**BCE LOSS:**

**# BASELINE - Next Item training**

Evaluation statistics when evaluating over all k-steps into the future:

Test:

NDCG@10 Test Average: 0.3638

HR@10 Test Average: 0.7205

Kendall's Tau Average: 0.1604

Evaluation statistics when evaluating for each k-step into the future:

NDCG@10 Test Average: 0.5556

HR@10 Test Average: 0.8164

Sequence\_Score@10 Test Average: 0.5278

HT\_Ordered@10 Test Average: 0.6721

Kendall's Tau Test Average: 0.1450

Position in future Test\_NDCG Test\_HR Test\_Sequence\_Score Test\_HT\_Ordered\_Score

1 0.6404 0.8827 0.6812 0.7820

2 0.6053 0.8562 0.6636 0.7599

3 0.5850 0.8410 0.6174 0.7292

4 0.5518 0.8132 0.5418 0.6775

5 0.5257 0.7898 0.4682 0.6290

6 0.4993 0.7750 0.4019 0.5885

7 0.4816 0.7566 0.3207 0.5387

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**# INDEPENDENT FEEDING SPLIT - Next Item training**

Evaluation statistics when evaluating over all k-steps into the future:

NDCG@10 Test Average: 0.3482

HR@10 Test Average: 0.6884

Kendall's Tau Average: 0.1156

Evaluation statistics when evaluating for each k-step into the future:

NDCG@10 Test Average: 0.5226

HR@10 Test Average: 0.7929

Sequence\_Score@10 Test Average: 0.5087

HT\_Ordered@10 Test Average: 0.6508

Kendall's Tau Average: 0.1061

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_Score

1 0.5852 0.8439 0.6193 0.7316

2 0.5641 0.8269 0.6276 0.7273

3 0.5416 0.8150 0.5963 0.7056

4 0.5213 0.7900 0.5317 0.6609

5 0.4999 0.7746 0.4677 0.6211

6 0.4807 0.7553 0.3969 0.5761

7 0.4657 0.7448 0.3218 0.5333

Execution time: 0.08261990547180176 seconds

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**# TEACHER FORCING FEEDING SPLIT - Next Item training**

Evaluation statistics when evaluating for each k-step into the future: - EPOCH 80

NDCG@10 Test Average: 0.5582

HR@10 Test Average: 0.8193

Sequence\_Score@10 Test Average: 0.5313

HT\_Ordered@10 Test Average: 0.6753

Kendall's Tau Test Average: 0.1467

NDCG@10 Valid Average: 0.5671

HR@10 Valid Average: 0.8277

Sequence\_Score@10 Valid Average: 0.5342

HT\_Ordered@10 Valid Average: 0.6810

Kendall's Tau Valid Average: 0.1342

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6435 0.8843 0.6874 0.7858 0.6423 0.8816 0.6861 0.7839

2 0.6090 0.8591 0.6644 0.7617 0.6151 0.8669 0.6719 0.7694

3 0.5881 0.8465 0.6214 0.7340 0.5898 0.8506 0.6225 0.7366

4 0.5549 0.8152 0.5488 0.6820 0.5697 0.8356 0.5592 0.6974

5 0.5263 0.7917 0.4707 0.6312 0.5403 0.8041 0.4794 0.6418

6 0.5031 0.7787 0.4029 0.5908 0.5215 0.7881 0.3969 0.5925

7 0.4826 0.7596 0.3238 0.5417 0.4907 0.7672 0.3234 0.5453

**# ALL ACTION**

Evaluation statistics when evaluating over all k-steps into the future:

NDCG@10 Test Average: 0.2891

HR@10 Test Average: 0.5654

Kendall's Tau Average: 0.0914

Evaluation statistics when evaluating for each k-step into the future:

NDCG@10 Test Average: 0.4101

HR@10 Test Average: 0.6576

Sequence\_Score@10 Test Average: 0.4160

HT\_Ordered@10 Test Average: 0.5368

Kendall's Tau Average: 0.0917

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_Score

1 0.4658 0.7136 0.4846 0.5991

2 0.4499 0.6921 0.4932 0.5926

3 0.4289 0.6740 0.4760 0.5750

4 0.4102 0.6638 0.4428 0.5533

5 0.3818 0.6354 0.3939 0.5146

6 0.3751 0.6159 0.3353 0.4756

7 0.3589 0.6085 0.2863 0.4474

16 SAMPLES ALL ACTION

NDCG@10 Test Average: 0.4267

HR@10 Test Average: 0.6827

Sequence\_Score@10 Test Average: 0.4303

HT\_Ordered@10 Test Average: 0.5565

Kendall's Tau Test Average: 0.0857

**# DENSE ALL ACTION**

Evaluation statistics when evaluating over all k-steps into the future:

NDCG@10 Test Average: 0.2110

HR@10 Test Average: 0.4328

Kendall's Tau Average: 0.0528

Evaluation statistics when evaluating for each k-step into the future:

NDCG@10 Test Average: 0.2853

HR@10 Test Average: 0.5184

Sequence\_Score@10 Test Average: 0.3166

HT\_Ordered@10 Test Average: 0.4175

Kendall's Tau Test Average: 0.0492

Position in future Test\_NDCG Test\_HR Test\_Sequence\_Score Test\_HT\_Ordered\_Score

1 0.3044 0.5390 0.2988 0.4189 0.3532

2 0.3063 0.5422 0.3368 0.4395 0.3436

3 0.2933 0.5301 0.3567 0.4434 0.3357

4 0.2823 0.5199 0.3443 0.4321 0.3316

5 0.2761 0.5051 0.3236 0.4143 0.3254

6 0.2704 0.5008 0.2967 0.3987 0.3160

7 0.2644 0.4919 0.2596 0.3757 0.3000

**# SUPER DENSE ALL ACTION**

Evaluation statistics when evaluating for each k-step into the future: - EPOCH 80

NDCG@10 Test Average: 0.2961

HR@10 Test Average: 0.5397

Sequence\_Score@10 Test Average: 0.3254

HT\_Ordered@10 Test Average: 0.4326

Kendall's Tau Test Average: 0.0434

NDCG@10 Valid Average: 0.3212

HR@10 Valid Average: 0.5805

Sequence\_Score@10 Valid Average: 0.3542

HT\_Ordered@10 Valid Average: 0.4674

Kendall's Tau Valid Average: 0.0407

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.3136 0.5635 0.3041 0.4338 0.3379 0.6083 0.3369 0.4726

2 0.3117 0.5633 0.3489 0.4561 0.3306 0.5863 0.3687 0.4775

3 0.3062 0.5553 0.3633 0.4593 0.3258 0.5816 0.3884 0.4850

4 0.2917 0.5336 0.3552 0.4444 0.3270 0.5849 0.3858 0.4854

5 0.2814 0.5244 0.3371 0.4307 0.3145 0.5683 0.3622 0.4652

6 0.2891 0.5216 0.3013 0.4115 0.3130 0.5765 0.3426 0.4595

7 0.2793 0.5164 0.2679 0.3921 0.2998 0.5577 0.2948 0.4262

**SAMPLED SOFTMAX LOSS**

**BASELINE**

Evaluation statistics when evaluating for each k-step into the future:

NDCG@10 Test Average: 0.5557

HR@10 Test Average: 0.8055

Sequence\_Score@10 Test Average: 0.5211

HT\_Ordered@10 Test Average: 0.6633

Kendall's Tau Test Average: 0.1520

NDCG@10 Valid Average: 0.5646

HR@10 Valid Average: 0.8154

Sequence\_Score@10 Valid Average: 0.5252

HT\_Ordered@10 Valid Average: 0.6703

Kendall's Tau Valid Average: 0.1311

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6424 0.8734 0.6834 0.7784 0.6434 0.8767 0.6797 0.7782

2 0.6162 0.8536 0.6633 0.7585 0.6126 0.8471 0.6646 0.7558

3 0.5845 0.8254 0.6042 0.7148 0.5854 0.8362 0.6160 0.7261

4 0.5495 0.8052 0.5374 0.6713 0.5682 0.8223 0.5461 0.6842

5 0.5214 0.7768 0.4617 0.6192 0.5354 0.7922 0.4664 0.6293

6 0.4953 0.7620 0.3920 0.5770 0.5210 0.7789 0.3912 0.5850

7 0.4807 0.7422 0.3060 0.5241 0.4864 0.7547 0.3122 0.5334

**# INDEPENDENT FEEDING SPLIT - Next Item training**

Evaluation statistics when evaluating for each k-step into the future: - EPOCH 100

NDCG@10 Test Average: 0.5609

HR@10 Test Average: 0.8115

Sequence\_Score@10 Test Average: 0.5234

HT\_Ordered@10 Test Average: 0.6675

Kendall's Tau Test Average: 0.1356

NDCG@10 Valid Average: 0.5668

HR@10 Valid Average: 0.8178

Sequence\_Score@10 Valid Average: 0.5227

HT\_Ordered@10 Valid Average: 0.6702

Kendall's Tau Valid Average: 0.1094

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6418 0.8712 0.6814 0.7763 0.6374 0.8647 0.6763 0.7705

2 0.6094 0.8478 0.6569 0.7523 0.6059 0.8490 0.6574 0.7532

3 0.5896 0.8339 0.6141 0.7240 0.5847 0.8419 0.6129 0.7274

4 0.5552 0.8106 0.5433 0.6770 0.5694 0.8261 0.5500 0.6881

5 0.5297 0.7846 0.4624 0.6235 0.5391 0.7935 0.4653 0.6294

6 0.5105 0.7731 0.3904 0.5817 0.5297 0.7916 0.3974 0.5945

7 0.4902 0.7596 0.3153 0.5374 0.5015 0.7574 0.2998 0.5286

**# TEACHER FORCING FEEDING SPLIT - Next Item training**

Evaluation statistics when evaluating for each k-step into the future: - EPOCH 100

NDCG@10 Test Average: 0.5660

HR@10 Test Average: 0.8161

Sequence\_Score@10 Test Average: 0.5272

HT\_Ordered@10 Test Average: 0.6717

Kendall's Tau Test Average: 0.1509

NDCG@10 Valid Average: 0.5767

HR@10 Valid Average: 0.8249

Sequence\_Score@10 Valid Average: 0.5325

HT\_Ordered@10 Valid Average: 0.6787

Kendall's Tau Valid Average: 0.1321

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.6502 0.8819 0.6906 0.7862 0.6575 0.8810 0.7007 0.7908

2 0.6177 0.8532 0.6638 0.7585 0.6208 0.8620 0.6768 0.7694

3 0.5990 0.8436 0.6176 0.7306 0.5978 0.8443 0.6217 0.7330

4 0.5640 0.8172 0.5467 0.6819 0.5800 0.8256 0.5500 0.6878

5 0.5351 0.7887 0.4652 0.6270 0.5488 0.8022 0.4723 0.6372

6 0.5103 0.7735 0.3929 0.5832 0.5285 0.7911 0.3948 0.5929

7 0.4859 0.7548 0.3137 0.5343 0.5038 0.7680 0.3113 0.5396

**# ALL ACTION**

Evaluation statistics when evaluating for each k-step into the future:

NDCG@10 Test Average: 0.4256

HR@10 Test Average: 0.6833

Sequence\_Score@10 Test Average: 0.4319

HT\_Ordered@10 Test Average: 0.5576

Kendall's Tau Test Average: 0.0888

NDCG@10 Valid Average: 0.4494

HR@10 Valid Average: 0.7138

Sequence\_Score@10 Valid Average: 0.4501

HT\_Ordered@10 Valid Average: 0.5820

Kendall's Tau Valid Average: 0.0781

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.4737 0.7370 0.4879 0.6125 0.5023 0.7653 0.5260 0.6456

2 0.4650 0.7170 0.5142 0.6156 0.4720 0.7316 0.5245 0.6281

3 0.4393 0.7021 0.4927 0.5974 0.4585 0.7202 0.5101 0.6151

4 0.4268 0.6814 0.4590 0.5702 0.4525 0.7210 0.4793 0.6002

5 0.4093 0.6667 0.4138 0.5402 0.4311 0.7020 0.4333 0.5676

6 0.3907 0.6439 0.3541 0.4990 0.4317 0.6960 0.3732 0.5346

7 0.3743 0.6350 0.3018 0.4684 0.3976 0.6604 0.3046 0.4825

16 SAMPLES ALL ACTION

NDCG@10 Test Average: 0.4329

HR@10 Test Average: 0.6908

Sequence\_Score@10 Test Average: 0.4349

HT\_Ordered@10 Test Average: 0.5628

Kendall's Tau Test Average: 0.0895

**# DENSE ALL ACTION**

Evaluation statistics when evaluating for each k-step into the future: - 40 EPOCHS

NDCG@10 Test Average: 0.3077

HR@10 Test Average: 0.5478

Sequence\_Score@10 Test Average: 0.3337

HT\_Ordered@10 Test Average: 0.4408

Kendall's Tau Test Average: 0.0466

NDCG@10 Valid Average: 0.3315

HR@10 Valid Average: 0.5841

Sequence\_Score@10 Valid Average: 0.3554

HT\_Ordered@10 Valid Average: 0.4697

Kendall's Tau Valid Average: 0.0408

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.3253 0.5681 0.3204 0.4443 0.3511 0.6131 0.3533 0.4832

2 0.3234 0.5689 0.3643 0.4666 0.3439 0.6028 0.3852 0.4940

3 0.3179 0.5613 0.3725 0.4669 0.3352 0.5941 0.3950 0.4946

4 0.3055 0.5451 0.3600 0.4525 0.3356 0.5909 0.3907 0.4908

5 0.2988 0.5377 0.3427 0.4402 0.3240 0.5686 0.3585 0.4635

6 0.2944 0.5286 0.3068 0.4177 0.3218 0.5640 0.3220 0.4430

7 0.2888 0.5249 0.2694 0.3971 0.3091 0.5550 0.2832 0.4191

**# SUPER DENSE ALL ACTION**

Evaluation statistics when evaluating for each k-step into the future: - EPOCH 60

NDCG@10 Test Average: 0.3055

HR@10 Test Average: 0.5468

Sequence\_Score@10 Test Average: 0.3332

HT\_Ordered@10 Test Average: 0.4400

Kendall's Tau Test Average: 0.0486

NDCG@10 Valid Average: 0.3320

HR@10 Valid Average: 0.5849

Sequence\_Score@10 Valid Average: 0.3562

HT\_Ordered@10 Valid Average: 0.4706

Kendall's Tau Valid Average: 0.0428

Position in futureTest\_NDCG Test\_HR Test\_Sequence\_ScoreTest\_HT\_Ordered\_ScoreValid\_NDCGValid\_HR Valid\_Sequence\_ScoreValid\_HT\_Ordered\_Score

1 0.3215 0.5653 0.3182 0.4417 0.3499 0.6072 0.3474 0.4773

2 0.3225 0.5687 0.3619 0.4653 0.3474 0.5985 0.3844 0.4915

3 0.3151 0.5581 0.3713 0.4647 0.3376 0.5982 0.3942 0.4962

4 0.3035 0.5470 0.3599 0.4535 0.3376 0.5911 0.3920 0.4916

5 0.2978 0.5368 0.3449 0.4409 0.3242 0.5740 0.3612 0.4676

6 0.2927 0.5264 0.3049 0.4156 0.3205 0.5735 0.3329 0.4532

7 0.2857 0.5253 0.2710 0.3982 0.3069 0.5520 0.2815 0.4168