657856 177369 260816 515338 276494 651068 269858

4 251139 930338 459569 790017 716018 810186 488455 520041 456122

5 420060 589891 227299 656499 941682 881344 411276 578077 199600

6 372964 729344 170836 611268 729673 189582 547289 514576 298047

7 24101 868943 9923 929301 828779 126861 271689 333824 649284

8 933928 529800 155721 45483 122685 242161 51677 502738 692044

9 560423 533361 698441 791094 559527 370445 919865 884799 957268

D=

29068.1 98062.6 101659 106684 107636 110172 112000 112062 112817 115049

6464.97 29625.3 29871.8 30265.5 33001.7 33296.8 33651.5 33758 34227.2 34314

6488.11 22411.8 24644.7 24782.1 25724.7 26352.1 27297.6 28645.9 28864.1 28884.6

9254.74 17285.3 20358.8 26798.9 30284.4 30999.3 32546.1 35567 41758.2 44729.7

11957.3 25758.4 29252.6 30165.6 38094.4 41039.7 53785.4 60852.7 61407.9 62194.9

8900.19 30354.3 30455.1 38366.6 42032.1 42321.6 44608.2 49530.5 50128.6 51367

7402.83 26576.4 27591.2 33970.4 37160.3 37342.5 44667.2 45827.2 46721.4 47642.6

11587.1 54056.3 60308.3 62978.8 65212.9 66054.2 66366.5 67390.9 67529.2 71402.5

2752.76 4475.24 9679.2 12666.5 12714.7 12811.8 12997.2 13264.4 13554.6 13577.4

10428.6 12643.4 13756.2 13895 15195.3 16464.1 18068.3 37924.1 48633 52263

GPU:

IVF

probe = 128

time: 0.033205

I=

0 925316 684032 789264 991387 938115 363475 485941 385880 566286

1 489271 494733 333760 981203 884381 248066 228951 116297 550197

2 689572 240041 107052 94320 362378 463489 279861 216321 782966

3 747208 440436 657856 177369 260816 515338 276494 269858 955105

4 251139 459569 930338 790017 716018 520041 966050 810186 488455

5 589891 420060 227299 941682 656499 881344 411276 252146 199600

6 372964 729344 729673 170836 611268 835883 101767 326279 189582

7 24101 868943 9923 271689 126861 333824 929301 649284 848740

8 933928 529800 45483 155721 120791 242161 599919 936385 575792

9 560423 533361 698441 791094 559527 370445 919865 884799 957268

D=

3.98996e-08 91673 96497.7 99978.6 101646 104424 109626 111667 111829 112417

1.09989e-07 26171.5 28759.3 30141 31313.9 31563.6 32896.6 32943.6 32996.9 33199.4

1.31738e-08 20317.5 22564.5 23182.8 24695.9 25934.2 26075.7 26711.4 27062.6 27454.1

7.76e-08 11294.5 14901.6 21785.1 26519.5 30319.2 32262.5 36021.4 41823.5 42020.6

8.38084e-08 18967.2 19481.3 20684.4 30599 31075.8 56669.4 58612.9 58928 60597.2

4.7601e-07 25296.4 28774.5 36526.2 37313.6 40603.5 42771.6 49700.4 50156.4 50841.9

3.96396e-08 22466.5 23013.8 33814.6 34212 38570.5 45389.5 45648.5 46613.9 48030.5

1.81989e-07 44151.4 56035.6 66047 66150.4 68174 68712.7 69802.3 70374.5 70454.4

3.81637e-08 1979.68 9658.85 10799.9 10887.7 10907.2 11155.7 11334.3 12326.5 12710.3

7.71742e-08 2772.89 4894.51 4896.35 5971.23 7371.83 9018.93 40647.1 49300.3 54119.4

IVFPQ

nprobe = 128

m = 32

time:0.006370

I=

0 925316 789264 938115 991387 684032 588715 465534 210963 965305

1 494733 489271 333760 481641 418198 228951 884381 904547 287102

2 689572 107052 240041 362378 279861 81135 94320 216321 782966

3 747208 440436 657856 515338 177369 260816 276494 651068 955105

4 459569 930338 251139 790017 716018 810186 520041 348558 488455

5 420060 589891 941682 227299 881344 656499 702953 411276 252146

6 729344 372964 170836 611268 729673 189582 101767 514576 298047

7 24101 929301 868943 126861 271689 828779 9923 541831 816914

8 933928 45483 529800 242161 936385 51677 120791 122685 522462

9 560423 533361 791094 698441 559527 370445 919865 884799 957268

D=

45200.3 102022 108690 110840 112571 112638 112872 113621 115429 116547

10919.7 29247.6 30803.6 32092 32355.3 32728.3 33101.3 33313.1 34018.2 34400.4

11109.6 25383.7 25678.2 26683.7 28926.3 29350.6 29590.4 29631.9 30264.4 30526.9

15437.9 22682.1 23518.4 32594.9 34622 35332.1 37426.8 38466 44400.8 46045.3

22291.4 33270.5 34719.6 35012.4 42577.6 47623.7 57461.5 57853.1 60947.1 61144

15858 35933.7 36468.2 41549.4 41595.9 45908.5 46526.9 48272.5 48822.5 50171.1

12634.4 25500.5 25559.1 35482.8 35946 37595 39586.1 43561.4 44264 44327.8

18421.6 59083.4 64157.1 64952.2 68874.4 68935.3 69219.2 69236.6 69506.8 71394.6

4827.16 7081.52 11299.7 12431.5 12608.9 12755.5 12834.9 12991.5 13026.8 13696.7

16306.7 17103.4 18141.6 19514 20723.2 22115.8 23491.9 39794.2 44356.9 48468.6