```
C:\ProgramData\Anaconda3\python.exe C:/Users/Joshmiao/Desktop/machine_learning_1/main.py
Total 1138251 words
Pre_processing data done! Used time = 60.23367404937744 second(s)
Load theta? (y/n)
y
Input training mode (manual / auto) : auto
Please input number of epoch : (now : 0)
40
Please input learning rate for theta 0 : (now : 0)
50
Please input learning rate for theta 1 : (now : 0)
50
Please input learning rate for theta 2 : (now : 0)
50
Initial theta 0:
tensor([[ 1.4262,  3.1046,  2.9230,  ...,  0.0639,  0.0824,  0.1197],
        [-5.4518,  0.6009, -0.4607,  ..., -0.0239, -0.0331, -0.0349],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
----------------------------------------------------------------------------------------------------
epoch 0 for theta 0 (Used time = 325.8937849998474 second(s)) :
training loss = 0.1465650349855423
tensor([[ 1.4196,  3.1128,  2.9283,  ...,  0.0649,  0.0835,  0.1217],
        [-5.3916,  0.6210, -0.4494,  ..., -0.0242, -0.0335, -0.0354],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 19.625793933868408 second(s)) :
loss = 0.14394716918468475
item_cnt = 4328 | predict_cnt = 554 | true_predict_cnt = 387
precision_rate = 0.6985559566787004 | recall_rate = 0.0894177449168207 | F1_measure = 0.15854158131913149
----------------------------------------------------------------------------------------------------
epoch 1 for theta 0 (Used time = 122.3963782787323 second(s)) :
training loss = 0.14574342966079712
tensor([[ 1.4133,  3.1211,  2.9334,  ...,  0.0659,  0.0847,  0.1236],
        [-5.3315,  0.6408, -0.4381,  ..., -0.0245, -0.0339, -0.0359],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.791898488998413 second(s)) :
loss = 0.14320772886276245
item_cnt = 4328 | predict_cnt = 554 | true_predict_cnt = 388
precision_rate = 0.7003610108303249 | recall_rate = 0.08964879852125693 | F1_measure = 0.15895124948791475
----------------------------------------------------------------------------------------------------
epoch 2 for theta 0 (Used time = 121.81017565727234 second(s)) :
training loss = 0.14496532082557678
tensor([[ 1.4073,  3.1293,  2.9384,  ...,  0.0669,  0.0858,  0.1255],
        [-5.2715,  0.6602, -0.4268,  ..., -0.0247, -0.0343, -0.0363],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 22.382492303848267 second(s)) :
loss = 0.1424858719110489
item_cnt = 4328 | predict_cnt = 553 | true_predict_cnt = 388
precision_rate = 0.701627486437613 | recall_rate = 0.08964879852125693 | F1_measure = 0.15898381479205081
----------------------------------------------------------------------------------------------------
epoch 3 for theta 0 (Used time = 129.32219243049622 second(s)) :
training loss = 0.14421530067920685
tensor([[ 1.4015,  3.1374,  2.9433,  ...,  0.0679,  0.0869,  0.1274],
        [-5.2116,  0.6793, -0.4155,  ..., -0.0250, -0.0346, -0.0368],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 22.988210678100586 second(s)) :
loss = 0.14177189767360687
item_cnt = 4328 | predict_cnt = 553 | true_predict_cnt = 388
precision_rate = 0.701627486437613 | recall_rate = 0.08964879852125693 | F1_measure = 0.15898381479205081
----------------------------------------------------------------------------------------------------
epoch 4 for theta 0 (Used time = 130.0833921432495 second(s)) :
training loss = 0.14351701736450195
tensor([[ 1.3959,  3.1456,  2.9481,  ...,  0.0688,  0.0880,  0.1293],
        [-5.1518,  0.6980, -0.4043,  ..., -0.0253, -0.0350, -0.0372],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 22.021807432174683 second(s)) :
loss = 0.14107690751552582
item_cnt = 4328 | predict_cnt = 552 | true_predict_cnt = 388
precision_rate = 0.7028985507246377 | recall_rate = 0.08964879852125693 | F1_measure = 0.15901639344262294
----------------------------------------------------------------------------------------------------
epoch 5 for theta 0 (Used time = 130.10391569137573 second(s)) :
training loss = 0.14276546239852905
tensor([[ 1.3905,  3.1537,  2.9528,  ...,  0.0698,  0.0891,  0.1312],
        [-5.0922,  0.7164, -0.3931,  ..., -0.0256, -0.0354, -0.0377],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 22.215076684951782 second(s)) :
loss = 0.1404125839471817
item_cnt = 4328 | predict_cnt = 554 | true_predict_cnt = 390
precision_rate = 0.703971119133574 | recall_rate = 0.09011090573012939 | F1_measure = 0.15977058582548137
----------------------------------------------------------------------------------------------------
epoch 6 for theta 0 (Used time = 136.10219931602478 second(s)) :
training loss = 0.1419561803340912
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tensor([[ 1.3852,  3.1617,  2.9573,  ...,  0.0708,  0.0902,  0.1331],
        [-5.0327,  0.7345, -0.3819,  ..., -0.0259, -0.0358, -0.0381],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 22.87225365638733 second(s)) :
loss = 0.13975673913955688
item_cnt = 4328 | predict_cnt = 554 | true_predict_cnt = 390
precision_rate = 0.703971119133574 | recall_rate = 0.09011090573012939 | F1_measure = 0.15977058582548137
--------------------------------------------------------------------------------
epoch 7 for theta 0 (Used time = 157.67104721069336 second(s)) :
training loss = 0.14136412739753723
tensor([[ 1.3801,  3.1698,  2.9618,  ...,  0.0717,  0.0913,  0.1350],
        [-4.9734,  0.7524, -0.3708,  ..., -0.0262, -0.0361, -0.0386],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.671119451522827 second(s)) :
loss = 0.13910134136676788
item_cnt = 4328 | predict_cnt = 553 | true_predict_cnt = 390
precision_rate = 0.705244122965642 | recall_rate = 0.09011090573012939 | F1_measure = 0.15980331899200984
--------------------------------------------------------------------------------
epoch 8 for theta 0 (Used time = 162.8047695159912 second(s)) :
training loss = 0.14064879715442657
tensor([[ 1.3752,  3.1777,  2.9662,  ...,  0.0727,  0.0923,  0.1369],
        [-4.9142,  0.7699, -0.3597,  ..., -0.0264, -0.0365, -0.0390],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.170380115509033 second(s)) :
loss = 0.13845044374465942
item_cnt = 4328 | predict_cnt = 561 | true_predict_cnt = 398
precision_rate = 0.7094474153297683 | recall_rate = 0.09195933456561922 | F1_measure = 0.16281448148905708
--------------------------------------------------------------------------------
epoch 9 for theta 0 (Used time = 175.69225120544434 second(s)) :
training loss = 0.13996915519237518
tensor([[ 1.3704,  3.1857,  2.9705,  ...,  0.0736,  0.0934,  0.1387],
        [-4.8552,  0.7872, -0.3486,  ..., -0.0267, -0.0369, -0.0394],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 21.881455898284912 second(s)) :
loss = 0.13782720267772675
item_cnt = 4328 | predict_cnt = 561 | true_predict_cnt = 398
precision_rate = 0.7094474153297683 | recall_rate = 0.09195933456561922 | F1_measure = 0.16281448148905708
--------------------------------------------------------------------------------
epoch 10 for theta 0 (Used time = 171.34610772132874 second(s)) :
training loss = 0.13933387398719788
tensor([[ 1.3658,  3.1936,  2.9747,  ...,  0.0746,  0.0945,  0.1406],
        [-4.7963,  0.8041, -0.3376,  ..., -0.0270, -0.0373, -0.0399],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.985990047454834 second(s)) :
loss = 0.1372029334306717
item_cnt = 4328 | predict_cnt = 562 | true_predict_cnt = 399
precision_rate = 0.7099644128113879 | recall_rate = 0.09219038817005545 | F1_measure = 0.16319018404907976
--------------------------------------------------------------------------------
epoch 11 for theta 0 (Used time = 172.21308064460754 second(s)) :
training loss = 0.13859376311302185
tensor([[ 1.3613,  3.2015,  2.9788,  ...,  0.0755,  0.0955,  0.1424],
        [-4.7376,  0.8209, -0.3266,  ..., -0.0273, -0.0376, -0.0403],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 21.043524265289307 second(s)) :
loss = 0.13663408160209656
item_cnt = 4328 | predict_cnt = 562 | true_predict_cnt = 399
precision_rate = 0.7099644128113879 | recall_rate = 0.09219038817005545 | F1_measure = 0.16319018404907976
--------------------------------------------------------------------------------
epoch 12 for theta 0 (Used time = 188.00597667694092 second(s)) :
training loss = 0.13811862468719482
tensor([[ 1.3569,  3.2093,  2.9829,  ...,  0.0764,  0.0966,  0.1443],
        [-4.6791,  0.8373, -0.3157,  ..., -0.0275, -0.0380, -0.0407],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.208999633789062 second(s)) :
loss = 0.13603132963180542
item_cnt = 4328 | predict_cnt = 563 | true_predict_cnt = 400
precision_rate = 0.7104795737122558 | recall_rate = 0.09242144177449169 | F1_measure = 0.1635657329789409
--------------------------------------------------------------------------------
epoch 13 for theta 0 (Used time = 193.37871146202087 second(s)) :
training loss = 0.13736236095428467
tensor([[ 1.3526,  3.2172,  2.9869,  ...,  0.0774,  0.0976,  0.1461],
        [-4.6208,  0.8535, -0.3048,  ..., -0.0278, -0.0383, -0.0412],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.52540898323059 second(s)) :
loss = 0.1354411542415619
item_cnt = 4328 | predict_cnt = 567 | true_predict_cnt = 403
precision_rate = 0.7107583774250441 | recall_rate = 0.09311460258780037 | F1_measure = 0.16465781409601635
--------------------------------------------------------------------------------
epoch 14 for theta 0 (Used time = 198.19446349143982 second(s)) :
training loss = 0.13688522577285767
```

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tensor([[ 1.3485,  3.2249,  2.9908,  ...,  0.0783,  0.0987,  0.1479],
        [-4.5627,  0.8695, -0.2939,  ..., -0.0281, -0.0387, -0.0416],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.583014249801636 second(s)) :
loss = 0.13486279547214508
item_cnt = 4328 | predict_cnt = 569 | true_predict_cnt = 406
precision_rate = 0.7135325131810193 | recall_rate = 0.09380776340110905 | F1_measure = 0.16581580559526238
--------------------------------------------------------------------------------
epoch 15 for theta 0 (Used time = 211.30252408981323 second(s)) :
training loss = 0.13617832958698273
tensor([[ 1.3444,  3.2326,  2.9947,  ...,  0.0792,  0.0997,  0.1498],
        [-4.5048,  0.8852, -0.2831,  ..., -0.0283, -0.0390, -0.0420],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 19.896345615386963 second(s)) :
loss = 0.13430586457252502
item_cnt = 4328 | predict_cnt = 569 | true_predict_cnt = 406
precision_rate = 0.7135325131810193 | recall_rate = 0.09380776340110905 | F1_measure = 0.16581580559526238
--------------------------------------------------------------------------------
epoch 16 for theta 0 (Used time = 205.72019839286804 second(s)) :
training loss = 0.13565410673618317
tensor([[ 1.3405,  3.2403,  2.9985,  ...,  0.0801,  0.1008,  0.1516],
        [-4.4471,  0.9007, -0.2723,  ..., -0.0286, -0.0394, -0.0424],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.605093479156494 second(s)) :
loss = 0.13375134766101837
item_cnt = 4328 | predict_cnt = 569 | true_predict_cnt = 406
precision_rate = 0.7135325131810193 | recall_rate = 0.09380776340110905 | F1_measure = 0.16581580559526238
--------------------------------------------------------------------------------
epoch 17 for theta 0 (Used time = 196.5331211090088 second(s)) :
training loss = 0.13503038883209229
tensor([[ 1.3367,  3.2480,  3.0022,  ...,  0.0811,  0.1018,  0.1534],
        [-4.3897,  0.9160, -0.2615,  ..., -0.0289, -0.0398, -0.0428],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 19.480767726898193 second(s)) :
loss = 0.13320231437683105
item_cnt = 4328 | predict_cnt = 570 | true_predict_cnt = 408
precision_rate = 0.7157894736842105 | recall_rate = 0.09426987060998152 | F1_measure = 0.16659861167823603
--------------------------------------------------------------------------------
epoch 18 for theta 0 (Used time = 202.08566641807556 second(s)) :
training loss = 0.13449597358703613
tensor([[ 1.3330,  3.2555,  3.0059,  ...,  0.0820,  0.1028,  0.1552],
        [-4.3326,  0.9310, -0.2508,  ..., -0.0291, -0.0401, -0.0432],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 19.45757532119751 second(s)) :
loss = 0.13266195356845856
item_cnt = 4328 | predict_cnt = 570 | true_predict_cnt = 408
precision_rate = 0.7157894736842105 | recall_rate = 0.09426987060998152 | F1_measure = 0.16659861167823603
--------------------------------------------------------------------------------
epoch 19 for theta 0 (Used time = 192.51461696624756 second(s)) :
training loss = 0.13388295471668243
tensor([[ 1.3294,  3.2631,  3.0095,  ...,  0.0829,  0.1038,  0.1569],
        [-4.2757,  0.9458, -0.2402,  ..., -0.0294, -0.0405, -0.0436],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.39940094947815 second(s)) :
loss = 0.1321265995502472
item_cnt = 4328 | predict_cnt = 571 | true_predict_cnt = 409
precision_rate = 0.7162872154115587 | recall_rate = 0.09450092421441775 | F1_measure = 0.16697285160236786
--------------------------------------------------------------------------------
epoch 20 for theta 0 (Used time = 191.67045092582703 second(s)) :
training loss = 0.13325099647045135
tensor([[ 1.3259,  3.2706,  3.0131,  ...,  0.0838,  0.1049,  0.1587],
        [-4.2192,  0.9605, -0.2296,  ..., -0.0297, -0.0408, -0.0440],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.306790590286255 second(s)) :
loss = 0.1316004991531372
item_cnt = 4328 | predict_cnt = 571 | true_predict_cnt = 410
precision_rate = 0.7180385288966725 | recall_rate = 0.09473197781885398 | F1_measure = 0.1673810981833027
--------------------------------------------------------------------------------
epoch 21 for theta 0 (Used time = 198.37968134880066 second(s)) :
training loss = 0.1328277587890625
tensor([[ 1.3225,  3.2781,  3.0166,  ...,  0.0847,  0.1059,  0.1605],
        [-4.1629,  0.9749, -0.2190,  ..., -0.0299, -0.0411, -0.0444],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.28083562850952 second(s)) :
loss = 0.13108953833580017
item_cnt = 4328 | predict_cnt = 572 | true_predict_cnt = 411
precision_rate = 0.7185314685314685 | recall_rate = 0.0949630314232902 | F1_measure = 0.1677551020408163
--------------------------------------------------------------------------------
epoch 22 for theta 0 (Used time = 199.27384400367737 second(s)) :
training loss = 0.13226723670959473
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tensor([[ 1.3192,  3.2855,  3.0201,  ...,  0.0856,  0.1069,  0.1623],
        [-4.1069,  0.9891, -0.2085,  ..., -0.0302, -0.0415, -0.0448],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 19.41667628288269 second(s)) :
loss = 0.13058780133724213
item_cnt = 4328 | predict_cnt = 573 | true_predict_cnt = 412
precision_rate = 0.7190226876090751 | recall_rate = 0.09519408502772643 | F1_measure = 0.16812895327484187
--------------------------------------------------------------------------------
epoch 23 for theta 0 (Used time = 205.20069909095764 second(s)) :
training loss = 0.13161510229110718
tensor([[ 1.3160,  3.2929,  3.0236,  ...,  0.0865,  0.1079,  0.1640],
        [-4.0513,  1.0031, -0.1980,  ..., -0.0305, -0.0418, -0.0452],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.4178729057312 second(s)) :
loss = 0.13008958101272583
item_cnt = 4328 | predict_cnt = 573 | true_predict_cnt = 412
precision_rate = 0.7190226876090751 | recall_rate = 0.09519408502772643 | F1_measure = 0.16812895327484187
--------------------------------------------------------------------------------
epoch 24 for theta 0 (Used time = 204.42148685455322 second(s)) :
training loss = 0.13123229146003723
tensor([[ 1.3129,  3.3002,  3.0270,  ...,  0.0874,  0.1089,  0.1658],
        [-3.9960,  1.0170, -0.1876,  ..., -0.0307, -0.0422, -0.0456],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 19.558629274368286 second(s)) :
loss = 0.12961269915103912
item_cnt = 4328 | predict_cnt = 573 | true_predict_cnt = 412
precision_rate = 0.7190226876090751 | recall_rate = 0.09519408502772643 | F1_measure = 0.16812895327484187
--------------------------------------------------------------------------------
epoch 25 for theta 0 (Used time = 209.4013683795929 second(s)) :
training loss = 0.13063181936740875
tensor([[ 1.3099,  3.3075,  3.0303,  ...,  0.0882,  0.1098,  0.1675],
        [-3.9411,  1.0306, -0.1772,  ..., -0.0310, -0.0425, -0.0460],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 19.652408838272095 second(s)) :
loss = 0.12912730872631073
item_cnt = 4328 | predict_cnt = 577 | true_predict_cnt = 413
precision_rate = 0.7157712305025996 | recall_rate = 0.09542513863216266 | F1_measure = 0.1683995922528033
--------------------------------------------------------------------------------
epoch 26 for theta 0 (Used time = 210.31098198890686 second(s)) :
training loss = 0.13020290434360504
tensor([[ 1.3070,  3.3147,  3.0337,  ...,  0.0891,  0.1108,  0.1692],
        [-3.8866,  1.0441, -0.1669,  ..., -0.0312, -0.0428, -0.0464],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.44819140434265 second(s)) :
loss = 0.12865692377090454
item_cnt = 4328 | predict_cnt = 583 | true_predict_cnt = 421
precision_rate = 0.7221269296740995 | recall_rate = 0.09727356746765249 | F1_measure = 0.17145184280187337
--------------------------------------------------------------------------------
epoch 27 for theta 0 (Used time = 212.38562726974487 second(s)) :
training loss = 0.12956005334854126
tensor([[ 1.3042,  3.3219,  3.0370,  ...,  0.0900,  0.1118,  0.1710],
        [-3.8325,  1.0574, -0.1566,  ..., -0.0315, -0.0432, -0.0468],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.277742385864258 second(s)) :
loss = 0.12818853557109833
item_cnt = 4328 | predict_cnt = 587 | true_predict_cnt = 424
precision_rate = 0.7223168654173765 | recall_rate = 0.09796672828096119 | F1_measure = 0.1725330620549339
--------------------------------------------------------------------------------
epoch 28 for theta 0 (Used time = 214.22736310958862 second(s)) :
training loss = 0.1292085200548172
tensor([[ 1.3015,  3.3291,  3.0402,  ...,  0.0909,  0.1128,  0.1727],
        [-3.7788,  1.0705, -0.1463,  ..., -0.0317, -0.0435, -0.0472],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 19.589048624038696 second(s)) :
loss = 0.12775114178657532
item_cnt = 4328 | predict_cnt = 589 | true_predict_cnt = 424
precision_rate = 0.7198641765704584 | recall_rate = 0.09796672828096119 | F1_measure = 0.17246288387227984
--------------------------------------------------------------------------------
epoch 29 for theta 0 (Used time = 212.64902472496033 second(s)) :
training loss = 0.12871961295604706
tensor([[ 1.2989,  3.3362,  3.0434,  ...,  0.0918,  0.1138,  0.1744],
        [-3.7256,  1.0835, -0.1361,  ..., -0.0320, -0.0438, -0.0476],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 19.635705947875977 second(s)) :
loss = 0.12729988992214203
item_cnt = 4328 | predict_cnt = 590 | true_predict_cnt = 425
precision_rate = 0.7203389830508474 | recall_rate = 0.0981977818853974 | F1_measure = 0.17283448556323708
--------------------------------------------------------------------------------
epoch 30 for theta 0 (Used time = 218.22709894180298 second(s)) :
training loss = 0.12823772430419922
```

```
tensor([[ 1.2963,  3.3432,  3.0466,  ...,  0.0926,  0.1147,  0.1761],
        [-3.6728,  1.0963, -0.1260,  ..., -0.0323, -0.0442, -0.0479],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.571847200393677 second(s)) :
loss = 0.1268586963415146
item_cnt = 4328 | predict_cnt = 590 | true_predict_cnt = 425
precision_rate = 0.7203389830508474 | recall_rate = 0.0981977818853974 | F1_measure = 0.17283448556323708
--------------------------------------------------------------------------------
epoch 31 for theta 0 (Used time = 218.33565878868103 second(s)) :
training loss = 0.1278330385684967
tensor([[ 1.2939,  3.3503,  3.0498,  ...,  0.0935,  0.1157,  0.1778],
        [-3.6205,  1.1089, -0.1159,  ..., -0.0325, -0.0445, -0.0483],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.698593854904175 second(s)) :
loss = 0.12641672790050507
item_cnt = 4328 | predict_cnt = 591 | true_predict_cnt = 426
precision_rate = 0.7208121827411168 | recall_rate = 0.09842883548983364 | F1_measure = 0.1732059361658874
--------------------------------------------------------------------------------
epoch 32 for theta 0 (Used time = 221.74681973457336 second(s)) :
training loss = 0.12733323872089386
tensor([[ 1.2916,  3.3572,  3.0530,  ...,  0.0944,  0.1167,  0.1795],
        [-3.5687,  1.1214, -0.1058,  ..., -0.0328, -0.0448, -0.0487],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 19.855008363723755 second(s)) :
loss = 0.12596921622753143
item_cnt = 4328 | predict_cnt = 591 | true_predict_cnt = 426
precision_rate = 0.7208121827411168 | recall_rate = 0.09842883548983364 | F1_measure = 0.1732059361658874
--------------------------------------------------------------------------------
epoch 33 for theta 0 (Used time = 224.2904326915741 second(s)) :
training loss = 0.12682084739208221
tensor([[ 1.2894,  3.3641,  3.0561,  ...,  0.0952,  0.1176,  0.1812],
        [-3.5174,  1.1338, -0.0958,  ..., -0.0330, -0.0451, -0.0491],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.67927098274231 second(s)) :
loss = 0.12555386126041412
item_cnt = 4328 | predict_cnt = 592 | true_predict_cnt = 427
precision_rate = 0.7212837837837838 | recall_rate = 0.09865988909426987 | F1_measure = 0.17357723577235776
--------------------------------------------------------------------------------
epoch 34 for theta 0 (Used time = 226.2870056629181 second(s)) :
training loss = 0.12638512253761292
tensor([[ 1.2872,  3.3710,  3.0592,  ...,  0.0961,  0.1186,  0.1829],
        [-3.4667,  1.1460, -0.0858,  ..., -0.0333, -0.0455, -0.0494],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.74828553199768 second(s)) :
loss = 0.12513548135757446
item_cnt = 4328 | predict_cnt = 594 | true_predict_cnt = 428
precision_rate = 0.7205387205387206 | recall_rate = 0.0988909426987061 | F1_measure = 0.1739130434782609
--------------------------------------------------------------------------------
epoch 35 for theta 0 (Used time = 233.02561259269714 second(s)) :
training loss = 0.1259002387523651
tensor([[ 1.2852,  3.3778,  3.0622,  ...,  0.0969,  0.1195,  0.1846],
        [-3.4165,  1.1580, -0.0759,  ..., -0.0335, -0.0458, -0.0498],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.076770305633545 second(s)) :
loss = 0.12472394853830338
item_cnt = 4328 | predict_cnt = 594 | true_predict_cnt = 428
precision_rate = 0.7205387205387206 | recall_rate = 0.0988909426987061 | F1_measure = 0.1739130434782609
--------------------------------------------------------------------------------
epoch 36 for theta 0 (Used time = 237.8342981338501 second(s)) :
training loss = 0.12550146877765656
tensor([[ 1.2832,  3.3846,  3.0653,  ...,  0.0978,  0.1205,  0.1862],
        [-3.3669,  1.1700, -0.0661,  ..., -0.0338, -0.0461, -0.0502],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.995978355407715 second(s)) :
loss = 0.12432138621807098
item_cnt = 4328 | predict_cnt = 595 | true_predict_cnt = 430
precision_rate = 0.7226890756302521 | recall_rate = 0.09935304990757855 | F1_measure = 0.17469022953483648
--------------------------------------------------------------------------------
epoch 37 for theta 0 (Used time = 237.90301752090454 second(s)) :
training loss = 0.12504667043685913
tensor([[ 1.2814,  3.3914,  3.0683,  ...,  0.0986,  0.1214,  0.1879],
        [-3.3180,  1.1817, -0.0562,  ..., -0.0340, -0.0464, -0.0506],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.886516094207764 second(s)) :
loss = 0.12391744554042816
item_cnt = 4328 | predict_cnt = 598 | true_predict_cnt = 433
precision_rate = 0.7240802675585284 | recall_rate = 0.10004621072088725 | F1_measure = 0.1758018676410881
--------------------------------------------------------------------------------
epoch 38 for theta 0 (Used time = 242.35535287857056 second(s)) :
training loss = 0.12457458674907684
```

```
tensor([[ 1.2796,  3.3980,  3.0713,  ...,  0.0995,  0.1223,  0.1896],
        [-3.2696,  1.1934, -0.0465,  ..., -0.0343, -0.0468, -0.0509],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.12048101425171 second(s)) :
loss = 0.12352897971868515
item_cnt = 4328 | predict_cnt = 603 | true_predict_cnt = 439
precision_rate = 0.7280265339966833 | recall_rate = 0.10143253234750461 | F1_measure = 0.17805718921111335
------------------------------------------------------------------------------------------
epoch 39 for theta 0 (Used time = 245.98141717910767 second(s)) :
training loss = 0.12430232018232346
tensor([[ 1.2779,  3.4047,  3.0743,  ...,  0.1003,  0.1233,  0.1912],
        [-3.2220,  1.2049, -0.0367,  ..., -0.0345, -0.0471, -0.0513],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 0 (Used time = 20.134971857070923 second(s)) :
loss = 0.12314289063215256
item_cnt = 4328 | predict_cnt = 605 | true_predict_cnt = 439
precision_rate = 0.7256198347107438 | recall_rate = 0.10143253234750461 | F1_measure = 0.17798499898641798
------------------------------------------------------------------------------------------
Initial theta 1:
tensor([[ 4.0148,  2.8747,  2.4135,  ...,  0.0644,  0.0794,  0.1134],
        [ 1.9046,  1.0675,  0.1528,  ..., -0.0327, -0.0359, -0.0498],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
------------------------------------------------------------------------------------------
epoch 0 for theta 1 (Used time = 219.6755006313324 second(s)) :
training loss = 0.13957098126411438
tensor([[ 4.1186,  2.9243,  2.4347,  ...,  0.0654,  0.0805,  0.1154],
        [ 1.7675,  1.0421,  0.1485,  ..., -0.0333, -0.0365, -0.0509],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 21.045291423797607 second(s)) :
loss = 0.13370734453201294
item_cnt = 4650 | predict_cnt = 1154 | true_predict_cnt = 1130
precision_rate = 0.9792027729636048 | recall_rate = 0.24301075268817204 | F1_measure = 0.3893866299104066
------------------------------------------------------------------------------------------
epoch 1 for theta 1 (Used time = 252.6280391216278 second(s)) :
training loss = 0.13942889869213104
tensor([[ 4.0110,  2.9039,  2.4276,  ...,  0.0662,  0.0814,  0.1169],
        [ 1.8392,  1.0850,  0.1717,  ..., -0.0338, -0.0369, -0.0515],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.98132634162903 second(s)) :
loss = 0.13102839887142181
item_cnt = 4650 | predict_cnt = 1246 | true_predict_cnt = 1216
precision_rate = 0.9759229534510433 | recall_rate = 0.26150537634408605 | F1_measure = 0.412483039348711
------------------------------------------------------------------------------------------
epoch 2 for theta 1 (Used time = 253.9802622795105 second(s)) :
training loss = 0.1346297413110733
tensor([[ 4.0283,  2.9257,  2.4375,  ...,  0.0672,  0.0825,  0.1186],
        [ 1.7886,  1.0863,  0.1782,  ..., -0.0343, -0.0375, -0.0524],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.042660236358643 second(s)) :
loss = 0.12930040061473846
item_cnt = 4650 | predict_cnt = 1209 | true_predict_cnt = 1183
precision_rate = 0.978494623655914 | recall_rate = 0.2544086021505376 | F1_measure = 0.40382317801672635
------------------------------------------------------------------------------------------
epoch 3 for theta 1 (Used time = 264.6912386417389 second(s)) :
training loss = 0.13397447764873505
tensor([[ 3.9806,  2.9253,  2.4384,  ...,  0.0681,  0.0835,  0.1202],
        [ 1.8023,  1.1090,  0.1933,  ..., -0.0349, -0.0379, -0.0531],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.870024919509888 second(s)) :
loss = 0.12923258543014526
item_cnt = 4650 | predict_cnt = 1261 | true_predict_cnt = 1232
precision_rate = 0.9770023790642347 | recall_rate = 0.2649462365591398 | F1_measure = 0.4168499407883607
------------------------------------------------------------------------------------------
epoch 4 for theta 1 (Used time = 266.26822209358215 second(s)) :
training loss = 0.13296569883823395
tensor([[ 3.9835,  2.9416,  2.4463,  ...,  0.0690,  0.0845,  0.1219],
        [ 1.7664,  1.1149,  0.2014,  ..., -0.0354, -0.0385, -0.0540],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 19.996184587478638 second(s)) :
loss = 0.1279994547367096
item_cnt = 4650 | predict_cnt = 1243 | true_predict_cnt = 1218
precision_rate = 0.9798873692679002 | recall_rate = 0.26193548387096777 | F1_measure = 0.41337179704734434
------------------------------------------------------------------------------------------
epoch 5 for theta 1 (Used time = 273.40387201309204 second(s)) :
training loss = 0.13232125341892242
tensor([[ 3.9483,  2.9449,  2.4489,  ...,  0.0699,  0.0855,  0.1236],
        [ 1.7683,  1.1333,  0.2144,  ..., -0.0359, -0.0390, -0.0547],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.102505445480347 second(s)) :
```

```
loss = 0.12777775526046753
item_cnt = 4650 | predict_cnt = 1269 | true_predict_cnt = 1241
precision_rate = 0.9779353821907013 | recall_rate = 0.26688172043010755 | F1_measure = 0.41932758911978374
--------------------------------------------------------------------------------------------------
epoch 6 for theta 1 (Used time = 275.7429232597351 second(s)) :
training loss = 0.1316702663898468
tensor([[ 3.9434,  2.9581,  2.4556,  ...,  0.0708,  0.0865,  0.1252],
        [ 1.7406,  1.1416,  0.2233,  ..., -0.0365, -0.0395, -0.0556],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.980236530303955 second(s)) :
loss = 0.12677796185016632
item_cnt = 4650 | predict_cnt = 1261 | true_predict_cnt = 1236
precision_rate = 0.9801744647105471 | recall_rate = 0.2658064516129032 | F1_measure = 0.41820334968702416
--------------------------------------------------------------------------------------------------
epoch 7 for theta 1 (Used time = 281.42841625213623 second(s)) :
training loss = 0.13102662563323975
tensor([[ 3.9153,  2.9632,  2.4592,  ...,  0.0716,  0.0875,  0.1268],
        [ 1.7361,  1.1576,  0.2351,  ..., -0.0370, -0.0399, -0.0563],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.85658836364746 second(s)) :
loss = 0.12644143402576447
item_cnt = 4650 | predict_cnt = 1275 | true_predict_cnt = 1248
precision_rate = 0.9788235294117648 | recall_rate = 0.26838709677419353 | F1_measure = 0.4212658227848101
--------------------------------------------------------------------------------------------------
epoch 8 for theta 1 (Used time = 279.91435837745667 second(s)) :
training loss = 0.13043485581874847
tensor([[ 3.9059,  2.9744,  2.4653,  ...,  0.0725,  0.0885,  0.1285],
        [ 1.7134,  1.1672,  0.2443,  ..., -0.0375, -0.0404, -0.0571],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.873533964157104 second(s)) :
loss = 0.12564942240715027
item_cnt = 4650 | predict_cnt = 1272 | true_predict_cnt = 1248
precision_rate = 0.9811320754716981 | recall_rate = 0.26838709677419353 | F1_measure = 0.4214792299898683
--------------------------------------------------------------------------------------------------
epoch 9 for theta 1 (Used time = 284.8877840042114 second(s)) :
training loss = 0.1297452747821808
tensor([[ 3.8821,  2.9806,  2.4693,  ...,  0.0734,  0.0895,  0.1301],
        [ 1.7052,  1.1815,  0.2553,  ..., -0.0380, -0.0409, -0.0579],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.16717004776001 second(s)) :
loss = 0.12523619830608368
item_cnt = 4650 | predict_cnt = 1282 | true_predict_cnt = 1256
precision_rate = 0.9797191887675507 | recall_rate = 0.2701075268817204 | F1_measure = 0.42346594740391097
--------------------------------------------------------------------------------------------------
epoch 10 for theta 1 (Used time = 290.29832887649536 second(s)) :
training loss = 0.12926162779331207
tensor([[ 3.8701,  2.9906,  2.4750,  ...,  0.0743,  0.0905,  0.1317],
        [ 1.6856,  1.1918,  0.2646,  ..., -0.0386, -0.0414, -0.0587],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.94871497154236 second(s)) :
loss = 0.12455297261476517
item_cnt = 4650 | predict_cnt = 1281 | true_predict_cnt = 1258
precision_rate = 0.9820452771272443 | recall_rate = 0.2705376344086021 | F1_measure = 0.42421176867307364
--------------------------------------------------------------------------------------------------
epoch 11 for theta 1 (Used time = 294.5485861301422 second(s)) :
training loss = 0.12861795723438263
tensor([[ 3.8490,  2.9973,  2.4794,  ...,  0.0752,  0.0914,  0.1333],
        [ 1.6752,  1.2050,  0.2749,  ..., -0.0391, -0.0419, -0.0594],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.21677303314209 second(s)) :
loss = 0.1240815669298172
item_cnt = 4650 | predict_cnt = 1302 | true_predict_cnt = 1277
precision_rate = 0.9807987711213517 | recall_rate = 0.27462365591397847 | F1_measure = 0.4290994623655913
--------------------------------------------------------------------------------------------------
epoch 12 for theta 1 (Used time = 294.68363666534424 second(s)) :
training loss = 0.1280658096075058
tensor([[ 3.8355,  3.0064,  2.4849,  ...,  0.0760,  0.0924,  0.1348],
        [ 1.6577,  1.2156,  0.2841,  ..., -0.0396, -0.0424, -0.0602],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.243391275405884 second(s)) :
loss = 0.12346834689378738
item_cnt = 4650 | predict_cnt = 1304 | true_predict_cnt = 1280
precision_rate = 0.9815950920245399 | recall_rate = 0.2752688172043011 | F1_measure = 0.4299630500503863
--------------------------------------------------------------------------------------------------
epoch 13 for theta 1 (Used time = 297.00357389450073 second(s)) :
training loss = 0.12745749950408936
tensor([[ 3.8163,  3.0134,  2.4894,  ...,  0.0769,  0.0934,  0.1364],
        [ 1.6461,  1.2280,  0.2940,  ..., -0.0401, -0.0429, -0.0609],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.92005729675293 second(s)) :
```

```
loss = 0.12300797551870346
item_cnt = 4650 | predict_cnt = 1309 | true_predict_cnt = 1285
precision_rate = 0.9816653934300993 | recall_rate = 0.2763440860215054 | F1_measure = 0.431280416177211
--------------------------------------------------------------------------------------------------
epoch 14 for theta 1 (Used time = 291.6899392604828 second(s)) :
training loss = 0.12693113088607788
tensor([[ 3.8019,  3.0219,  2.4947,  ...,  0.0778,  0.0943,  0.1380],
        [ 1.6299,  1.2386,  0.3031,  ..., -0.0406, -0.0433, -0.0617],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.937384128570557 second(s)) :
loss = 0.12242831289768219
item_cnt = 4650 | predict_cnt = 1309 | true_predict_cnt = 1285
precision_rate = 0.9816653934300993 | recall_rate = 0.2763440860215054 | F1_measure = 0.431280416177211
--------------------------------------------------------------------------------------------------
epoch 15 for theta 1 (Used time = 297.172794342041 second(s)) :
training loss = 0.12637989223003387
tensor([[ 3.7840,  3.0290,  2.4994,  ...,  0.0786,  0.0953,  0.1395],
        [ 1.6176,  1.2504,  0.3125,  ..., -0.0411, -0.0438, -0.0624],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.166077136993408 second(s)) :
loss = 0.12197171151638031
item_cnt = 4650 | predict_cnt = 1312 | true_predict_cnt = 1288
precision_rate = 0.9817073170731707 | recall_rate = 0.27698924731182795 | F1_measure = 0.43206977524320694
--------------------------------------------------------------------------------------------------
epoch 16 for theta 1 (Used time = 293.71831154823303 second(s)) :
training loss = 0.12595351040363312
tensor([[ 3.7692,  3.0370,  2.5045,  ...,  0.0795,  0.0962,  0.1411],
        [ 1.6024,  1.2610,  0.3215,  ..., -0.0417, -0.0443, -0.0631],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.93395209312439 second(s)) :
loss = 0.12141770869493484
item_cnt = 4650 | predict_cnt = 1313 | true_predict_cnt = 1289
precision_rate = 0.9817212490479817 | recall_rate = 0.27720430107526883 | F1_measure = 0.43233271843032034
--------------------------------------------------------------------------------------------------
epoch 17 for theta 1 (Used time = 295.66173791885376 second(s)) :
training loss = 0.12547066807746887
tensor([[ 3.7522,  3.0441,  2.5093,  ...,  0.0803,  0.0971,  0.1426],
        [ 1.5897,  1.2722,  0.3306,  ..., -0.0422, -0.0448, -0.0639],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.873388290405273 second(s)) :
loss = 0.12096410989761353
item_cnt = 4650 | predict_cnt = 1322 | true_predict_cnt = 1298
precision_rate = 0.9818456883509834 | recall_rate = 0.27913978494623654 | F1_measure = 0.4346952444742129
--------------------------------------------------------------------------------------------------
epoch 18 for theta 1 (Used time = 298.94500946998596 second(s)) :
training loss = 0.12495370209217072
tensor([[ 3.7373,  3.0518,  2.5144,  ...,  0.0812,  0.0981,  0.1441],
        [ 1.5751,  1.2827,  0.3393,  ..., -0.0427, -0.0452, -0.0646],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.27620029449463 second(s)) :
loss = 0.1204623132944107
item_cnt = 4650 | predict_cnt = 1350 | true_predict_cnt = 1326
precision_rate = 0.9822222222222222 | recall_rate = 0.28516129032258064 | F1_measure = 0.442
--------------------------------------------------------------------------------------------------
epoch 19 for theta 1 (Used time = 298.5775284767151 second(s)) :
training loss = 0.12454704940319061
tensor([[ 3.7210,  3.0589,  2.5192,  ...,  0.0820,  0.0990,  0.1456],
        [ 1.5623,  1.2935,  0.3481,  ..., -0.0432, -0.0457, -0.0653],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.37091827392578 second(s)) :
loss = 0.11999556422233582
item_cnt = 4650 | predict_cnt = 1354 | true_predict_cnt = 1330
precision_rate = 0.982274741506647 | recall_rate = 0.2860215053763441 | F1_measure = 0.44303797468354433
--------------------------------------------------------------------------------------------------
epoch 20 for theta 1 (Used time = 290.24237632751465 second(s)) :
training loss = 0.12393711507320404
tensor([[ 3.7061,  3.0663,  2.5242,  ...,  0.0828,  0.0999,  0.1471],
        [ 1.5483,  1.3038,  0.3567,  ..., -0.0437, -0.0462, -0.0660],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 21.042903184890747 second(s)) :
loss = 0.11951512843370438
item_cnt = 4650 | predict_cnt = 1354 | true_predict_cnt = 1330
precision_rate = 0.982274741506647 | recall_rate = 0.2860215053763441 | F1_measure = 0.44303797468354433
--------------------------------------------------------------------------------------------------
epoch 21 for theta 1 (Used time = 288.62176299095154 second(s)) :
training loss = 0.12358216196298599
tensor([[ 3.6903,  3.0733,  2.5290,  ...,  0.0837,  0.1009,  0.1486],
        [ 1.5354,  1.3143,  0.3652,  ..., -0.0442, -0.0466, -0.0667],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.9949152469635 second(s)) :
```

```
loss = 0.11909370869398117
item_cnt = 4650 | predict_cnt = 1359 | true_predict_cnt = 1335
precision_rate = 0.9823399558498896 | recall_rate = 0.2870967741935484 | F1_measure = 0.4443334997503745
--------------------------------------------------------------------------------------------
epoch 22 for theta 1 (Used time = 295.3126859664917 second(s)) :
training loss = 0.12302204221487045
tensor([[ 3.6756,  3.0805,  2.5339,  ...,  0.0845,  0.1018,  0.1501],
        [ 1.5218,  1.3243,  0.3736,  ..., -0.0447, -0.0471, -0.0674],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.027588367462158 second(s)) :
loss = 0.11863269656896591
item_cnt = 4650 | predict_cnt = 1363 | true_predict_cnt = 1339
precision_rate = 0.9823917828319882 | recall_rate = 0.28795698924731183 | F1_measure = 0.4453683685348412
--------------------------------------------------------------------------------------------
epoch 23 for theta 1 (Used time = 293.22212409973145 second(s)) :
training loss = 0.12248247116804123
tensor([[ 3.6603,  3.0874,  2.5387,  ...,  0.0853,  0.1027,  0.1516],
        [ 1.5090,  1.3345,  0.3819,  ..., -0.0452, -0.0475, -0.0681],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 21.052783012390137 second(s)) :
loss = 0.11819388717412949
item_cnt = 4650 | predict_cnt = 1369 | true_predict_cnt = 1345
precision_rate = 0.9824689554419284 | recall_rate = 0.289247311827957 | F1_measure = 0.44691809270642957
--------------------------------------------------------------------------------------------
epoch 24 for theta 1 (Used time = 295.2926287651062 second(s)) :
training loss = 0.12214150279760361
tensor([[ 3.6458,  3.0944,  2.5436,  ...,  0.0862,  0.1036,  0.1531],
        [ 1.4958,  1.3443,  0.3900,  ..., -0.0457, -0.0480, -0.0688],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.966264009475708 second(s)) :
loss = 0.1177477240562439
item_cnt = 4650 | predict_cnt = 1369 | true_predict_cnt = 1345
precision_rate = 0.9824689554419284 | recall_rate = 0.289247311827957 | F1_measure = 0.44691809270642957
--------------------------------------------------------------------------------------------
epoch 25 for theta 1 (Used time = 318.54051542282104 second(s)) :
training loss = 0.12170278280973434
tensor([[ 3.6309,  3.1012,  2.5484,  ...,  0.0870,  0.1045,  0.1545],
        [ 1.4831,  1.3542,  0.3981,  ..., -0.0462, -0.0484, -0.0695],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 24.935994625091553 second(s)) :
loss = 0.11732379347085953
item_cnt = 4650 | predict_cnt = 1370 | true_predict_cnt = 1346
precision_rate = 0.9824817518248176 | recall_rate = 0.2894623655913979 | F1_measure = 0.4471760797342193
--------------------------------------------------------------------------------------------
epoch 26 for theta 1 (Used time = 306.60039925575256 second(s)) :
training loss = 0.12128469347953796
tensor([[ 3.6166,  3.1080,  2.5532,  ...,  0.0878,  0.1054,  0.1560],
        [ 1.4702,  1.3638,  0.4060,  ..., -0.0467, -0.0489, -0.0702],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.792040586471558 second(s)) :
loss = 0.11689673364162445
item_cnt = 4650 | predict_cnt = 1370 | true_predict_cnt = 1346
precision_rate = 0.9824817518248176 | recall_rate = 0.2894623655913979 | F1_measure = 0.4471760797342193
--------------------------------------------------------------------------------------------
epoch 27 for theta 1 (Used time = 297.9971213340759 second(s)) :
training loss = 0.12078811228275299
tensor([[ 3.6021,  3.1146,  2.5579,  ...,  0.0886,  0.1063,  0.1574],
        [ 1.4577,  1.3734,  0.4139,  ..., -0.0471, -0.0493, -0.0709],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.714972734451294 second(s)) :
loss = 0.11647365987300873
item_cnt = 4650 | predict_cnt = 1376 | true_predict_cnt = 1352
precision_rate = 0.9825581395348837 | recall_rate = 0.29075268817204303 | F1_measure = 0.44872220378360433
--------------------------------------------------------------------------------------------
epoch 28 for theta 1 (Used time = 298.3657205104828 second(s)) :
training loss = 0.1204381212592125
tensor([[ 3.5881,  3.1213,  2.5627,  ...,  0.0894,  0.1072,  0.1589],
        [ 1.4451,  1.3828,  0.4217,  ..., -0.0476, -0.0498, -0.0716],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 19.95770573616028 second(s)) :
loss = 0.11608657240867615
item_cnt = 4650 | predict_cnt = 1382 | true_predict_cnt = 1358
precision_rate = 0.9826338639652678 | recall_rate = 0.2920430107526882 | F1_measure = 0.4502652519893899
--------------------------------------------------------------------------------------------
epoch 29 for theta 1 (Used time = 299.6431562900543 second(s)) :
training loss = 0.1199805960059166
tensor([[ 3.5740,  3.1278,  2.5675,  ...,  0.0902,  0.1081,  0.1603],
        [ 1.4328,  1.3922,  0.4294,  ..., -0.0481, -0.0502, -0.0722],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 19.948699951171875 second(s)) :
```

```
loss = 0.11568157374858856
item_cnt = 4650 | predict_cnt = 1387 | true_predict_cnt = 1364
precision_rate = 0.9834174477289113 | recall_rate = 0.29333333333333333 | F1_measure = 0.45188007288388277
--------------------------------------------------------------------------------------------
epoch 30 for theta 1 (Used time = 296.9365770816803 second(s)) :
training loss = 0.11966146528720856
tensor([[ 3.5602,  3.1344,  2.5722,  ...,  0.0910,  0.1090,  0.1617],
        [ 1.4205,  1.4014,  0.4369,  ..., -0.0486, -0.0507, -0.0729],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.84139585494995 second(s)) :
loss = 0.11529315263032913
item_cnt = 4650 | predict_cnt = 1393 | true_predict_cnt = 1369
precision_rate = 0.9827709978463748 | recall_rate = 0.29440860215053766 | F1_measure = 0.4530862154558994
--------------------------------------------------------------------------------------------
epoch 31 for theta 1 (Used time = 291.44876313209534 second(s)) :
training loss = 0.11916181445121765
tensor([[ 3.5464,  3.1408,  2.5769,  ...,  0.0918,  0.1098,  0.1631],
        [ 1.4084,  1.4105,  0.4444,  ..., -0.0491, -0.0511, -0.0736],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.621461629867554 second(s)) :
loss = 0.11489883810281754
item_cnt = 4650 | predict_cnt = 1394 | true_predict_cnt = 1370
precision_rate = 0.9827833572453372 | recall_rate = 0.2946236559139785 | F1_measure = 0.45334215751158174
--------------------------------------------------------------------------------------------
epoch 32 for theta 1 (Used time = 304.8544828891754 second(s)) :
training loss = 0.11876434087753296
tensor([[ 3.5329,  3.1472,  2.5816,  ...,  0.0926,  0.1107,  0.1645],
        [ 1.3963,  1.4194,  0.4518,  ..., -0.0496, -0.0516, -0.0742],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 19.933647632598877 second(s)) :
loss = 0.11451516300439835
item_cnt = 4650 | predict_cnt = 1396 | true_predict_cnt = 1372
precision_rate = 0.9828080229226361 | recall_rate = 0.2950537634408602 | F1_measure = 0.45385378762818396
--------------------------------------------------------------------------------------------
epoch 33 for theta 1 (Used time = 296.3558111190796 second(s)) :
training loss = 0.11840607970952988
tensor([[ 3.5195,  3.1534,  2.5862,  ...,  0.0934,  0.1116,  0.1659],
        [ 1.3844,  1.4283,  0.4592,  ..., -0.0501, -0.0520, -0.0749],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 19.80868935585022 second(s)) :
loss = 0.11415474116802216
item_cnt = 4650 | predict_cnt = 1398 | true_predict_cnt = 1374
precision_rate = 0.9828326180257511 | recall_rate = 0.2954838709677419 | F1_measure = 0.4543650793650793
--------------------------------------------------------------------------------------------
epoch 34 for theta 1 (Used time = 294.7071866989136 second(s)) :
training loss = 0.11799838393926662
tensor([[ 3.5062,  3.1597,  2.5909,  ...,  0.0942,  0.1125,  0.1673],
        [ 1.3726,  1.4371,  0.4664,  ..., -0.0505, -0.0524, -0.0755],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.698832035064697 second(s)) :
loss = 0.11377531290054321
item_cnt = 4650 | predict_cnt = 1400 | true_predict_cnt = 1376
precision_rate = 0.9828571428571429 | recall_rate = 0.29591397849462364 | F1_measure = 0.45487603305785124
--------------------------------------------------------------------------------------------
epoch 35 for theta 1 (Used time = 298.115216255188 second(s)) :
training loss = 0.11763642728328705
tensor([[ 3.4931,  3.1659,  2.5955,  ...,  0.0950,  0.1133,  0.1687],
        [ 1.3609,  1.4458,  0.4736,  ..., -0.0510, -0.0529, -0.0761],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.620054721832275 second(s)) :
loss = 0.11341641843318939
item_cnt = 4650 | predict_cnt = 1404 | true_predict_cnt = 1380
precision_rate = 0.9829059829059829 | recall_rate = 0.2967741935483871 | F1_measure = 0.4558969276511397
--------------------------------------------------------------------------------------------
epoch 36 for theta 1 (Used time = 299.5291588306427 second(s)) :
training loss = 0.11726720631122589
tensor([[ 3.4802,  3.1720,  2.6001,  ...,  0.0958,  0.1142,  0.1701],
        [ 1.3493,  1.4544,  0.4806,  ..., -0.0515, -0.0533, -0.0768],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.05806851387024 second(s)) :
loss = 0.11305832862854004
item_cnt = 4650 | predict_cnt = 1404 | true_predict_cnt = 1380
precision_rate = 0.9829059829059829 | recall_rate = 0.2967741935483871 | F1_measure = 0.4558969276511397
--------------------------------------------------------------------------------------------
epoch 37 for theta 1 (Used time = 296.94481110572815 second(s)) :
training loss = 0.11687225103378296
tensor([[ 3.4674,  3.1781,  2.6047,  ...,  0.0966,  0.1150,  0.1715],
        [ 1.3379,  1.4629,  0.4876,  ..., -0.0520, -0.0537, -0.0774],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.01343274116516 second(s)) :
```

```
loss = 0.11269840598106384
item_cnt = 4650 | predict_cnt = 1406 | true_predict_cnt = 1382
precision_rate = 0.9829302987197724 | recall_rate = 0.2972043010752688 | F1_measure = 0.4564068692206076
--------------------------------------------------------------------------------------------------
epoch 38 for theta 1 (Used time = 297.1798803806305 second(s)) :
training loss = 0.11657392233610153
tensor([[ 3.4547,  3.1841,  2.6093,  ...,  0.0974,  0.1159,  0.1728],
        [ 1.3266,  1.4713,  0.4945,  ..., -0.0524, -0.0542, -0.0780],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.744441986083984 second(s)) :
loss = 0.1123514473438263
item_cnt = 4650 | predict_cnt = 1409 | true_predict_cnt = 1385
precision_rate = 0.9829666430092264 | recall_rate = 0.2978494623655914 | F1_measure = 0.45717115035484396
--------------------------------------------------------------------------------------------------
epoch 39 for theta 1 (Used time = 295.4778800010681 second(s)) :
training loss = 0.11627945303916931
tensor([[ 3.4422,  3.1900,  2.6138,  ...,  0.0982,  0.1168,  0.1742],
        [ 1.3154,  1.4796,  0.5014,  ..., -0.0529, -0.0546, -0.0787],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 1 (Used time = 20.088828325271606 second(s)) :
loss = 0.11201351135969162
item_cnt = 4650 | predict_cnt = 1415 | true_predict_cnt = 1391
precision_rate = 0.9830388692579505 | recall_rate = 0.29913978494623655 | F1_measure = 0.45869744435284415
--------------------------------------------------------------------------------------------------
Initial theta 2:
tensor([[ 1.7827,  3.0688,  2.8834,  ...,  0.0662,  0.0778,  0.1470],
        [-0.7960,  0.5346, -0.4093,  ..., -0.0268, -0.0332, -0.0642],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
--------------------------------------------------------------------------------------------------
epoch 0 for theta 2 (Used time = 262.59608793258667 second(s)) :
training loss = 0.14159366488456726
tensor([[ 1.7916,  3.0767,  2.8882,  ...,  0.0672,  0.0788,  0.1493],
        [-0.7688,  0.5525, -0.3976,  ..., -0.0271, -0.0336, -0.0651],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 19.86993145942688 second(s)) :
loss = 0.20563827455043793
item_cnt = 9578 | predict_cnt = 1644 | true_predict_cnt = 1520
precision_rate = 0.9245742092457421 | recall_rate = 0.15869701399039465 | F1_measure = 0.2708964533951167
--------------------------------------------------------------------------------------------------
epoch 1 for theta 2 (Used time = 297.1325945854187 second(s)) :
training loss = 0.14073370397090912
tensor([[ 1.7961,  3.0840,  2.8928,  ...,  0.0682,  0.0798,  0.1515],
        [-0.7422,  0.5707, -0.3858,  ..., -0.0275, -0.0340, -0.0660],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 20.604530572891235 second(s)) :
loss = 0.20443423092365265
item_cnt = 9578 | predict_cnt = 1646 | true_predict_cnt = 1522
precision_rate = 0.9246658566221142 | recall_rate = 0.15890582585090834 | F1_measure = 0.27120456165359946
--------------------------------------------------------------------------------------------------
epoch 2 for theta 2 (Used time = 297.48459100723267 second(s)) :
training loss = 0.13994953036308289
tensor([[ 1.8015,  3.0916,  2.8973,  ...,  0.0692,  0.0809,  0.1537],
        [-0.7188,  0.5883, -0.3741,  ..., -0.0279, -0.0344, -0.0669],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 20.510897874832153 second(s)) :
loss = 0.20350390672683716
item_cnt = 9578 | predict_cnt = 1659 | true_predict_cnt = 1534
precision_rate = 0.9246534056660639 | recall_rate = 0.16015869701399038 | F1_measure = 0.2730266085254071
--------------------------------------------------------------------------------------------------
epoch 3 for theta 2 (Used time = 298.70736718177795 second(s)) :
training loss = 0.13905289769172668
tensor([[ 1.8057,  3.0991,  2.9018,  ...,  0.0702,  0.0819,  0.1559],
        [-0.6971,  0.6057, -0.3624,  ..., -0.0283, -0.0348, -0.0678],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 19.823954343795776 second(s)) :
loss = 0.20247645676136017
item_cnt = 9578 | predict_cnt = 1669 | true_predict_cnt = 1544
precision_rate = 0.9251048532055123 | recall_rate = 0.16120275631655878 | F1_measure = 0.2745621054503423
--------------------------------------------------------------------------------------------------
epoch 4 for theta 2 (Used time = 292.4744727611542 second(s)) :
training loss = 0.13832536339759827
tensor([[ 1.8096,  3.1066,  2.9062,  ...,  0.0712,  0.0829,  0.1581],
        [-0.6776,  0.6227, -0.3508,  ..., -0.0287, -0.0352, -0.0688],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 20.542722940444946 second(s)) :
loss = 0.20151560008525848
item_cnt = 9578 | predict_cnt = 1808 | true_predict_cnt = 1683
precision_rate = 0.9308628318584071 | recall_rate = 0.17571518062225935 | F1_measure = 0.29562620762339714
--------------------------------------------------------------------------------------------------
epoch 5 for theta 2 (Used time = 296.2662079334259 second(s)) :
```

```
training loss = 0.1376735419034958
tensor([[ 1.8128,  3.1141,  2.9106,  ...,  0.0721,  0.0839,  0.1603],
        [-0.6598,  0.6395, -0.3393,  ..., -0.0290, -0.0356, -0.0697],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 20.62009286880493 second(s)) :
loss = 0.20056048035621643
item_cnt = 9578 | predict_cnt = 1809 | true_predict_cnt = 1684
precision_rate = 0.9309010503040354 | recall_rate = 0.17581958655251617 | F1_measure = 0.29577588478089045
--------------------------------------------------------------------------------------------
epoch 6 for theta 2 (Used time = 298.5549244880676 second(s)) :
training loss = 0.13685081899166107
tensor([[ 1.8156,  3.1216,  2.9149,  ...,  0.0731,  0.0848,  0.1625],
        [-0.6437,  0.6559, -0.3278,  ..., -0.0294, -0.0360, -0.0706],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 19.745773792266846 second(s)) :
loss = 0.19963617622852325
item_cnt = 9578 | predict_cnt = 1813 | true_predict_cnt = 1688
precision_rate = 0.9310535024820739 | recall_rate = 0.17623721027354353 | F1_measure = 0.2963743306118866
--------------------------------------------------------------------------------------------
epoch 7 for theta 2 (Used time = 297.3383078575134 second(s)) :
training loss = 0.1361183077096939
tensor([[ 1.8179,  3.1291,  2.9191,  ...,  0.0741,  0.0858,  0.1647],
        [-0.6290,  0.6721, -0.3163,  ..., -0.0298, -0.0364, -0.0715],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 19.652464151382446 second(s)) :
loss = 0.19870732724666595
item_cnt = 9578 | predict_cnt = 1819 | true_predict_cnt = 1694
precision_rate = 0.9312809235843871 | recall_rate = 0.17686364585508457 | F1_measure = 0.2972712117223831
--------------------------------------------------------------------------------------------
epoch 8 for theta 2 (Used time = 301.08630442619324 second(s)) :
training loss = 0.13540729880332947
tensor([[ 1.8197,  3.1366,  2.9233,  ...,  0.0750,  0.0868,  0.1668],
        [-0.6157,  0.6881, -0.3050,  ..., -0.0301, -0.0368, -0.0723],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 20.605885982513428 second(s)) :
loss = 0.19781935214996338
item_cnt = 9578 | predict_cnt = 1873 | true_predict_cnt = 1748
precision_rate = 0.9332621462893753 | recall_rate = 0.18250156608895385 | F1_measure = 0.30530084708759064
--------------------------------------------------------------------------------------------
epoch 9 for theta 2 (Used time = 297.9099440574646 second(s)) :
training loss = 0.1347867101430893
tensor([[ 1.8212,  3.1441,  2.9274,  ...,  0.0760,  0.0878,  0.1690],
        [-0.6036,  0.7037, -0.2937,  ..., -0.0305, -0.0372, -0.0732],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 20.538789749145508 second(s)) :
loss = 0.19694460928440094
item_cnt = 9578 | predict_cnt = 1881 | true_predict_cnt = 1756
precision_rate = 0.9335459861775651 | recall_rate = 0.18333681353100856 | F1_measure = 0.30648398638624663
--------------------------------------------------------------------------------------------
epoch 10 for theta 2 (Used time = 301.70336389541626 second(s)) :
training loss = 0.13406600058078766
tensor([[ 1.8222,  3.1515,  2.9315,  ...,  0.0769,  0.0887,  0.1711],
        [-0.5926,  0.7191, -0.2824,  ..., -0.0309, -0.0376, -0.0741],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 19.776196241378784 second(s)) :
loss = 0.1960580050945282
item_cnt = 9578 | predict_cnt = 1886 | true_predict_cnt = 1761
precision_rate = 0.9337221633085896 | recall_rate = 0.18385884318229276 | F1_measure = 0.30722260990928124
--------------------------------------------------------------------------------------------
epoch 11 for theta 2 (Used time = 296.06748151779175 second(s)) :
training loss = 0.13339795172214508
tensor([[ 1.8230,  3.1589,  2.9356,  ...,  0.0779,  0.0897,  0.1732],
        [-0.5826,  0.7343, -0.2712,  ..., -0.0313, -0.0380, -0.0750],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 20.49768090248108 second(s)) :
loss = 0.1952105313539505
item_cnt = 9578 | predict_cnt = 2047 | true_predict_cnt = 1921
precision_rate = 0.9384465070835368 | recall_rate = 0.20056379202338692 | F1_measure = 0.330494623655914
--------------------------------------------------------------------------------------------
epoch 12 for theta 2 (Used time = 300.0456397533417 second(s)) :
training loss = 0.13276436924934387
tensor([[ 1.8233,  3.1663,  2.9396,  ...,  0.0788,  0.0906,  0.1753],
        [-0.5736,  0.7492, -0.2601,  ..., -0.0316, -0.0384, -0.0759],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 20.40196943283081 second(s)) :
loss = 0.19436407089233398
item_cnt = 9578 | predict_cnt = 2074 | true_predict_cnt = 1948
precision_rate = 0.9392478302796529 | recall_rate = 0.20338275214032156 | F1_measure = 0.33436319945073806
--------------------------------------------------------------------------------------------
epoch 13 for theta 2 (Used time = 295.67964363098145 second(s)) :
```

```
training loss = 0.13211098313331604
tensor([[ 1.8234,  3.1736,  2.9436,  ...,  0.0797,  0.0916,  0.1774],
        [-0.5654,  0.7639, -0.2490,  ..., -0.0320, -0.0388, -0.0767],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 19.588652849197388 second(s)) :
loss = 0.193542018532753
item_cnt = 9578 | predict_cnt = 2094 | true_predict_cnt = 1968
precision_rate = 0.9398280802292264 | recall_rate = 0.20547087074545833 | F1_measure = 0.33721727210418095
--------------------------------------------------------------------------------------------
epoch 14 for theta 2 (Used time = 295.5241415500641 second(s)) :
training loss = 0.13154418766498566
tensor([[ 1.8233,  3.1810,  2.9476,  ...,  0.0807,  0.0925,  0.1795],
        [-0.5580,  0.7783, -0.2380,  ..., -0.0324, -0.0391, -0.0776],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 19.73007106781006 second(s)) :
loss = 0.19275498390197754
item_cnt = 9578 | predict_cnt = 2098 | true_predict_cnt = 1970
precision_rate = 0.9389895138226882 | recall_rate = 0.20567968260597203 | F1_measure = 0.3374443302500856
--------------------------------------------------------------------------------------------
epoch 15 for theta 2 (Used time = 296.30733489990234 second(s)) :
training loss = 0.13097618520259857
tensor([[ 1.8228,  3.1882,  2.9515,  ...,  0.0816,  0.0934,  0.1816],
        [-0.5512,  0.7925, -0.2271,  ..., -0.0327, -0.0395, -0.0784],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 20.435869932174683 second(s)) :
loss = 0.19196659326553345
item_cnt = 9578 | predict_cnt = 2102 | true_predict_cnt = 1974
precision_rate = 0.9391056137012369 | recall_rate = 0.20609730632699938 | F1_measure = 0.33801369863013697
--------------------------------------------------------------------------------------------
epoch 16 for theta 2 (Used time = 296.3517048358917 second(s)) :
training loss = 0.130262553691864
tensor([[ 1.8222,  3.1955,  2.9554,  ...,  0.0825,  0.0943,  0.1836],
        [-0.5452,  0.8066, -0.2162,  ..., -0.0331, -0.0399, -0.0793],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 20.401442527770996 second(s)) :
loss = 0.19116637110710144
item_cnt = 9578 | predict_cnt = 2106 | true_predict_cnt = 1978
precision_rate = 0.9392212725546059 | recall_rate = 0.20651493004802673 | F1_measure = 0.33858267716535434
--------------------------------------------------------------------------------------------
epoch 17 for theta 2 (Used time = 295.84012389183044 second(s)) :
training loss = 0.12966275215148926
tensor([[ 1.8213,  3.2027,  2.9593,  ...,  0.0834,  0.0953,  0.1857],
        [-0.5397,  0.8204, -0.2055,  ..., -0.0334, -0.0403, -0.0801],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 19.757750988006592 second(s)) :
loss = 0.19039441645145416
item_cnt = 9578 | predict_cnt = 2126 | true_predict_cnt = 1998
precision_rate = 0.9397930385700847 | recall_rate = 0.2086030486531635 | F1_measure = 0.3414217361585783
--------------------------------------------------------------------------------------------
epoch 18 for theta 2 (Used time = 317.13648986816406 second(s)) :
training loss = 0.12911784648895264
tensor([[ 1.8203,  3.2099,  2.9631,  ...,  0.0843,  0.0962,  0.1877],
        [-0.5347,  0.8340, -0.1947,  ..., -0.0338, -0.0406, -0.0810],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 19.964614629745483 second(s)) :
loss = 0.18963927030563354
item_cnt = 9578 | predict_cnt = 2127 | true_predict_cnt = 1999
precision_rate = 0.9398213446168312 | recall_rate = 0.20870745458342033 | F1_measure = 0.34156343442973086
--------------------------------------------------------------------------------------------
epoch 19 for theta 2 (Used time = 333.5461356639862 second(s)) :
training loss = 0.12851755321025848
tensor([[ 1.8191,  3.2171,  2.9670,  ...,  0.0853,  0.0971,  0.1897],
        [-0.5302,  0.8473, -0.1841,  ..., -0.0342, -0.0410, -0.0818],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 21.073493003845215 second(s)) :
loss = 0.18890395760536194
item_cnt = 9578 | predict_cnt = 2164 | true_predict_cnt = 2035
precision_rate = 0.9403881700554528 | recall_rate = 0.21246606807266652 | F1_measure = 0.34661897462101854
--------------------------------------------------------------------------------------------
epoch 20 for theta 2 (Used time = 347.58928179740906 second(s)) :
training loss = 0.1279096007347107
tensor([[ 1.8177,  3.2242,  2.9708,  ...,  0.0862,  0.0980,  0.1918],
        [-0.5262,  0.8605, -0.1735,  ..., -0.0345, -0.0414, -0.0826],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 20.933013916015625 second(s)) :
loss = 0.1881670206785202
item_cnt = 9578 | predict_cnt = 2171 | true_predict_cnt = 2042
precision_rate = 0.9405803777061262 | recall_rate = 0.2131969095844644 | F1_measure = 0.34760405140863054
--------------------------------------------------------------------------------------------
epoch 21 for theta 2 (Used time = 357.09688329696655 second(s)) :
```

```
training loss = 0.12749086320400238
tensor([[ 1.8162,  3.2313,  2.9746,  ...,  0.0871,  0.0989,  0.1938],
        [-0.5226,  0.8736, -0.1630,  ..., -0.0349, -0.0417, -0.0835],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 21.004180192947388 second(s)) :
loss = 0.18743868172168732
item_cnt = 9578 | predict_cnt = 2202 | true_predict_cnt = 2072
precision_rate = 0.9409627611262489 | recall_rate = 0.21632908749216956 | F1_measure = 0.3517826825127335
--------------------------------------------------------------------------------------------
epoch 22 for theta 2 (Used time = 346.2600531578064 second(s)) :
training loss = 0.12687809765338898
tensor([[ 1.8146,  3.2383,  2.9783,  ...,  0.0879,  0.0998,  0.1958],
        [-0.5194,  0.8864, -0.1525,  ..., -0.0352, -0.0421, -0.0843],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 21.24615716934204 second(s)) :
loss = 0.1867365539073944
item_cnt = 9578 | predict_cnt = 2204 | true_predict_cnt = 2074
precision_rate = 0.941016333938294 | recall_rate = 0.21653789935268322 | F1_measure = 0.35206246817178743
--------------------------------------------------------------------------------------------
epoch 23 for theta 2 (Used time = 361.9823365211487 second(s)) :
training loss = 0.1264561116695404
tensor([[ 1.8128,  3.2453,  2.9821,  ...,  0.0888,  0.1007,  0.1978],
        [-0.5165,  0.8990, -0.1421,  ..., -0.0356, -0.0425, -0.0851],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 21.387953281402588 second(s)) :
loss = 0.18601727485656738
item_cnt = 9578 | predict_cnt = 2210 | true_predict_cnt = 2080
precision_rate = 0.9411764705882353 | recall_rate = 0.21716433493422427 | F1_measure = 0.3529012555140821
--------------------------------------------------------------------------------------------
epoch 24 for theta 2 (Used time = 364.9205527305603 second(s)) :
training loss = 0.1259029656648636
tensor([[ 1.8110,  3.2522,  2.9858,  ...,  0.0897,  0.1016,  0.1997],
        [-0.5140,  0.9115, -0.1318,  ..., -0.0359, -0.0428, -0.0859],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 21.29176354408264 second(s)) :
loss = 0.1853308081626892
item_cnt = 9578 | predict_cnt = 2214 | true_predict_cnt = 2083
precision_rate = 0.9408310749774165 | recall_rate = 0.21747755272499478 | F1_measure = 0.35329036635006783
--------------------------------------------------------------------------------------------
epoch 25 for theta 2 (Used time = 367.4037003517151 second(s)) :
training loss = 0.1253247708082199
tensor([[ 1.8091,  3.2591,  2.9895,  ...,  0.0906,  0.1024,  0.2017],
        [-0.5117,  0.9238, -0.1216,  ..., -0.0363, -0.0432, -0.0867],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 21.560339212417603 second(s)) :
loss = 0.18464669585227966
item_cnt = 9578 | predict_cnt = 2219 | true_predict_cnt = 2088
precision_rate = 0.9409643983776476 | recall_rate = 0.21799958237627898 | F1_measure = 0.35398830211070614
--------------------------------------------------------------------------------------------
epoch 26 for theta 2 (Used time = 368.1876916885376 second(s)) :
training loss = 0.12490792572498322
tensor([[ 1.8070,  3.2660,  2.9932,  ...,  0.0915,  0.1033,  0.2037],
        [-0.5097,  0.9359, -0.1114,  ..., -0.0366, -0.0435, -0.0875],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 22.558534622192383 second(s)) :
loss = 0.18398456275463104
item_cnt = 9578 | predict_cnt = 2280 | true_predict_cnt = 2148
precision_rate = 0.9421052631578948 | recall_rate = 0.2242639381916893 | F1_measure = 0.3622870635857649
--------------------------------------------------------------------------------------------
epoch 27 for theta 2 (Used time = 369.6453437805176 second(s)) :
training loss = 0.12424644082784653
tensor([[ 1.8049,  3.2728,  2.9969,  ...,  0.0924,  0.1042,  0.2056],
        [-0.5079,  0.9479, -0.1014,  ..., -0.0370, -0.0439, -0.0883],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 22.194120407104492 second(s)) :
loss = 0.18334569036960602
item_cnt = 9578 | predict_cnt = 2291 | true_predict_cnt = 2158
precision_rate = 0.9419467481449149 | recall_rate = 0.22530799749425767 | F1_measure = 0.3636363636363637
--------------------------------------------------------------------------------------------
epoch 28 for theta 2 (Used time = 376.8221161365509 second(s)) :
training loss = 0.12385915964841843
tensor([[ 1.8028,  3.2796,  3.0006,  ...,  0.0932,  0.1051,  0.2075],
        [-0.5064,  0.9597, -0.0913,  ..., -0.0373, -0.0442, -0.0891],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 22.107322454452515 second(s)) :
loss = 0.18270175158977509
item_cnt = 9578 | predict_cnt = 2465 | true_predict_cnt = 2331
precision_rate = 0.9456389452332657 | recall_rate = 0.24337022342869075 | F1_measure = 0.38711284563646936
--------------------------------------------------------------------------------------------
epoch 29 for theta 2 (Used time = 379.1980228424072 second(s)) :
```

```
training loss = 0.12333269417285919
tensor([[ 1.8006,  3.2863,  3.0042,  ...,  0.0941,  0.1059,  0.2095],
        [-0.5051,  0.9713, -0.0814,  ..., -0.0377, -0.0446, -0.0899],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 21.730974912643433 second(s)) :
loss = 0.18205100297927856
item_cnt = 9578 | predict_cnt = 2501 | true_predict_cnt = 2366
precision_rate = 0.9460215913634547 | recall_rate = 0.2470244309876801 | F1_measure = 0.3917542842950575
--------------------------------------------------------------------------------------------
epoch 30 for theta 2 (Used time = 376.9699213504791 second(s)) :
training loss = 0.12291834503412247
tensor([[ 1.7983,  3.2930,  3.0079,  ...,  0.0950,  0.1068,  0.2114],
        [-0.5039,  0.9829, -0.0715,  ..., -0.0380, -0.0449, -0.0907],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 23.38662362098694 second(s)) :
loss = 0.18143077194690704
item_cnt = 9578 | predict_cnt = 2596 | true_predict_cnt = 2461
precision_rate = 0.9479969183359014 | recall_rate = 0.2569429943620798 | F1_measure = 0.40430425496960737
--------------------------------------------------------------------------------------------
epoch 31 for theta 2 (Used time = 378.4792973995209 second(s)) :
training loss = 0.12244440615177155
tensor([[ 1.7960,  3.2997,  3.0115,  ...,  0.0958,  0.1076,  0.2133],
        [-0.5030,  0.9942, -0.0617,  ..., -0.0384, -0.0453, -0.0915],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 23.325615882873535 second(s)) :
loss = 0.18084008991718292
item_cnt = 9578 | predict_cnt = 2596 | true_predict_cnt = 2461
precision_rate = 0.9479969183359014 | recall_rate = 0.2569429943620798 | F1_measure = 0.40430425496960737
--------------------------------------------------------------------------------------------
epoch 32 for theta 2 (Used time = 376.7502248287201 second(s)) :
training loss = 0.12200324237346649
tensor([[ 1.7937,  3.3063,  3.0152,  ...,  0.0967,  0.1085,  0.2152],
        [-0.5022,  1.0054, -0.0520,  ..., -0.0387, -0.0456, -0.0923],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 22.565771102905273 second(s)) :
loss = 0.18022620677947998
item_cnt = 9578 | predict_cnt = 2599 | true_predict_cnt = 2464
precision_rate = 0.948056944978838 | recall_rate = 0.25725621215285027 | F1_measure = 0.4046973803071364
--------------------------------------------------------------------------------------------
epoch 33 for theta 2 (Used time = 375.8321444988251 second(s)) :
training loss = 0.12158133834600449
tensor([[ 1.7913,  3.3128,  3.0188,  ...,  0.0976,  0.1093,  0.2171],
        [-0.5015,  1.0165, -0.0423,  ..., -0.0391, -0.0460, -0.0930],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 22.918686866760254 second(s)) :
loss = 0.17961978912353516
item_cnt = 9578 | predict_cnt = 2605 | true_predict_cnt = 2470
precision_rate = 0.9481765834932822 | recall_rate = 0.2578826477343913 | F1_measure = 0.4054830501518509
--------------------------------------------------------------------------------------------
epoch 34 for theta 2 (Used time = 374.27904057502747 second(s)) :
training loss = 0.12108318507671356
tensor([[ 1.7889,  3.3193,  3.0224,  ...,  0.0984,  0.1102,  0.2190],
        [-0.5010,  1.0274, -0.0327,  ..., -0.0394, -0.0463, -0.0938],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 23.37457513809204 second(s)) :
loss = 0.17902801930904388
item_cnt = 9578 | predict_cnt = 2629 | true_predict_cnt = 2494
precision_rate = 0.9486496766831495 | recall_rate = 0.2603883900605554 | F1_measure = 0.40861800606209553
--------------------------------------------------------------------------------------------
epoch 35 for theta 2 (Used time = 385.6772015094757 second(s)) :
training loss = 0.12059421092271805
tensor([[ 1.7864,  3.3258,  3.0260,  ...,  0.0993,  0.1110,  0.2209],
        [-0.5006,  1.0382, -0.0232,  ..., -0.0397, -0.0467, -0.0946],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 24.16932225227356 second(s)) :
loss = 0.1784381866455078
item_cnt = 9578 | predict_cnt = 2631 | true_predict_cnt = 2496
precision_rate = 0.9486887115165337 | recall_rate = 0.2605972019210691 | F1_measure = 0.40887869604390203
--------------------------------------------------------------------------------------------
epoch 36 for theta 2 (Used time = 381.46160554885864 second(s)) :
training loss = 0.12031352519989014
tensor([[ 1.7840,  3.3322,  3.0296,  ...,  0.1001,  0.1118,  0.2227],
        [-0.5003,  1.0489, -0.0137,  ..., -0.0401, -0.0470, -0.0953],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 22.995059967041016 second(s)) :
loss = 0.1778925657272339
item_cnt = 9578 | predict_cnt = 2639 | true_predict_cnt = 2500
precision_rate = 0.9473285335354301 | recall_rate = 0.2610148256420965 | F1_measure = 0.40926577719571094
--------------------------------------------------------------------------------------------
epoch 37 for theta 2 (Used time = 383.1768295764923 second(s)) :
```

```
training loss = 0.11981122195720673
tensor([[ 1.7815,  3.3385,  3.0332,  ...,  0.1009,  0.1127,  0.2246],
        [-0.5001,  1.0594, -0.0043,  ..., -0.0404, -0.0473, -0.0961],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 24.52842426300049 second(s)) :
loss = 0.1773173213005066
item_cnt = 9578 | predict_cnt = 2655 | true_predict_cnt = 2516
precision_rate = 0.9476459510357815 | recall_rate = 0.2626853205262059 | F1_measure = 0.4113463582113954
------------------------------------------------------------------------------------------
epoch 38 for theta 2 (Used time = 375.509822845459 second(s)) :
training loss = 0.11936706304550171
tensor([[ 1.7790,  3.3449,  3.0368,  ...,  0.1018,  0.1135,  0.2264],
        [-0.5000,  1.0699,  0.0050,  ..., -0.0407, -0.0477, -0.0968],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 23.70564365386963 second(s)) :
loss = 0.17676205933094025
item_cnt = 9578 | predict_cnt = 2657 | true_predict_cnt = 2518
precision_rate = 0.9476853594279262 | recall_rate = 0.26289413238671955 | F1_measure = 0.411606048222313
------------------------------------------------------------------------------------------
epoch 39 for theta 2 (Used time = 377.0108184814453 second(s)) :
training loss = 0.11893097311258316
tensor([[ 1.7765,  3.3511,  3.0404,  ...,  0.1026,  0.1143,  0.2283],
        [-0.5000,  1.0801,  0.0142,  ..., -0.0411, -0.0480, -0.0976],
        [ 0.0000,  0.0000,  0.0000,  ...,  0.0000,  0.0000,  0.0000]],
       requires_grad=True)
Evaluation For theta 2 (Used time = 24.480374336242676 second(s)) :
loss = 0.17620398104190826
item_cnt = 9578 | predict_cnt = 2792 | true_predict_cnt = 2653
precision_rate = 0.9502148997134671 | recall_rate = 0.27698893297139277 | F1_measure = 0.42894098625707355
------------------------------------------------------------------------------------------
Want to continue? (y/n)
n
loss = 0.12796136736869812
loss = 0.12031760066747665
loss = 0.12199708074331284

进程已结束，退出代码0
```