# LSTM+FC

## 6k+3k

batch\_size=10，timestep=15。测试集得分远低于训练集得分。训练效果一般。

iter: 0 loss\_train: 0.0454625494157 loss\_test: 0.0529127721985 1535451811.9509661

iter: 10 loss\_train: 0.0220189064741 loss\_test: 0.0260856099427 1535451819.9974477

iter: 20 loss\_train: 0.0200393390221 loss\_test: 0.0238025011495 1535451828.0289695

iter: 30 loss\_train: 0.0186725622664 loss\_test: 0.0222717368975 1535451836.0555048

iter: 40 loss\_train: 0.0174810236009 loss\_test: 0.0211663651591 1535451844.0810435

iter: 50 loss\_train: 0.0164355211115 loss\_test: 0.0202268248424 1535451852.0966077

iter: 60 loss\_train: 0.0154653628512 loss\_test: 0.0193612252052 1535451860.1261356

iter: 70 loss\_train: 0.0147408266086 loss\_test: 0.0185684837401 1535451868.114772

iter: 80 loss\_train: 0.014252310805 loss\_test: 0.0180218377461 1535451876.109393

iter: 90 loss\_train: 0.0139072972971 loss\_test: 0.0175347082938 1535451884.1139865

iter: 100 loss\_train: 0.0134654213519 loss\_test: 0.0171955769882 1535451892.146506

iter: 110 loss\_train: 0.0130962544742 loss\_test: 0.0169746202727 1535451900.174039

iter: 120 loss\_train: 0.01272651831 loss\_test: 0.0167004556085 1535451908.1786332

iter: 130 loss\_train: 0.0128037705241 loss\_test: 0.0167069476098 1535451916.1912053

iter: 140 loss\_train: 0.0122203565513 loss\_test: 0.0166362075756 1535451924.1987915

iter: 150 loss\_train: 0.0119557007061 loss\_test: 0.0161986526412 1535451932.1844368

iter: 160 loss\_train: 0.0117128052749 loss\_test: 0.0159886200291 1535451940.1780596

iter: 170 loss\_train: 0.0117954846472 loss\_test: 0.0156764547961 1535451948.1796618

iter: 180 loss\_train: 0.0114440588281 loss\_test: 0.0157824892551 1535451956.280997

iter: 190 loss\_train: 0.0112401279776 loss\_test: 0.0158115376718 1535451964.5219593

iter: 200 loss\_train: 0.0111082906835 loss\_test: 0.0156691403749 1535451972.6452363

iter: 210 loss\_train: 0.0109777081603 loss\_test: 0.0158870775873 1535451980.670774

iter: 220 loss\_train: 0.0109692744445 loss\_test: 0.0157578921256 1535451988.64844

iter: 230 loss\_train: 0.0109197838077 loss\_test: 0.0155149473498 1535451996.752767

iter: 240 loss\_train: 0.0108416687542 loss\_test: 0.0152811287902 1535452005.024647

iter: 250 loss\_train: 0.0110183297656 loss\_test: 0.0152056739355 1535452013.0850916

iter: 260 loss\_train: 0.0105890274824 loss\_test: 0.0154423399828 1535452021.1335678

iter: 270 loss\_train: 0.0105717395277 loss\_test: 0.0156618298963 1535452029.2797832

iter: 280 loss\_train: 0.0104536238437 loss\_test: 0.0152250951156 1535452037.6025267

iter: 290 loss\_train: 0.0102907513889 loss\_test: 0.0153880387234 1535452045.8953495

iter: 300 loss\_train: 0.0102743329636 loss\_test: 0.0155640612977 1535452053.997682

iter: 310 loss\_train: 0.0102143497982 loss\_test: 0.0152980304634 1535452090.1267633

iter: 320 loss\_train: 0.0101643807876 loss\_test: 0.0149283196156 1535452098.1134052

iter: 330 loss\_train: 0.0101491085719 loss\_test: 0.0156732733361 1535452106.187812

iter: 340 loss\_train: 0.0100153082206 loss\_test: 0.0151745928141 1535452114.1774464

iter: 350 loss\_train: 0.0101264773247 loss\_test: 0.0148157291114 1535452122.1979978

iter: 360 loss\_train: 0.0099821403157 loss\_test: 0.0151986363033 1535452130.3731356

iter: 370 loss\_train: 0.00981442852256 loss\_test: 0.014991334981 1535452138.5921564

iter: 380 loss\_train: 0.00978353304478 loss\_test: 0.0149913968208 1535452146.8560574

iter: 390 loss\_train: 0.00990585684776 loss\_test: 0.0151448009846 1535452154.9643736

rmse: [0.0022435445382629655, 0.007792469672526561, 0.028891882115555437, 0.025080977954158798, 0.02860383281483354, 0.05979182454515993, 0.06563228841547904, 0.03148246656528919, 0.05372311584010409, 0.010165455551124742, 0.024029895938795988, 0.37216317322021003, 0.5277415210446038, 0.6493167894835618, 0.4880018985334852, 0.8872174210817851, 0.07202188751092675, 0.04353294355876012, 0.047921134668560045, 0.06626450648696633, 0.09377668099282314, 0.14755446625360596, 0.042014898388530356, 0.10360608421706902, 0.08846553424298045, 0.12837469672222754, 0.22620773890085802, 0.07483662561473953, 0.27772623390199486, 0.0826152687202335, 0.055902791583618404, 0.03373771897306226, 0.11690348905819044, 0.22522386855309479, 0.1290829800261925, 0.08279528387346757, 0.20239064838675508, 0.1275058264099615, 0.04729342797522072, 0.3459794338631076, 0.017209968818828438, 0.9061609676021792, 1.0099974161143932, 0.5386803902839653, 0.07743461028402539, 0.9048652480849549, 0.5154212688561195, 0.08285836598367376, 0.2267163724645475, 0.5042050365974103, 1.4041080207966743, 0.7702946440496229, 0.5465977352188034, 0.16038831114989066, 0.1883235444730589, 0.19953979929632634]

## 60k+30k

batch\_size=1000，timestep=15。测试集与训练集得分非常相近。训练效果较好。

iter: 0 loss\_train: 0.0456599315008 loss\_test: 0.050075248753 1535450614.2562435

iter: 10 loss\_train: 0.0185018292007 loss\_test: 0.0194468560318 1535450628.7454927

iter: 20 loss\_train: 0.0171694656679 loss\_test: 0.018059134235 1535450643.4511704

iter: 30 loss\_train: 0.0162395610319 loss\_test: 0.0171776882683 1535450657.830697

iter: 40 loss\_train: 0.0154988623535 loss\_test: 0.0164820378025 1535450672.2312071

iter: 50 loss\_train: 0.0148218401242 loss\_test: 0.015746047503 1535450686.7523718

iter: 60 loss\_train: 0.0145074063912 loss\_test: 0.015258897158 1535450701.1179383

iter: 70 loss\_train: 0.0141052911834 loss\_test: 0.0147320525721 1535450715.4426317

iter: 80 loss\_train: 0.0135274573074 loss\_test: 0.0141611228076 1535450729.6675904

iter: 90 loss\_train: 0.0130624531458 loss\_test: 0.013827157331 1535450744.0182133

iter: 100 loss\_train: 0.0122152160077 loss\_test: 0.0130396381331 1535450759.6105177

iter: 110 loss\_train: 0.0118458914571 loss\_test: 0.0126596295585 1535450773.8514333

iter: 120 loss\_train: 0.0114058811838 loss\_test: 0.0122668635721 1535450788.8505287

iter: 130 loss\_train: 0.0112428271212 loss\_test: 0.0120660335136 1535450803.0445714

iter: 140 loss\_train: 0.0110178361026 loss\_test: 0.0114487891085 1535450817.5268426

iter: 150 loss\_train: 0.0110172483294 loss\_test: 0.0114271918312 1535450831.769755

iter: 160 loss\_train: 0.0106955758917 loss\_test: 0.0112789125492 1535450846.022805

iter: 170 loss\_train: 0.0102759907488 loss\_test: 0.0109185785676 1535450860.820234

iter: 180 loss\_train: 0.0103734927097 loss\_test: 0.0110547869156 1535450875.074115

iter: 190 loss\_train: 0.0106003232921 loss\_test: 0.0112873337852 1535450889.3868392

iter: 200 loss\_train: 0.0102651018184 loss\_test: 0.0112099656525 1535450903.5948446

iter: 210 loss\_train: 0.0103372476995 loss\_test: 0.0113011652914 1535450917.8611734

iter: 220 loss\_train: 0.0101420740752 loss\_test: 0.0112904532502 1535450932.2147894

iter: 230 loss\_train: 0.00982254296541 loss\_test: 0.0110869166441 1535450946.427791

iter: 240 loss\_train: 0.00955716895405 loss\_test: 0.010830362017 1535450960.6936307

iter: 250 loss\_train: 0.00953135861394 loss\_test: 0.0107504569615 1535450974.97145

iter: 260 loss\_train: 0.0094089879732 loss\_test: 0.0107387636478 1535450989.318084

iter: 270 loss\_train: 0.00922128673022 loss\_test: 0.0105314401599 1535451003.6866798

iter: 280 loss\_train: 0.00927777731946 loss\_test: 0.0105521365379 1535451017.896658

iter: 290 loss\_train: 0.00895397020504 loss\_test: 0.0102137464099 1535451032.215367

iter: 300 loss\_train: 0.00925800687789 loss\_test: 0.0100868260798 1535451046.439349

iter: 310 loss\_train: 0.00925850180599 loss\_test: 0.0100047100335 1535451060.6523397

iter: 320 loss\_train: 0.00917314573502 loss\_test: 0.00998904018973 1535451075.140595

iter: 330 loss\_train: 0.00915818088688 loss\_test: 0.0100472879906 1535451089.48721

iter: 340 loss\_train: 0.00874623593409 loss\_test: 0.00945922366033 1535451103.6846123

iter: 350 loss\_train: 0.00886090012888 loss\_test: 0.00952461430182 1535451118.0212715

iter: 360 loss\_train: 0.00894642622831 loss\_test: 0.00962163253377 1535451132.3928206

iter: 370 loss\_train: 0.00846171106678 loss\_test: 0.00916002209609 1535451146.5489635

iter: 380 loss\_train: 0.00852997988307 loss\_test: 0.00911336926123 1535451160.842738

iter: 390 loss\_train: 0.00847400872347 loss\_test: 0.00936323019365 1535451175.3430905

rmse: [0.00165418600383222, 0.006143186145242677, 0.03136218072024079, 0.024269390237469525, 0.0272054980027433, 0.06033091792323781, 0.07257875097862168, 0.03586247662077212, 0.04407139577985861, 0.010368977614017446, 0.025971025191574366, 0.4328583893386473, 0.3409710323112661, 0.34751119151519744, 0.3730912939466939, 0.3980562105907638, 0.06123438938562185, 0.04673590767849723, 0.04803081902491846, 0.06698862405875886, 0.08410809598157513, 0.22423800229347804, 0.03927743729103354, 0.11310700451624332, 0.08773366161389955, 0.12270594615412497, 0.1855721651381469, 0.07471064055584135, 0.19001343057552889, 0.12640234036352432, 0.06881572394109119, 0.05459837769947476, 0.134785475465618, 0.18345482887507916, 0.20994610184167314, 0.09581628117003352, 0.15244554297729895, 0.14285571361680885, 0.05583156072403909, 0.5280803936570343, 0.02020386662064576, 0.6881106742531407, 1.0939473196566485, 0.6969157855589628, 0.08206257239528694, 0.7927937539900984, 0.8010156011479077, 0.08280069377373736, 0.26192380049873004, 0.5586214022090974, 1.405145591972503, 0.8455392554488929, 0.5129638342629642, 0.22013795086424598, 0.23224251185879402, 0.2186382063819273]

## 360k+90k

batch\_size=10000，timestep=15。训练集和测试集得分相差不大不小。训练效果好。

iter: 0 loss\_train: 0.0781507976353 loss\_test: 0.0821069536938 time: 1535453763.6999626

iter: 10 loss\_train: 0.014095723034 loss\_test: 0.0186745764481 time: 1535453809.0267222

iter: 20 loss\_train: 0.0128779420112 loss\_test: 0.0171813259108 time: 1535453853.9695675

iter: 30 loss\_train: 0.0119448371439 loss\_test: 0.0157196141986 time: 1535453898.9492507

iter: 40 loss\_train: 0.0116576684587 loss\_test: 0.0152574745524 time: 1535453943.9389389

iter: 50 loss\_train: 0.0112918903016 loss\_test: 0.0149945615687 time: 1535453988.9047232

iter: 60 loss\_train: 0.0113951603934 loss\_test: 0.0150793699755 time: 1535454034.1586742

iter: 70 loss\_train: 0.0105130360979 loss\_test: 0.0139070486443 time: 1535454079.4775126

iter: 80 loss\_train: 0.0105726344563 loss\_test: 0.0137452280356 time: 1535454124.6916003

iter: 90 loss\_train: 0.0102496218816 loss\_test: 0.0137072136212 time: 1535454169.656356

iter: 100 loss\_train: 0.00997420666843 loss\_test: 0.0133382011619 time: 1535454214.5662572

iter: 110 loss\_train: 0.00973521563638 loss\_test: 0.0138047071588 time: 1535454259.4601696

iter: 120 loss\_train: 0.0100748630292 loss\_test: 0.0137413920214 time: 1535454304.4069724

iter: 130 loss\_train: 0.00953633190754 loss\_test: 0.0133095021463 time: 1535454349.3617864

iter: 140 loss\_train: 0.00945954868156 loss\_test: 0.0135548840173 time: 1535454394.3375142

iter: 150 loss\_train: 0.00921291759652 loss\_test: 0.0133372824639 time: 1535454439.2942882

iter: 160 loss\_train: 0.00893217704207 loss\_test: 0.0126698514861 time: 1535454484.2390637

iter: 170 loss\_train: 0.00887390136874 loss\_test: 0.012658193397 time: 1535454529.2117975

iter: 180 loss\_train: 0.00867947584225 loss\_test: 0.0128053763053 time: 1535454574.154646

iter: 190 loss\_train: 0.0083177119183 loss\_test: 0.0120860860787 time: 1535454619.092438

iter: 200 loss\_train: 0.00920514832251 loss\_test: 0.0120947623832 time: 1535454664.055231

iter: 210 loss\_train: 0.00850016248619 loss\_test: 0.0124703722282 time: 1535454709.0060232

iter: 220 loss\_train: 0.00869357351783 loss\_test: 0.0127719399623 time: 1535454753.9557853

iter: 230 loss\_train: 0.00806296880667 loss\_test: 0.0110674906108 time: 1535454798.9215384

iter: 240 loss\_train: 0.007559940801 loss\_test: 0.0107464884511 time: 1535454843.8743246

iter: 250 loss\_train: 0.00765381754738 loss\_test: 0.0106169432402 time: 1535454888.8321297

iter: 260 loss\_train: 0.0076896524212 loss\_test: 0.0104149274735 time: 1535454933.786912

iter: 270 loss\_train: 0.00828162014174 loss\_test: 0.0121691707108 time: 1535454978.7665944

iter: 280 loss\_train: 0.00772574109336 loss\_test: 0.0114655557813 time: 1535455023.733375

iter: 290 loss\_train: 0.00725252860381 loss\_test: 0.0108170887041 time: 1535455068.7120614

iter: 300 loss\_train: 0.00726944429334 loss\_test: 0.010788665774 time: 1535455113.6678405

iter: 310 loss\_train: 0.00724671090332 loss\_test: 0.0107472650707 time: 1535455158.6396084

iter: 320 loss\_train: 0.00785835741812 loss\_test: 0.0117845982313 time: 1535455203.6133075

iter: 330 loss\_train: 0.00716737104166 loss\_test: 0.0107708096297 time: 1535455248.554159

iter: 340 loss\_train: 0.0071703530848 loss\_test: 0.0101573984656 time: 1535455293.5348706

iter: 350 loss\_train: 0.00699504512724 loss\_test: 0.010166668954 time: 1535455338.4856632

iter: 360 loss\_train: 0.00713455706783 loss\_test: 0.0101637247329 time: 1535455383.4494214

iter: 370 loss\_train: 0.00697919498715 loss\_test: 0.00968536569013 time: 1535455428.3902395

iter: 380 loss\_train: 0.00703405348274 loss\_test: 0.0106621765428 time: 1535455473.331026

iter: 390 loss\_train: 0.00714208093834 loss\_test: 0.0110602549588 time: 1535455518.2907953

rmse: [0.0044803492733182185, 0.006097186848253421, 0.03365275057691853, 0.02788646634206735, 0.029443555674869334, 0.07386560681211551, 0.06616211452707058, 0.03770168155911194, 0.046255407796984, 0.011644942508482466, 0.036291082395319446, 0.40878079449180815, 0.4601613186049794, 0.377838215475245, 0.42275679297042446, 0.44126228335501716, 0.060604971106558526, 0.046813452438946135, 0.048940676547925874, 0.06326957737010667, 0.09409914014328948, 0.15247224068168738, 0.04322089562845242, 0.156669414695362, 0.0959137062782352, 0.14192665498280008, 0.1899262491893397, 0.07526574859504923, 0.18625367915777402, 0.09116229561200363, 0.11751021865538111, 0.059151223163602926, 0.15198549993136634, 0.17455556447197607, 0.15987244288487024, 0.16668395613612505, 0.14506024470216436, 0.2001821676451562, 0.051801996871328325, 0.4160356211407825, 0.03944615842086389, 0.7715574205081267, 1.2058358511861968, 0.8145859416075278, 0.0793663771465852, 0.9172408045373363, 1.037642861931574, 0.0890114288706993, 0.2374749421768305, 0.5446995745967611, 1.1470248952052824, 1.1415436791499973, 0.584869144400625, 0.18140125572565383, 0.22264110105120222, 0.18773774185171008]

# FC+LSTM+FC

## 60k+30k

Batch\_size=1000，timestep=15，训练集与测试集得分相近。训练效果较好。

iter: 0 loss\_train: 0.0880571875721 loss\_test: 0.0913159064949 time: 1535462715.7597628

iter: 10 loss\_train: 0.0174129289575 loss\_test: 0.0183551181729 time: 1535462730.932163

iter: 20 loss\_train: 0.016948707231 loss\_test: 0.0179606205473 time: 1535462746.20335

iter: 30 loss\_train: 0.016297021384 loss\_test: 0.0172114380946 time: 1535462761.3039422

iter: 40 loss\_train: 0.015910803418 loss\_test: 0.0167266995025 time: 1535462776.398576

iter: 50 loss\_train: 0.0151973465613 loss\_test: 0.016000556387 time: 1535462791.565018

iter: 60 loss\_train: 0.014553450436 loss\_test: 0.0153968327368 time: 1535462806.7434468

iter: 70 loss\_train: 0.0141852075079 loss\_test: 0.0149562442675 time: 1535462822.022568

iter: 80 loss\_train: 0.0141343185368 loss\_test: 0.0147656708335 time: 1535462837.3226533

iter: 90 loss\_train: 0.0136048581762 loss\_test: 0.0143931672908 time: 1535462852.538962

iter: 100 loss\_train: 0.0130802877092 loss\_test: 0.0139833127459 time: 1535462867.8021448

iter: 110 loss\_train: 0.0126553877412 loss\_test: 0.013570781673 time: 1535462883.0414102

iter: 120 loss\_train: 0.0122981686145 loss\_test: 0.0132098190486 time: 1535462898.5180044

iter: 130 loss\_train: 0.0119648630265 loss\_test: 0.012834428375 time: 1535462913.753261

iter: 140 loss\_train: 0.0117331842581 loss\_test: 0.0126099955911 time: 1535462929.2199

iter: 150 loss\_train: 0.0116710254767 loss\_test: 0.0125489127512 time: 1535462944.4212484

iter: 160 loss\_train: 0.0115285093741 loss\_test: 0.0124787484606 time: 1535462959.8489923

iter: 170 loss\_train: 0.0112874320398 loss\_test: 0.0121147245169 time: 1535462975.1410975

iter: 180 loss\_train: 0.0107335310119 loss\_test: 0.0117606289995 time: 1535462990.308537

iter: 190 loss\_train: 0.0106279076698 loss\_test: 0.0116360211124 time: 1535463005.6953895

iter: 200 loss\_train: 0.0104461667904 loss\_test: 0.0115413087731 time: 1535463021.1839874

iter: 210 loss\_train: 0.0102260785953 loss\_test: 0.0114671736956 time: 1535463036.5468862

iter: 220 loss\_train: 0.0100066141381 loss\_test: 0.0112216717564 time: 1535463052.018511

iter: 230 loss\_train: 0.00991527258108 loss\_test: 0.0110303817006 time: 1535463067.4622126

iter: 240 loss\_train: 0.00977217061445 loss\_test: 0.0108853285511 time: 1535463082.957774

iter: 250 loss\_train: 0.00953237507492 loss\_test: 0.0107516206801 time: 1535463098.3236814

iter: 260 loss\_train: 0.00942903684142 loss\_test: 0.010587169944 time: 1535463114.0815413

iter: 270 loss\_train: 0.00946389683522 loss\_test: 0.0104149914036 time: 1535463129.2968526

iter: 280 loss\_train: 0.00912536432346 loss\_test: 0.0103723027743 time: 1535463144.5530736

iter: 290 loss\_train: 0.00895815695015 loss\_test: 0.010154507154 time: 1535463159.8730862

iter: 300 loss\_train: 0.00900079053827 loss\_test: 0.0103225947979 time: 1535463174.999634

iter: 310 loss\_train: 0.00879457824243 loss\_test: 0.0101676738821 time: 1535463190.2159426

iter: 320 loss\_train: 0.00872285764975 loss\_test: 0.00992829777921 time: 1535463205.334513

iter: 330 loss\_train: 0.00864177021819 loss\_test: 0.00986035022264 time: 1535463220.5378551

iter: 340 loss\_train: 0.00859896258917 loss\_test: 0.00998962443943 time: 1535463235.851935

iter: 350 loss\_train: 0.00847522322244 loss\_test: 0.00989914815873 time: 1535463251.1789153

iter: 360 loss\_train: 0.00855001607755 loss\_test: 0.00985905397683 time: 1535463266.5408335

iter: 370 loss\_train: 0.00850282131384 loss\_test: 0.00987043548375 time: 1535463281.8967853

iter: 380 loss\_train: 0.0085105980436 loss\_test: 0.00997035282974 time: 1535463297.2217872

iter: 390 loss\_train: 0.00847539602934 loss\_test: 0.00972081903989 time: 1535463312.3483355

rmse: [0.0018824665913214724, 0.006148305835185304, 0.03557550380416555, 0.02406151821329123, 0.028650215595252198, 0.06776261032632698, 0.07191382847870034, 0.03710614969933304, 0.05050690784777794, 0.015217472718832144, 0.030187148734302675, 0.4508495264939126, 0.371929320576564, 0.3882145989134724, 0.33052273226612555, 0.4236947580392688, 0.061480195900944654, 0.04560055815596984, 0.05286676930669185, 0.0666068251323643, 0.09296706032145162, 0.2531170323212159, 0.03893053874000056, 0.13549033928077298, 0.09901248885689418, 0.13211397065907762, 0.19528097550627196, 0.07722889613610602, 0.18228581717995476, 0.08343427008617205, 0.06845643953882746, 0.021292894673202247, 0.12842317522901125, 0.17032528044040213, 0.20770203234787682, 0.11425627706136629, 0.22248382745825251, 0.1615017234304554, 0.02830060791493036, 0.41350832767515266, 0.025086801947200987, 0.7771264874449625, 1.1672860307298005, 0.8555578632429444, 0.08428926411551275, 0.9781762086177953, 0.6482125420153764, 0.08910375512646203, 0.2569280446008448, 0.614538365356004, 0.8632559031190616, 0.7966403954794321, 0.5121455937998188, 0.16996582490034273, 0.21450765705352096, 0.18594754945622824]

## 360k+90k

batch\_size=10000，timestep=15。训练集和测试集得分差距大。训练效果较好。

iter: 0 loss\_train: 0.200133625004 loss\_test: 0.199671455555 time: 1535457942.8801134

iter: 10 loss\_train: 0.0135410638888 loss\_test: 0.0171759229981 time: 1535457975.9401202

iter: 20 loss\_train: 0.0131292829497 loss\_test: 0.0167487795568 time: 1535458009.1024806

iter: 30 loss\_train: 0.0130985862472 loss\_test: 0.0166766701473 time: 1535458042.156419

iter: 40 loss\_train: 0.0130973663698 loss\_test: 0.0166441028317 time: 1535458075.1043046

iter: 50 loss\_train: 0.0131092360243 loss\_test: 0.0166374171774 time: 1535458108.0374331

iter: 60 loss\_train: 0.0130716316505 loss\_test: 0.0166216167725 time: 1535458140.8954258

iter: 70 loss\_train: 0.0129622196675 loss\_test: 0.0165654964124 time: 1535458173.6555016

iter: 80 loss\_train: 0.0128870213197 loss\_test: 0.0165290516905 time: 1535458206.3938725

iter: 90 loss\_train: 0.0128101853706 loss\_test: 0.0164730086302 time: 1535458239.4769566

iter: 100 loss\_train: 0.0127285395025 loss\_test: 0.0164265939966 time: 1535458272.5562596

iter: 110 loss\_train: 0.0126587285971 loss\_test: 0.0164211947057 time: 1535458644.3763473

iter: 120 loss\_train: 0.0125554174495 loss\_test: 0.0163797204279 time: 1535458677.641169

iter: 130 loss\_train: 0.0123834138891 loss\_test: 0.0162859197913 time: 1535458710.5915208

iter: 140 loss\_train: 0.0121674675029 loss\_test: 0.0161040499806 time: 1535458743.6402655

iter: 150 loss\_train: 0.0120776818496 loss\_test: 0.0161252062147 time: 1535458776.5907943

iter: 160 loss\_train: 0.0116597264229 loss\_test: 0.015730330824 time: 1535458809.5865538

iter: 170 loss\_train: 0.0115662040965 loss\_test: 0.0156676085252 time: 1535458842.51989

iter: 180 loss\_train: 0.0114554491205 loss\_test: 0.0155720680745 time: 1535458875.5478563

iter: 190 loss\_train: 0.0113760643742 loss\_test: 0.0154767801157 time: 1535458908.6528459

iter: 200 loss\_train: 0.0112932304748 loss\_test: 0.0153744418381 time: 1535458941.9741313

iter: 210 loss\_train: 0.0112037139996 loss\_test: 0.0152586438797 time: 1535458975.123451

iter: 220 loss\_train: 0.0110722651912 loss\_test: 0.015079107446 time: 1535459008.777761

iter: 230 loss\_train: 0.0108718237736 loss\_test: 0.0148641803405 time: 1535459041.6282222

iter: 240 loss\_train: 0.0107125030158 loss\_test: 0.0146734733135 time: 1535459074.7001283

iter: 250 loss\_train: 0.010693372486 loss\_test: 0.0145478539376 time: 1535459109.2283115

iter: 260 loss\_train: 0.0104366030751 loss\_test: 0.0143084104897 time: 1535459143.5661576

iter: 270 loss\_train: 0.0102710567622 loss\_test: 0.0141359521076 time: 1535459176.7968035

iter: 280 loss\_train: 0.010238440966 loss\_test: 0.0141344851711 time: 1535459210.254619

iter: 290 loss\_train: 0.0101184042222 loss\_test: 0.0140066658043 time: 1535459244.5470297

iter: 300 loss\_train: 0.0100236992455 loss\_test: 0.0138755561784 time: 1535459277.339498

iter: 310 loss\_train: 0.00993996982773 loss\_test: 0.013813605946 time: 1535459310.0832543

iter: 320 loss\_train: 0.00991425877954 loss\_test: 0.0138205444026 time: 1535459341.9591534

iter: 330 loss\_train: 0.00989935112496 loss\_test: 0.013869424661 time: 1535459373.4180233

iter: 340 loss\_train: 0.00978274731379 loss\_test: 0.0136203870384 time: 1535459404.850966

iter: 350 loss\_train: 0.00969666666869 loss\_test: 0.0136550560387 time: 1535459436.2928834

iter: 360 loss\_train: 0.00968211221819 loss\_test: 0.0136091459749 time: 1535459467.8594723

iter: 370 loss\_train: 0.00960366815949 loss\_test: 0.0134976504164 time: 1535459499.3233259

iter: 380 loss\_train: 0.00955355927969 loss\_test: 0.0135692199692 time: 1535459530.7353263

iter: 390 loss\_train: 0.0095302292094 loss\_test: 0.0134627229224 time: 1535459562.1732533

rmse: [0.0037424583556819723, 0.006253945855715276, 0.052631929231366524, 0.03344658502863442, 0.04448245156574353, 0.08647677996754248, 0.08151082713430169, 0.060871708049481776, 0.08573083413009083, 0.019735663148058216, 0.045109442298897684, 0.4585994073926265, 0.6359894050571013, 0.5641431967378177, 0.43204704827206974, 0.46986702297602057, 0.07258391994732308, 0.049869999947173886, 0.0658417240614996, 0.06253197416981827, 0.13468440791072833, 0.1850691869253281, 0.055207712050739224, 0.2676472659812708, 0.12207563644441263, 0.16651836813048396, 0.20070747251274257, 0.0814101853418469, 0.19458134791141124, 0.09374495145245394, 0.09052092392292406, 0.01997600799601439, 0.15251386536590822, 0.178546013922618, 0.19564294252157743, 0.191169811347634, 0.17528881660368983, 0.18433719159789155, 0.024548491026711985, 0.42692012842278976, 0.044848156173991884, 1.194294072810425, 1.4222708565569606, 0.8652655540848418, 0.08854170286449987, 1.049270610498213, 1.2665505659145913, 0.09380100557069386, 0.23403466996534167, 0.6740438712117616, 1.6811315274216811, 1.3156118852371421, 0.6590766194647686, 0.22134475399686437, 0.2106272578485588, 0.21090696464477335]

# LSTM

## 60k+30k

Batch\_size=1000，timestep=15，训练集和测试集得分相近。训练效果好。

iter: 0 loss\_train: 0.0180818682381 loss\_test: 0.0194234518334 time: 1535459963.2082198

iter: 10 loss\_train: 0.0158035393183 loss\_test: 0.01679060782 time: 1535459976.8547258

iter: 20 loss\_train: 0.0143199513822 loss\_test: 0.0151759924057 time: 1535459990.8024268

iter: 30 loss\_train: 0.0131266045695 loss\_test: 0.0138783448686 time: 1535460004.3940814

iter: 40 loss\_train: 0.0123424810978 loss\_test: 0.0130279862011 time: 1535460018.478416

iter: 50 loss\_train: 0.0116004022149 loss\_test: 0.0122788141482 time: 1535460032.4111564

iter: 60 loss\_train: 0.0110748647557 loss\_test: 0.0117504393371 time: 1535460046.2471821

iter: 70 loss\_train: 0.0105396085884 loss\_test: 0.011176876196 time: 1535460060.2566922

iter: 80 loss\_train: 0.01009502979 loss\_test: 0.0106833140676 time: 1535460074.1864417

iter: 90 loss\_train: 0.00974343659667 loss\_test: 0.01036433621 time: 1535460088.0453792

iter: 100 loss\_train: 0.00950672581481 loss\_test: 0.0102438328788 time: 1535460101.8833733

iter: 110 loss\_train: 0.00940295706193 loss\_test: 0.0102245234263 time: 1535460115.8510213

iter: 120 loss\_train: 0.00902139017514 loss\_test: 0.00978420137738 time: 1535460129.8715272

iter: 130 loss\_train: 0.00879043682944 loss\_test: 0.00950115233039 time: 1535460143.95686

iter: 140 loss\_train: 0.00853115876671 loss\_test: 0.00922190143416 time: 1535460157.9574258

iter: 150 loss\_train: 0.00833040884075 loss\_test: 0.00897370238478 time: 1535460171.6752532

iter: 160 loss\_train: 0.0082031014453 loss\_test: 0.00881535997614 time: 1535460185.6359203

iter: 170 loss\_train: 0.00810020883412 loss\_test: 0.00877401670441 time: 1535460199.531759

iter: 180 loss\_train: 0.00798180708662 loss\_test: 0.00873932270333 time: 1535460213.4335828

iter: 190 loss\_train: 0.00790524581292 loss\_test: 0.00871737676983 time: 1535460227.260607

iter: 200 loss\_train: 0.00776432761922 loss\_test: 0.00854007822151 time: 1535460241.4147553

iter: 210 loss\_train: 0.00780402463861 loss\_test: 0.00848079432423 time: 1535460255.4582012

iter: 220 loss\_train: 0.00756428570021 loss\_test: 0.0083727885969 time: 1535460269.4657414

iter: 230 loss\_train: 0.00749624088251 loss\_test: 0.00834914141645 time: 1535460283.509186

iter: 240 loss\_train: 0.00743380878121 loss\_test: 0.00831676825571 time: 1535460297.4449193

iter: 250 loss\_train: 0.00735202359501 loss\_test: 0.00830298818958 time: 1535460311.316823

iter: 260 loss\_train: 0.00731231936564 loss\_test: 0.00828865493337 time: 1535460325.2814786

iter: 270 loss\_train: 0.00698716692471 loss\_test: 0.00805676328018 time: 1535460339.3528495

iter: 280 loss\_train: 0.00688754055494 loss\_test: 0.00805354914628 time: 1535460353.3374507

iter: 290 loss\_train: 0.00681928754784 loss\_test: 0.00799302593805 time: 1535460367.2213225

iter: 300 loss\_train: 0.00691636687455 loss\_test: 0.0081153778825 time: 1535460381.1191568

iter: 310 loss\_train: 0.00678821605785 loss\_test: 0.00792152963889 time: 1535460395.1286922

iter: 320 loss\_train: 0.00678093029807 loss\_test: 0.00803681410228 time: 1535460409.1821105

iter: 330 loss\_train: 0.00672039855272 loss\_test: 0.007962812266 time: 1535460423.1387877

iter: 340 loss\_train: 0.00672584435282 loss\_test: 0.00795724736527 time: 1535460437.1393468

iter: 350 loss\_train: 0.00669564219036 loss\_test: 0.00797220077366 time: 1535460451.2107172

iter: 360 loss\_train: 0.00676533714092 loss\_test: 0.0081470995831 time: 1535460465.0646691

iter: 370 loss\_train: 0.00648282389933 loss\_test: 0.00774207594804 time: 1535460479.0652285

iter: 380 loss\_train: 0.00649083543103 loss\_test: 0.00775270893549 time: 1535460493.0318792

iter: 390 loss\_train: 0.00647668331706 loss\_test: 0.00766442852716 time: 1535460506.6594362

rmse: [0.0015012818984673118, 0.006732864514644494, 0.029996727157157663, 0.01816504805001165, 0.02104561936343899, 0.05653206469176394, 0.06796877399906034, 0.030700852373352083, 0.04126288786475657, 0.008921755416046845, 0.02244013782673885, 0.23399189815638644, 0.734487953886966, 0.6931985836702029, 0.34978260118068266, 0.41323843080479167, 0.060979260162174295, 0.043541000885013954, 0.04545825591911303, 0.06752091693579267, 0.08045804213224488, 0.14358651134514505, 0.038510160524262184, 0.08875340854808017, 0.06681512125124678, 0.10437320347044281, 0.17071396481499773, 0.0779582739243891, 0.20175812096917706, 0.08081275455620758, 0.05905904083815392, 0.0130300600044364, 0.1162560534040407, 0.12957556580111848, 0.13512525628971148, 0.08106347436141796, 0.1272548642461077, 0.12399940264560612, 0.009879047034986784, 0.4061816475207814, 0.025815387959230957, 0.5892599306073181, 1.1766817882994838, 0.7034109565070351, 0.07831230709302446, 0.6649933744435524, 0.49729596359228617, 0.08037862180575651, 0.20060918024199642, 0.45972404526601673, 0.8657012608004104, 0.6353405504116628, 0.38639428316394464, 0.14855296598197798, 0.1865471561344026, 0.1801532500558423]

# FC+LSTM

## 60k+30k

batch\_size=1000，timestep=15，训练集与测试集得分相近。训练效果好。

iter: 0 loss\_train: 0.0231989215749 loss\_test: 0.024993465282 time: 1535461258.4170642

iter: 10 loss\_train: 0.0152863868823 loss\_test: 0.0161963027281 time: 1535461273.206514

iter: 20 loss\_train: 0.013775823017 loss\_test: 0.0146103701244 time: 1535461287.84038

iter: 30 loss\_train: 0.0125558489313 loss\_test: 0.013292842793 time: 1535461302.433355

iter: 40 loss\_train: 0.0116139519494 loss\_test: 0.0125929828423 time: 1535461317.2327788

iter: 50 loss\_train: 0.0112476043558 loss\_test: 0.0122642349452 time: 1535461331.9135194

iter: 60 loss\_train: 0.0108246813218 loss\_test: 0.0118728214875 time: 1535461346.4406707

iter: 70 loss\_train: 0.0103330424366 loss\_test: 0.0113955092616 time: 1535461361.213166

iter: 80 loss\_train: 0.0102646128119 loss\_test: 0.011367388318 time: 1535461376.065447

iter: 90 loss\_train: 0.00956895607524 loss\_test: 0.0109040343203 time: 1535461390.745204

iter: 100 loss\_train: 0.00948055718715 loss\_test: 0.0106624868078 time: 1535461405.5665555

iter: 110 loss\_train: 0.00917599448003 loss\_test: 0.0105096584496 time: 1535461420.2103949

iter: 120 loss\_train: 0.00873216238494 loss\_test: 0.0105577079269 time: 1535461434.8452585

iter: 130 loss\_train: 0.00885780928656 loss\_test: 0.0103668055808 time: 1535461449.7743347

iter: 140 loss\_train: 0.00845611917321 loss\_test: 0.0102132504806 time: 1535461464.5976942

iter: 150 loss\_train: 0.00835362805519 loss\_test: 0.00995960216969 time: 1535461479.5935917

iter: 160 loss\_train: 0.00821879570528 loss\_test: 0.010023654749 time: 1535461494.3072448

iter: 170 loss\_train: 0.00799577244713 loss\_test: 0.00979361459613 time: 1535461509.0677714

iter: 180 loss\_train: 0.00799037149021 loss\_test: 0.0095695007282 time: 1535461523.7455204

iter: 190 loss\_train: 0.00780253806928 loss\_test: 0.0095490003936 time: 1535461538.456181

iter: 200 loss\_train: 0.00765100018277 loss\_test: 0.00962201431394 time: 1535461553.2625868

iter: 210 loss\_train: 0.00749796819873 loss\_test: 0.00951631466548 time: 1535461568.1138706

iter: 220 loss\_train: 0.00769172713626 loss\_test: 0.00944833448157 time: 1535461582.9382267

iter: 230 loss\_train: 0.00713391199242 loss\_test: 0.0085789234067 time: 1535461597.721692

iter: 240 loss\_train: 0.00728221899675 loss\_test: 0.00907688308507 time: 1535461612.413404

iter: 250 loss\_train: 0.00709698133481 loss\_test: 0.00838961039359 time: 1535461627.180913

iter: 260 loss\_train: 0.0069213913288 loss\_test: 0.00838351420437 time: 1535461641.769899

iter: 270 loss\_train: 0.00670687556267 loss\_test: 0.00813152010863 time: 1535461656.4745748

iter: 280 loss\_train: 0.00658917957141 loss\_test: 0.00826703972804 time: 1535461671.1942112

iter: 290 loss\_train: 0.00654841071616 loss\_test: 0.00807109282662 time: 1535461686.0644457

iter: 300 loss\_train: 0.00668703445699 loss\_test: 0.00832147834202 time: 1535461700.8588822

iter: 310 loss\_train: 0.00662822149073 loss\_test: 0.00803277428883 time: 1535461715.6762576

iter: 320 loss\_train: 0.0064175370615 loss\_test: 0.0080860705891 time: 1535461730.3968918

iter: 330 loss\_train: 0.00648290621272 loss\_test: 0.00808572525469 time: 1535461745.1604111

iter: 340 loss\_train: 0.00643310513503 loss\_test: 0.00791455488652 time: 1535461759.9169488

iter: 350 loss\_train: 0.00641331253573 loss\_test: 0.00794877282654 time: 1535461774.5617855

iter: 360 loss\_train: 0.00638931748302 loss\_test: 0.00793341031919 time: 1535461789.362206

iter: 370 loss\_train: 0.00620959127167 loss\_test: 0.00769503077803 time: 1535461803.9860992

iter: 380 loss\_train: 0.00621169258375 loss\_test: 0.00773848130678 time: 1535461818.6558692

iter: 390 loss\_train: 0.00637266164801 loss\_test: 0.00763730594578 time: 1535461833.4303591

rmse: [0.0014318874867825762, 0.0056315664100512535, 0.034398593275341977, 0.019711284909011025, 0.026198767619650405, 0.05673843645901208, 0.06180995788415092, 0.03538351808391011, 0.05064847367156842, 0.011253859208724253, 0.03372702176241397, 0.279846214754506, 0.4004099168086649, 0.3551577314225149, 0.3070117661010914, 0.4006381408990124, 0.05841982971388784, 0.04503045588503576, 0.04562714263183162, 0.06465199070299796, 0.0835753835387185, 0.19015441626589444, 0.03295969201039027, 0.090440312060531, 0.08533237919505501, 0.11162460584612859, 0.19580688812785674, 0.0718308022131201, 0.19169519419058156, 0.07561931450923039, 0.061146609485048235, 0.003029542943371438, 0.10502268388057506, 0.13924798071896283, 0.17036022987778524, 0.09623216127616832, 0.14357197139145922, 0.12226656040965932, 0.006798645912537453, 0.3892238459731937, 0.030433029772193993, 0.5519327258348652, 1.092216361886453, 0.8500237707607665, 0.0779432129096776, 0.6831961490358605, 0.5693602380198315, 0.08405805070901873, 0.18732163640369828, 0.5072223120478825, 0.7608023148252905, 0.6195719138785093, 0.4421494941305547, 0.16235622782610568, 0.18119017054086112, 0.1722349305609049]