

## NRLMF OUTPUT SUMMARY

( $r=20, c=5, K_1=5, \lambda_1=2, \lambda_p=2, \alpha=1, \beta=1, \gamma=0.01, K_2=5$ )

**CVS-1:** 10-fold cross validation on rows(represents RNAs) in the interaction matrix. The rows were randomly split into 10 equal sets. For each such set:

1. Entries of rows in that set are made 0
2. NRLMF is performed with this set of RNAs as the negative RNA set
3. ROC curve and PR curve are drawn taking the negative RNA set as the test set

+++ CVS-1: Dataset-0 +++

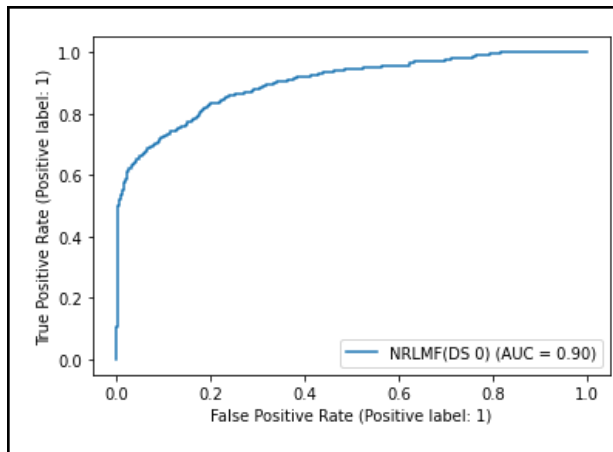
Negative RNA set=

[749, 563, 92, 865, 984, 617, 851, 102, 457, 170, 874, 812, 972, 361, 846, 965, 717, 176, 927, 335, 244, 868, 829, 360, 95, 203, 753, 754, 837, 363, 625, 691, 979, 46, 437, 178, 147, 963, 278, 608, 200, 474, 319, 24, 589, 56, 104, 935, 280, 737, 503, 271, 616, 795, 83, 23, 719, 395, 113, 613, 600, 25, 317, 78, 61, 284, 84, 208, 960, 505, 473, 666, 154, 594, 63, 331, 26, 751, 212, 20, 631, 343, 133, 645, 968, 120, 89, 892, 140, 646, 777, 973, 192, 817, 709, 377, 294, 844, 181]

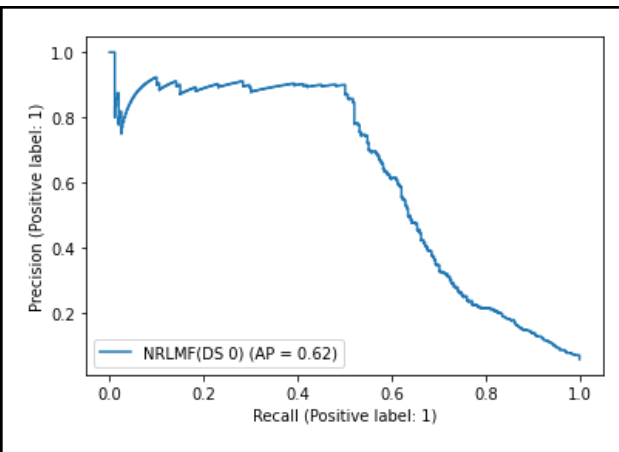
Iteration count=8368

AUROC=0.9004260994909455

AUPR=0.6218750846006903



ROC Curve DS-0



PR Curve DS-0

+++ CVS-1: Dataset-1 +++

Negative RNA set=

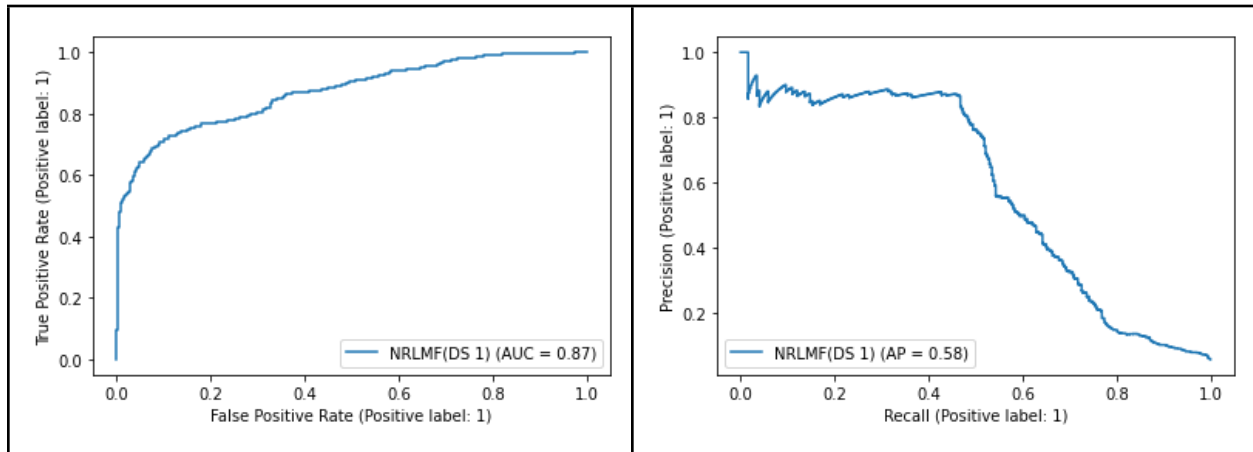
[657, 287, 782, 969, 943, 700, 441, 686, 698, 109, 676, 463, 659, 546, 557, 708, 619, 712, 914, 525, 752, 392, 802, 134, 529, 68, 674, 980, 542, 34, 720, 332, 434, 924, 460, 223, 122, 50, 606, 349, 864, 549, 138, 810, 942, 590, 199, 789, 906, 261, 871, 470, 16, 198, 895, 118, 346, 801, 298,

605, 740, 408, 7, 746, 239, 315, 629, 67, 537, 194, 66, 447, 848, 732,  
533, 697, 248, 899, 125, 206, 404, 270, 399, 824, 932, 119, 772, 153, 872,  
436, 39, 472, 780, 562, 311, 850, 229, 382, 747]

Iteration count=8953

AUROC=0.8706756669046538

AUPR=0.5817807196128691



ROC Curve DS-1

PR Curve DS-1

+++ CVS-1: Dataset-2 +++

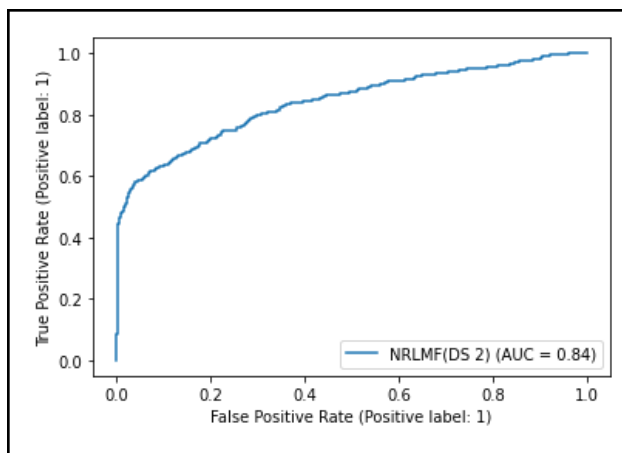
Negative RNA set=

[249, 479, 803, 135, 855, 306, 451, 484, 224, 531, 845, 375, 251, 638,  
538, 826, 18, 653, 207, 920, 350, 449, 96, 302, 986, 701, 52, 941, 423,  
627, 379, 596, 316, 347, 340, 334, 269, 946, 150, 293, 255, 950, 448, 215,  
155, 658, 98, 237, 64, 274, 526, 690, 912, 799, 455, 739, 165, 329, 45,  
158, 688, 362, 728, 954, 2, 507, 559, 230, 126, 947, 540, 916, 241, 87,  
413, 733, 901, 623, 422, 723, 618, 862, 201, 124, 956, 432, 800, 703, 842,  
584, 665, 19, 275, 964, 508, 368, 21, 940, 426]

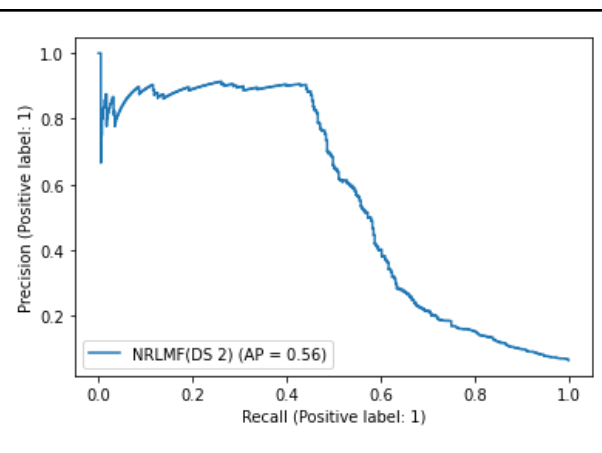
Iteration count=8768

AUROC=0.8407480261692593

AUPR=0.5593224162122352



ROC Curve DS-2



PR Curve DS-2

+++ CVS-1: Dataset-3 +++

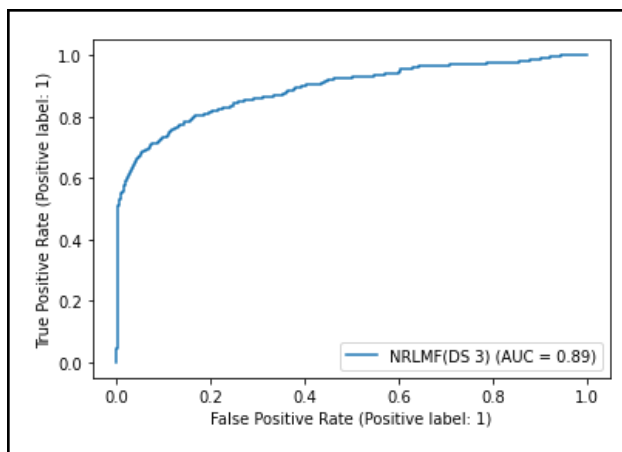
Negative RNA set=

[896, 324, 787, 641, 522, 485, 62, 380, 352, 527, 689, 400, 515, 337, 681, 905, 365, 521, 160, 412, 366, 693, 857, 890, 13, 58, 123, 425, 828, 983, 247, 788, 705, 55, 687, 715, 273, 756, 421, 974, 684, 35, 640, 252, 593, 386, 454, 182, 834, 402, 14, 348, 628, 40, 415, 734, 928, 636, 79, 878, 725, 220, 388, 786, 452, 656, 8, 97, 295, 142, 673, 286, 235, 163, 166, 564, 475, 111, 196, 161, 184, 323, 806, 358, 819, 938, 879, 157, 831, 635, 0, 420, 175, 869, 296, 706, 174, 886, 464]

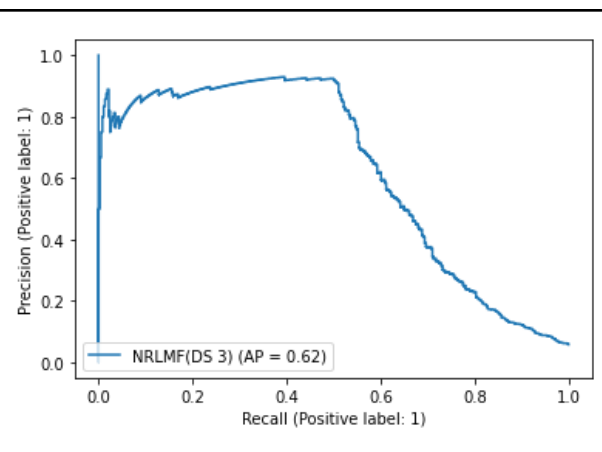
Iteration count=8813

AUROC=0.8899268656579802

AUPR=0.6222670871448832



ROC Curve DS-3



PR Curve DS-3

+++ CVS-1: Dataset-4 +++

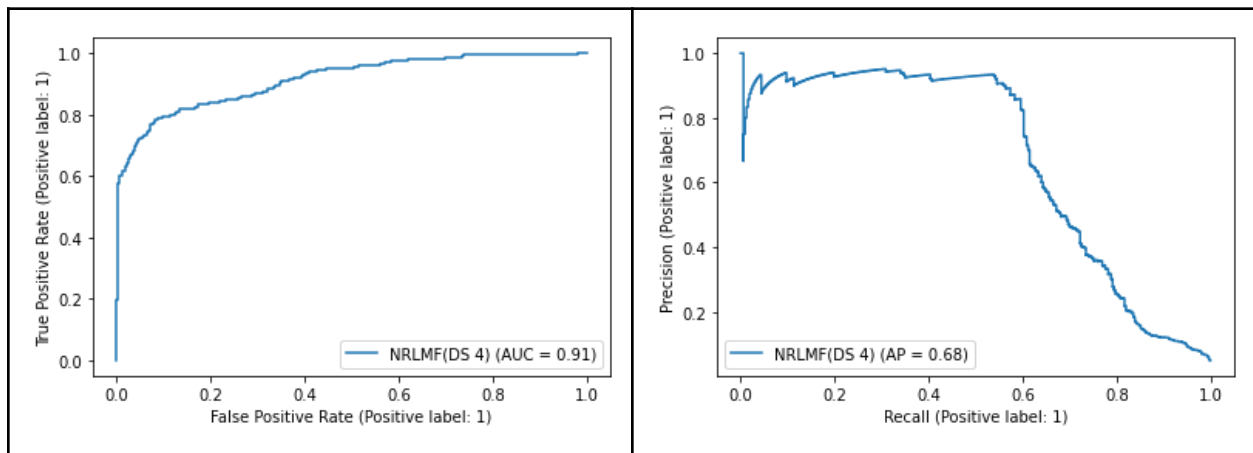
Negative RNA set=

[131, 91, 962, 773, 838, 288, 775, 652, 320, 849, 141, 240, 904, 977, 738, 867, 722, 394, 393, 355, 744, 900, 761, 289, 17, 893, 82, 57, 299, 246, 644, 607, 1, 554, 544, 543, 823, 888, 373, 471, 500, 186, 766, 677, 338, 843, 218, 38, 390, 726, 769, 907, 356, 106, 764, 668, 820, 755, 736, 662, 146, 372, 310, 405, 74, 467, 409, 634, 647, 783, 504, 71, 731, 487, 971, 359, 351, 816, 651, 796, 419, 770, 567, 649, 742, 621, 258, 512, 169, 568, 839, 863, 655, 204, 516, 903, 870, 325, 193]

Iteration count=8816

AUROC=0.9141535505599252

AUPR=0.6763652802909339



ROC Curve DS-4

PR Curve DS-4

+++ CVS-1: Dataset-5 +++

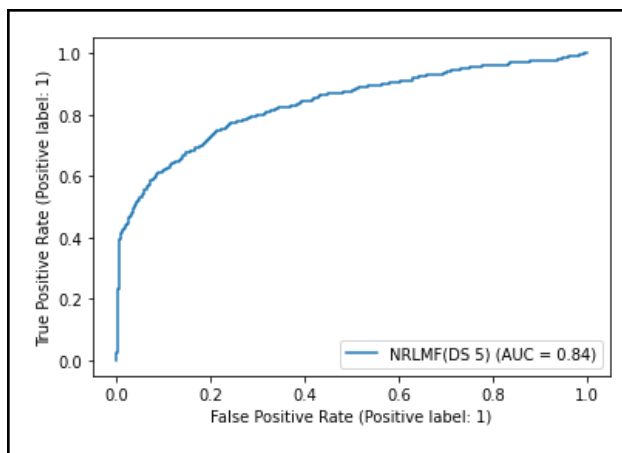
Negative RNA set=

[33, 172, 398, 266, 488, 427, 406, 85, 374, 264, 881, 558, 285, 713, 716, 835, 482, 735, 385, 535, 443, 794, 148, 127, 53, 391, 401, 321, 364, 570, 267, 80, 369, 987, 277, 847, 882, 518, 830, 60, 478, 601, 177, 190, 100, 54, 771, 959, 519, 573, 307, 858, 781, 494, 322, 433, 745, 461, 458, 682, 88, 397, 615, 378, 592, 931, 152, 614, 833, 910, 32, 260, 836, 985, 694, 813, 219, 70, 578, 860, 117, 303, 431, 854, 934, 231, 988, 65, 514, 630, 342, 227, 439, 949, 714, 48, 951, 669, 222]

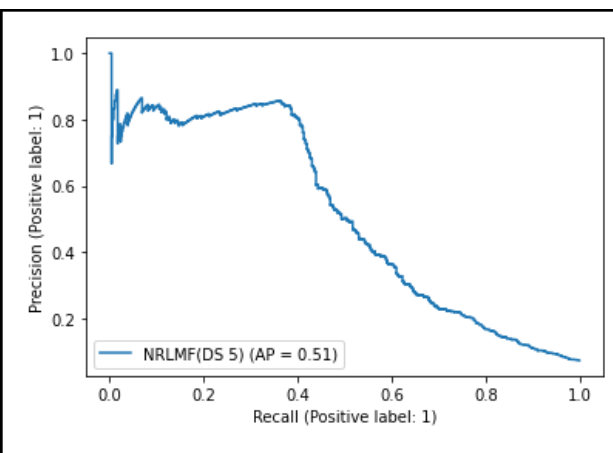
Iteration count=7881

AUROC=0.835060439503749

AUPR=0.5077024341575238



ROC Curve DS-5



PR Curve DS-5

+++ CVS-1: Dataset-6 +++

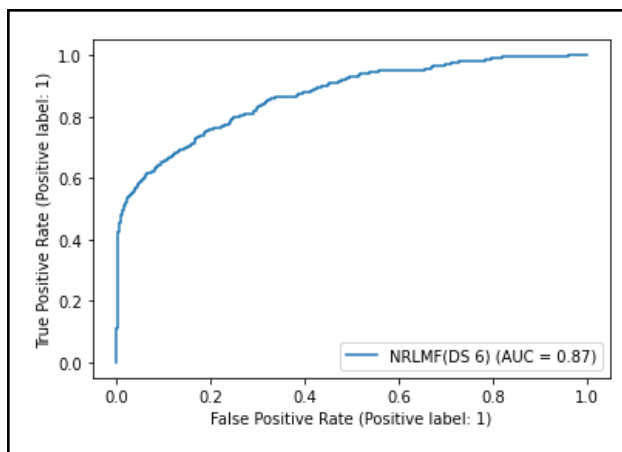
Negative RNA set=

[37, 272, 541, 695, 5, 243, 603, 588, 29, 480, 502, 236, 925, 692, 528, 561, 670, 923, 620, 661, 982, 637, 105, 371, 51, 591, 195, 36, 103, 94, 156, 915, 4, 15, 595, 12, 115, 632, 609, 536, 28, 159, 822, 654, 489, 462, 179, 534, 101, 202, 493, 952, 213, 776, 599, 809, 137, 582, 44, 90, 276, 922, 210, 297, 575, 957, 442, 417, 743, 491, 414, 767, 232, 532, 3, 970, 911, 265, 579, 553, 586, 908, 476, 624, 216, 547, 933, 86, 407, 77, 889, 31, 145, 290, 10, 304, 330, 727, 918]

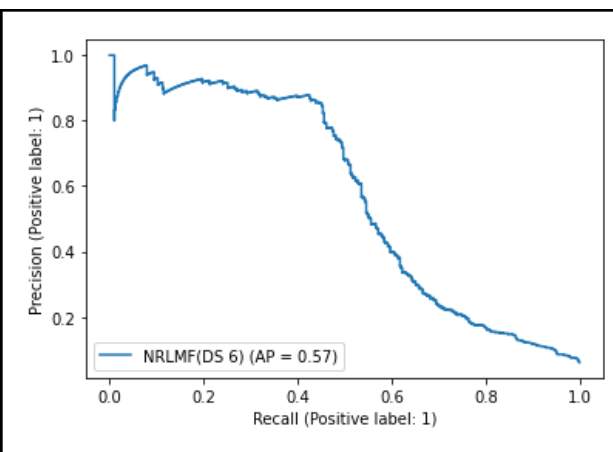
Iteration count=9758

AUROC=0.869511500944397

AUPR=0.5737601746568197



ROC Curve DS-6



PR Curve DS-6

+++ CVS-1: Dataset-7 +++

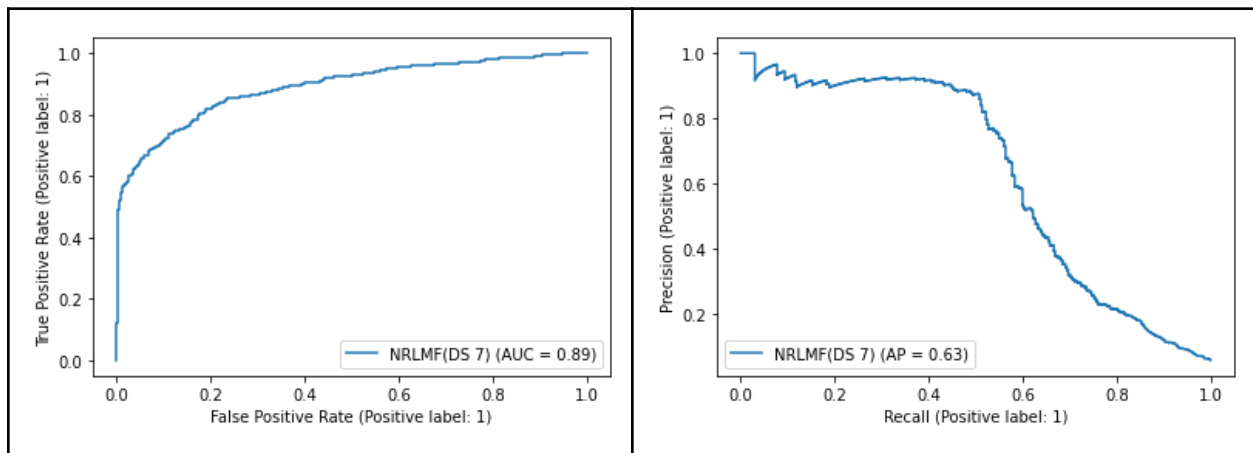
Negative RNA set=

[944, 357, 937, 587, 696, 976, 748, 818, 233, 576, 456, 711, 883, 571, 435, 866, 897, 683, 707, 309, 778, 877, 939, 424, 539, 729, 41, 171, 410, 750, 966, 30, 611, 917, 779, 859, 501, 180, 465, 887, 814, 583, 209, 387, 116, 353, 253, 757, 660, 47, 411, 185, 730, 981, 42, 466, 495, 73, 183, 560, 566, 281, 913, 197, 191, 381, 327, 667, 762, 704, 136, 496, 469, 572, 217, 785, 792, 167, 506, 164, 498, 523, 825, 492, 162, 99, 250, 604, 279, 256, 861, 675, 626, 768, 282, 784, 875, 314, 648]

Iteration count=8512

AUROC=0.8901378662799345

AUPR=0.6286433245782772



ROC Curve DS-7

PR Curve DS-7

+++ CVS-1: Dataset-8 +++

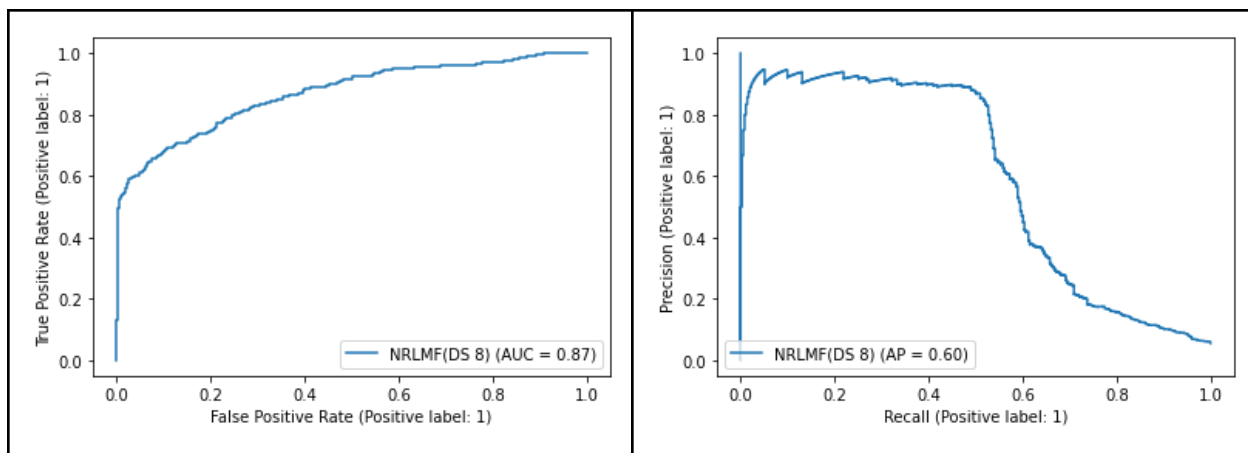
Negative RNA set=

[565, 389, 459, 76, 702, 345, 483, 791, 468, 517, 430, 312, 967, 187, 545, 774, 815, 110, 612, 93, 827, 760, 989, 149, 685, 59, 238, 22, 909, 509, 679, 168, 450, 680, 81, 214, 305, 808, 328, 840, 758, 948, 341, 11, 556, 832, 664, 173, 370, 978, 144, 221, 797, 902, 225, 577, 598, 804, 132, 114, 953, 936, 876, 43, 574, 958, 724, 121, 72, 975, 643, 139, 339, 234, 880, 27, 383, 569, 926, 699, 128, 530, 805, 663, 268, 318, 548, 497, 633, 884, 445, 440, 75, 602, 580, 301, 283, 650, 444]

Iteration count=8195

AUROC=0.8695885011674486

AUPR=0.5959787580550565



ROC Curve DS-8

PR Curve DS-8

+++ CVS-1: Dataset-9 +++

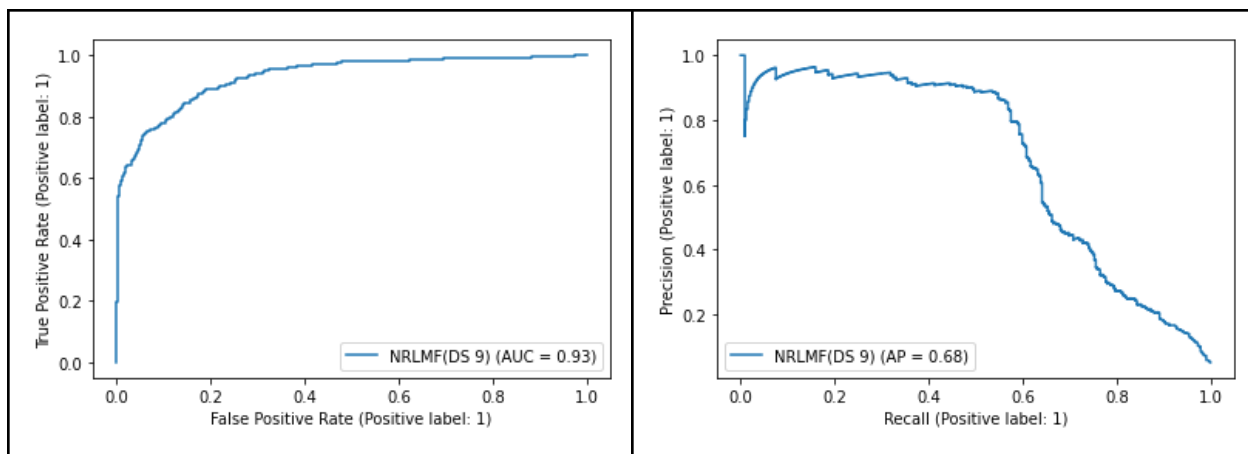
Negative RNA set=

[112, 403, 807, 107, 873, 69, 585, 763, 520, 721, 396, 513, 262, 151, 354, 130, 891, 428, 259, 853, 929, 242, 511, 300, 945, 597, 486, 718, 376, 313, 292, 551, 333, 741, 921, 344, 919, 671, 254, 821, 856, 245, 639, 188, 898, 291, 108, 129, 257, 429, 550, 211, 765, 49, 189, 524, 581, 790, 552, 793, 798, 384, 642, 885, 678, 555, 453, 336, 955, 308, 961, 367, 759, 228, 418, 481, 930, 894, 9, 438, 841, 226, 852, 811, 710, 610, 477, 416, 672, 326, 263, 446, 499, 143, 205, 6, 510, 490, 622]

Iteration count=9228

AUROC=0.9315837634348186

AUPR=0.6800650800432312



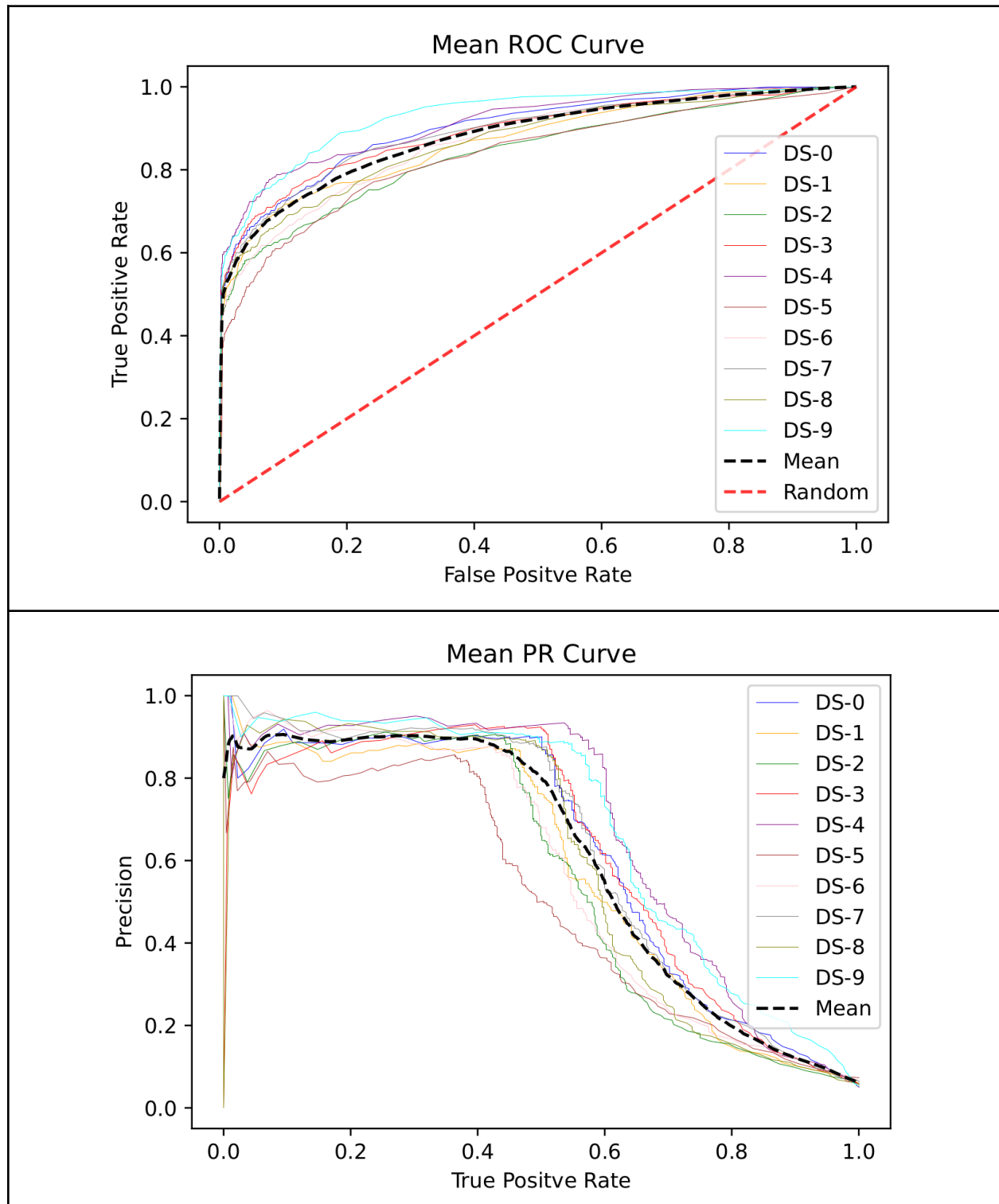
ROC Curve DS-9

PR Curve DS-9

AVERAGE RESULTS CVS-1:

AUROC (arithmetic mean) = **0.881181228**

AUPR (arithmetic mean) = **0.604776036**





**CVS-2:** 16-fold cross validation on columns(represents Proteins) in the interaction matrix. The columns were randomly split into 16 equal sets(took 16 for ease of division since the total number of proteins taken is 64). For each such set:

1. Entries of columns in that set are made 0
2. NRLMF is performed with this set of proteins as the negative RNA set
3. ROC curve and PR curve are drawn taking the negative protein set as the test set

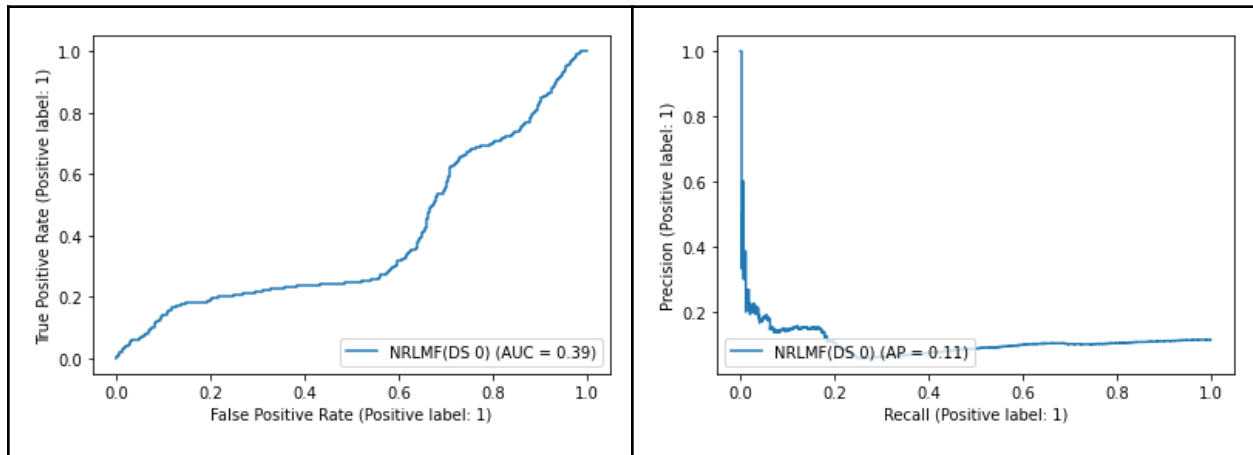
+++ CVS-2: Dataset-0 +++

Negative protein set= [34, 6, 13, 54]

Iteration count=7578

AUROC=0.3943744560515146

AUPR=0.10879344184776682



ROC Curve DS-0

PR Curve DS-0

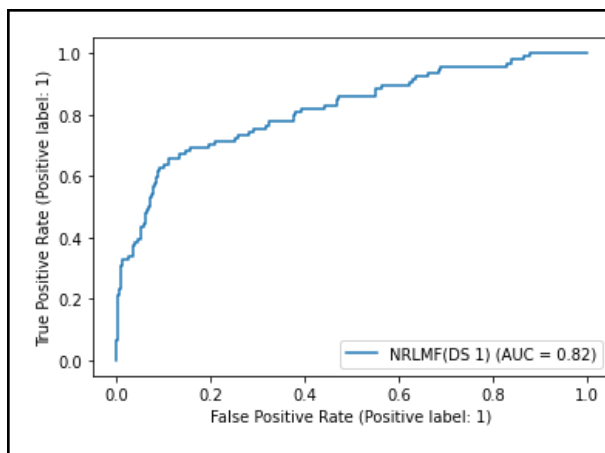
+++ CVS-2: Dataset-1 +++

Negative protein set= [16, 31, 46, 53]

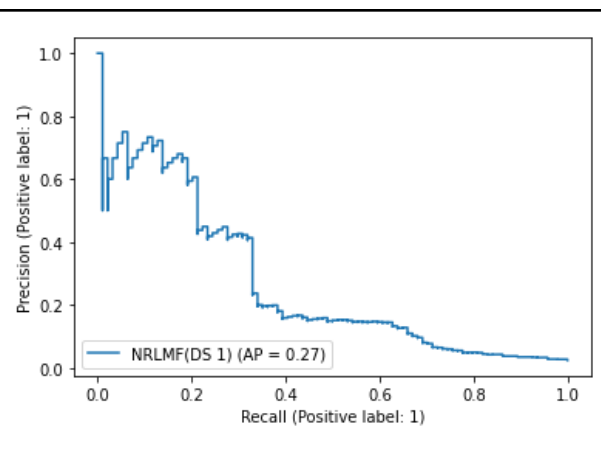
Iteration count=8733

AUROC=0.8174043213613499

AUPR=0.26656696269352



ROC Curve DS-1



PR Curve DS-1

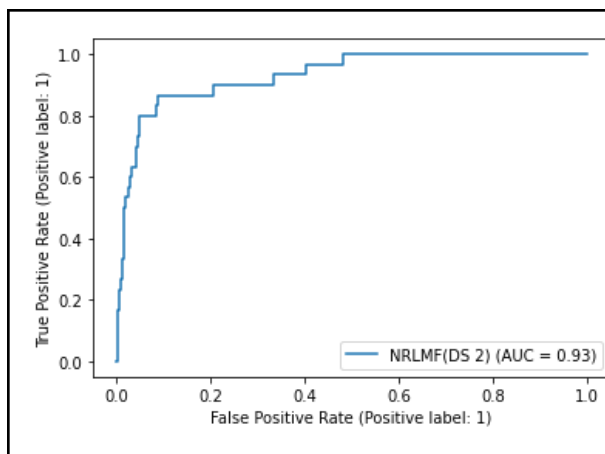
+++ CVS-2: Dataset-2 +++

Negative protein set= [21, 38, 60, 33]

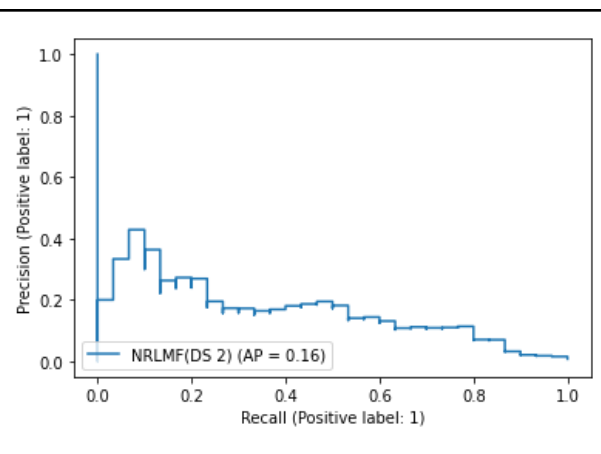
Iteration count=7700

AUROC=0.9317217981340118

AUPR=0.16480753187311284



ROC Curve DS-2



PR Curve DS-2

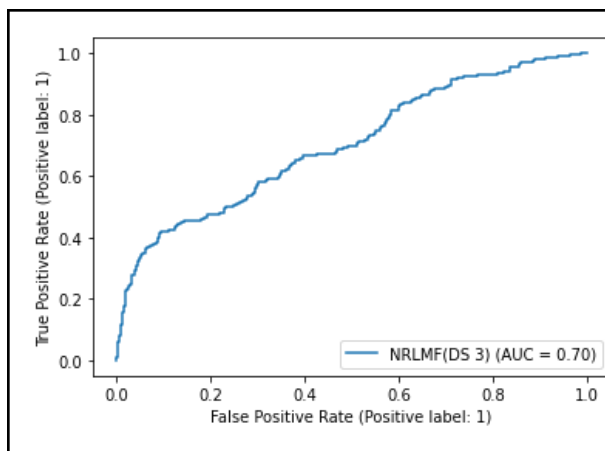
+++ CVS-2: Dataset-3 +++

Negative protein set= [2, 14, 26, 35]

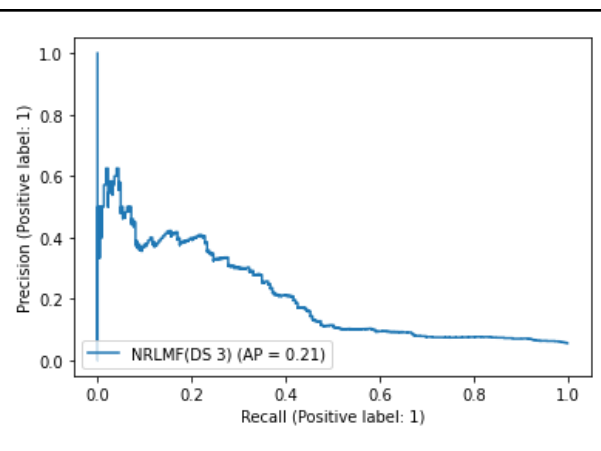
Iteration count=8325

AUROC=0.7017439230288318

AUPR=0.20710966103647782



ROC Curve DS-3



PR Curve DS-3

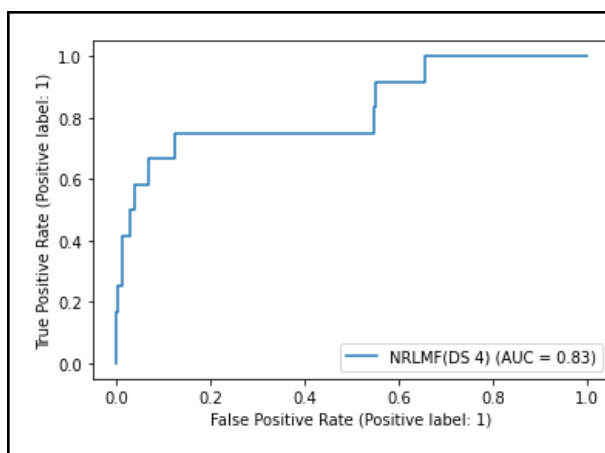
+++ CVS-2: Dataset-4 +++

Negative protein set= [59, 52, 42, 63]

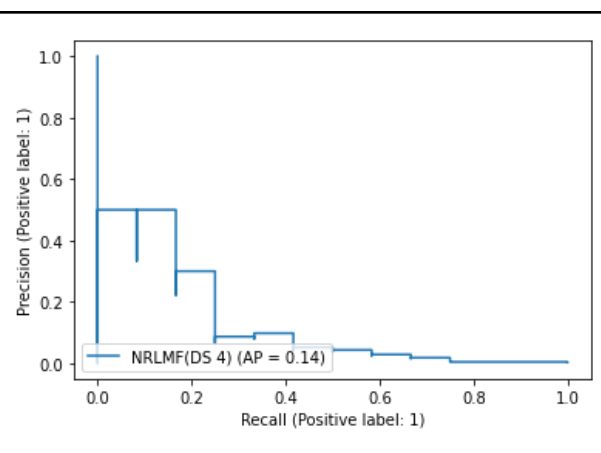
Iteration count=8951

AUROC=0.8302727119216481

AUPR=0.13681626592720655



ROC Curve DS-4



PR Curve DS-4

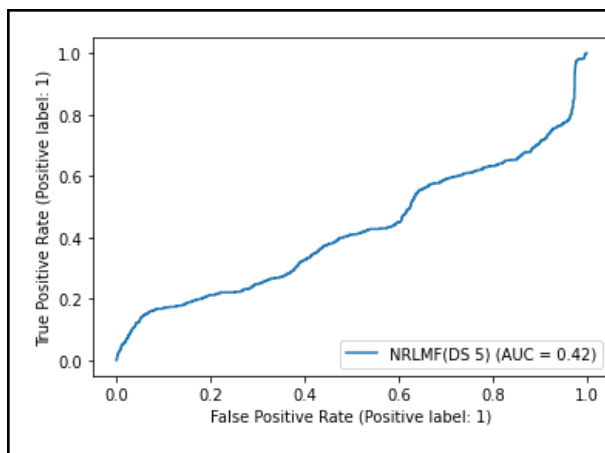
+++ CVS-2: Dataset-5 +++

Negative protein set= [7, 4, 32, 22]

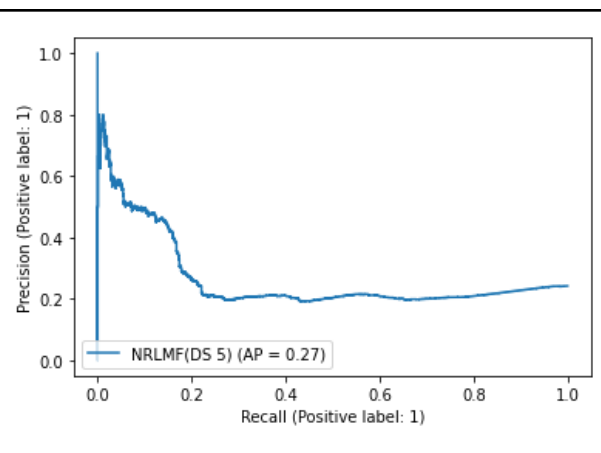
Iteration count=7884

AUROC=0.42377532133015106

AUPR=0.26794040406973596



ROC Curve DS-5



PR Curve DS-5

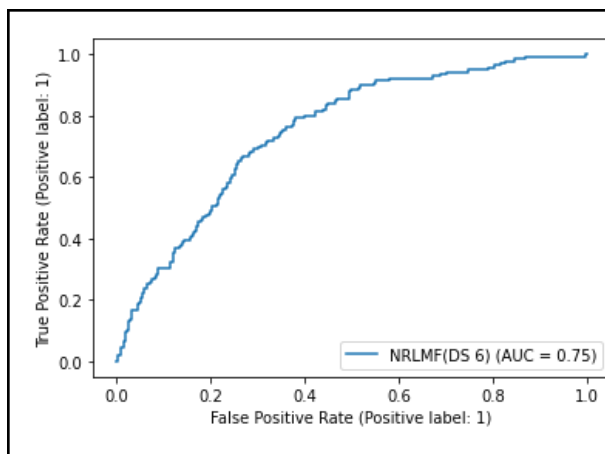
+++ CVS-2: Dataset-6 +++

Negative protein set= [10, 39, 44, 43]

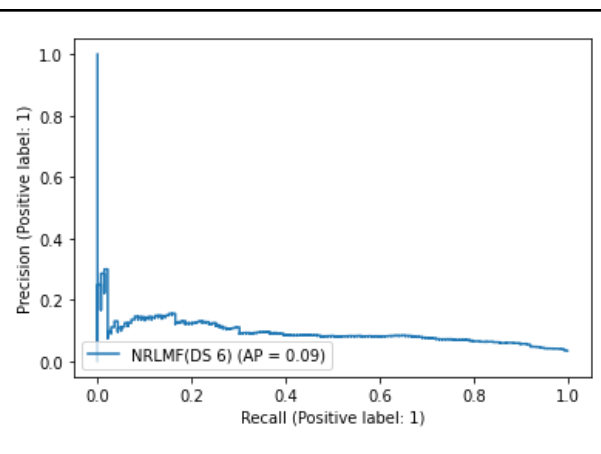
Iteration count=8588

AUROC=0.751008719326554

AUPR=0.09382022010958256



ROC Curve DS-6



PR Curve DS-6

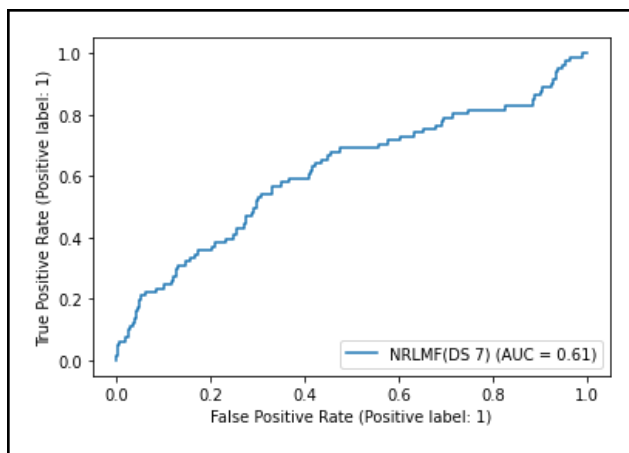
+++ CVS-2: Dataset-7 +++

Negative protein set= [25, 36, 12, 48]

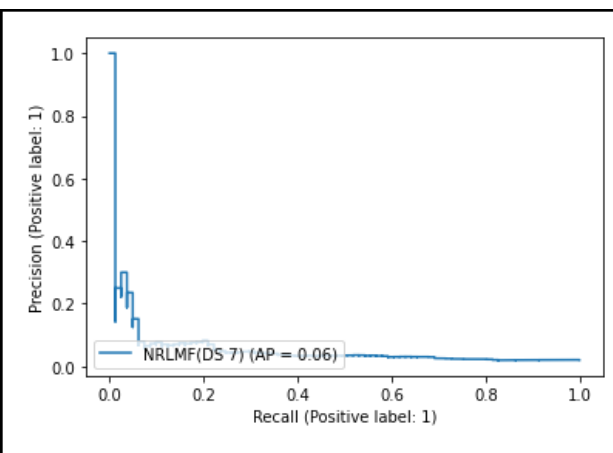
Iteration count=10030

AUROC=0.6146168511039183

AUPR=0.05954327975473403

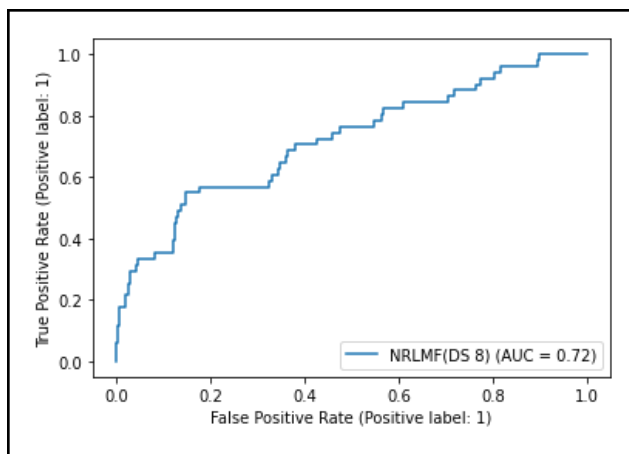


ROC Curve DS-7

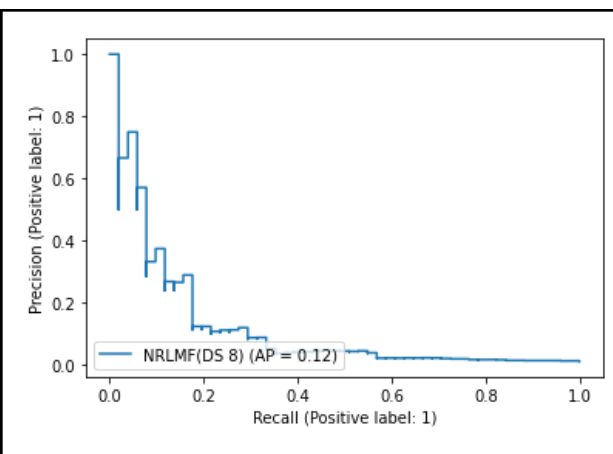


PR Curve DS-7

+++ CVS-2: Dataset-8 +++  
 Negative protein set= [62, 29, 27, 20]  
 Iteration count=8409  
 AUROC=0.7198119974518331  
 AUPR=0.12477641577042871

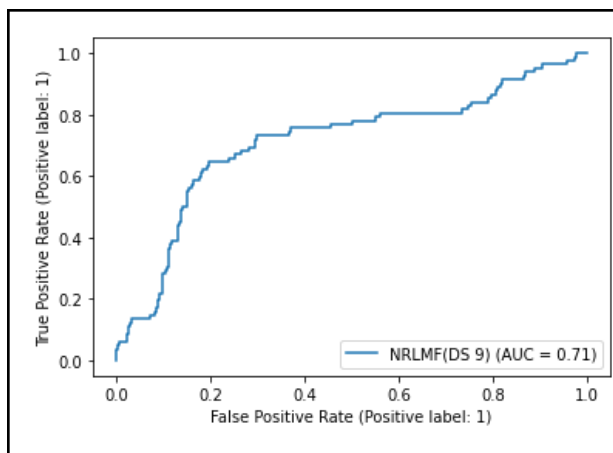


ROC Curve DS-8

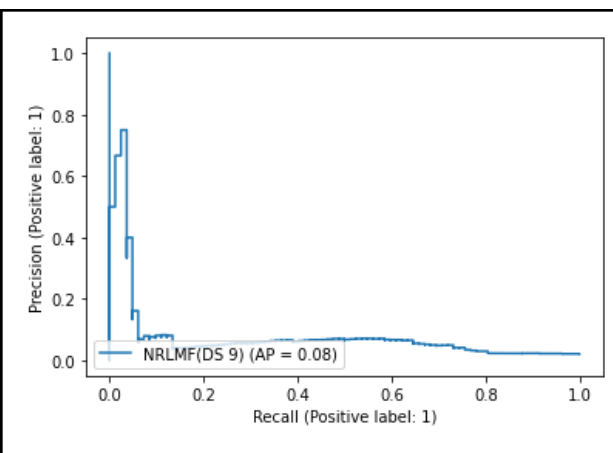


PR Curve DS-8

+++ CVS-2: Dataset-9 +++  
 Negative protein set= [3, 50, 5, 41]  
 Iteration count=8119  
 AUROC=0.7108642876011018  
 AUPR=0.07808162303819033

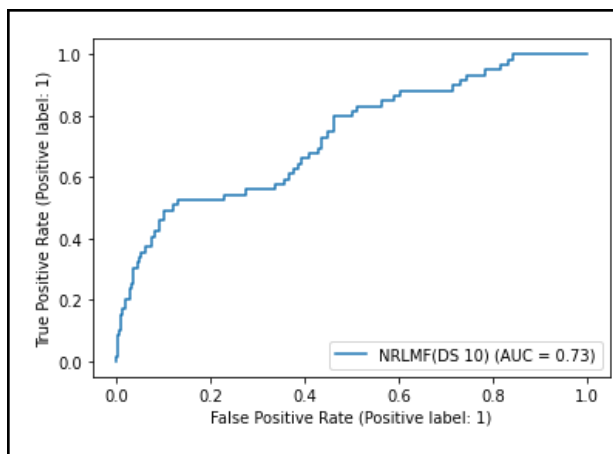


ROC Curve DS-9

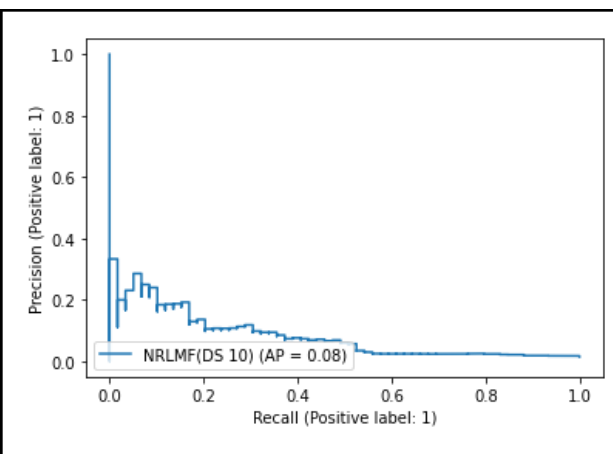


PR Curve DS-9

+++ CVS-2: Dataset-10 +++  
 Negative protein set= [45, 61, 11, 47]  
 Iteration count=8768  
 AUROC=0.7310815566630026  
 AUPR=0.08226797163617039

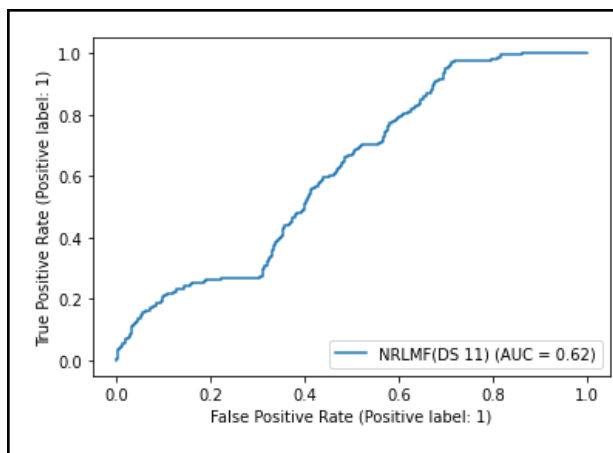


ROC Curve DS-10

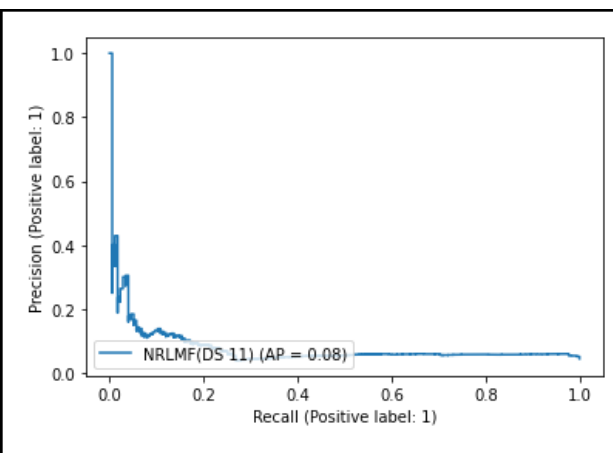


PR Curve DS-10

+++ CVS-2: Dataset-11 +++  
 Negative protein set= [24, 40, 28, 17]  
 Iteration count=9406  
 AUROC=0.6166718248726174  
 AUPR=0.08126634546875909

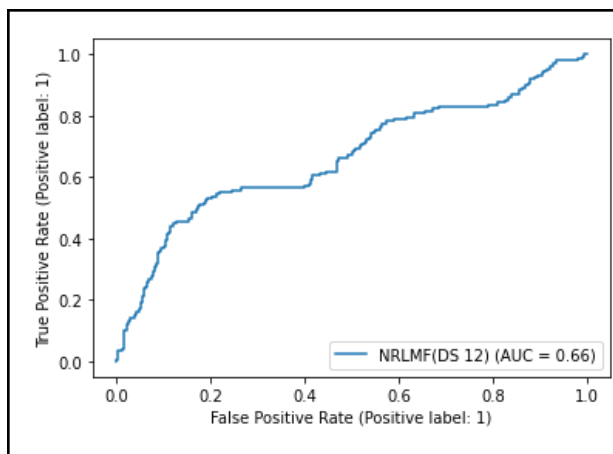


ROC Curve DS-11

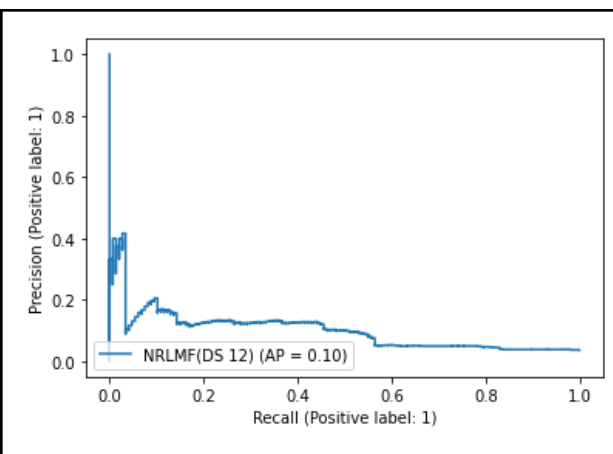


PR Curve DS-11

+++ CVS-2: Dataset-12 +++  
 Negative protein set= [8, 0, 19, 49]  
 Iteration count=8657  
 AUROC=0.6635623564925577  
 AUPR=0.10060344552373236

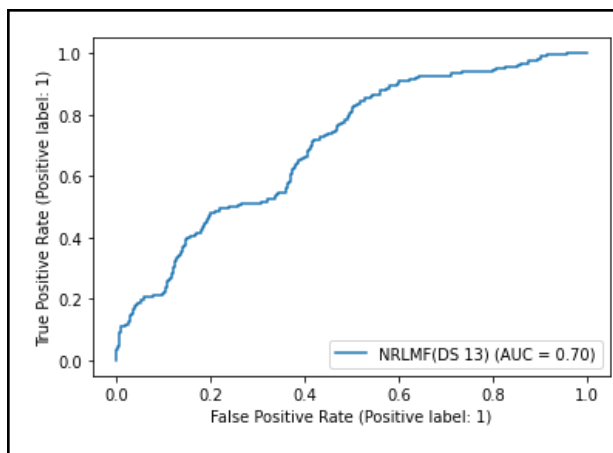


ROC Curve DS-12

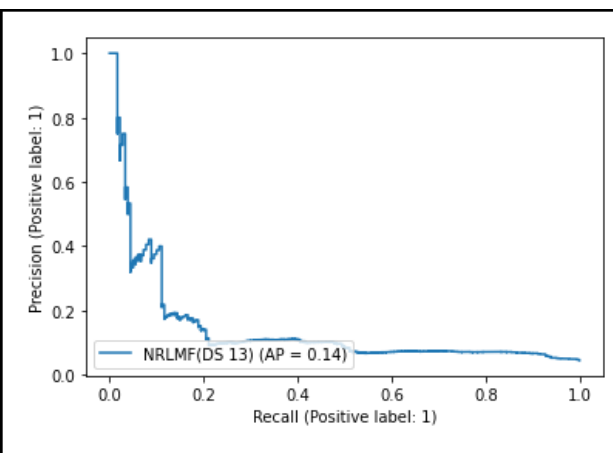


PR Curve DS-12

+++ CVS-2: Dataset-13 +++  
 Negative protein set= [18, 9, 23, 55]  
 Iteration count=8059  
 AUROC=0.7017151675485009  
 AUPR=0.14251797500795346



ROC Curve DS-13



PR Curve DS-13

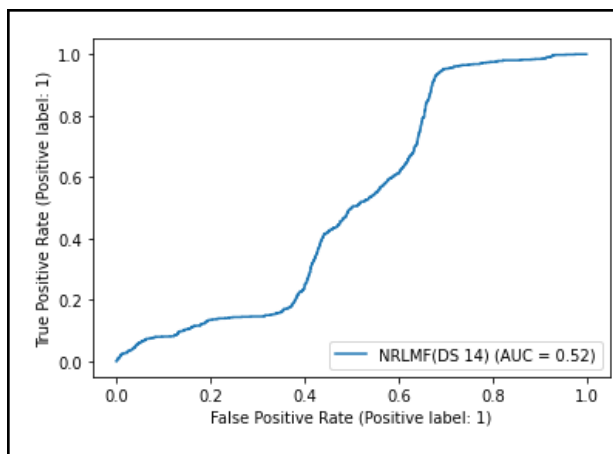
+++ CVS-2: Dataset-14 +++

Negative protein set= [51, 1, 57, 15]

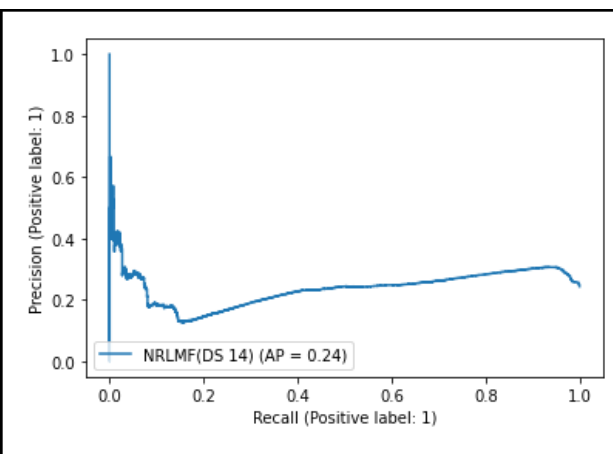
Iteration count=8568

AUROC=0.5151410481418324

AUPR=0.2428367232560794



ROC Curve DS-14



PR Curve DS-14

+++ CVS-2: Dataset-15 +++

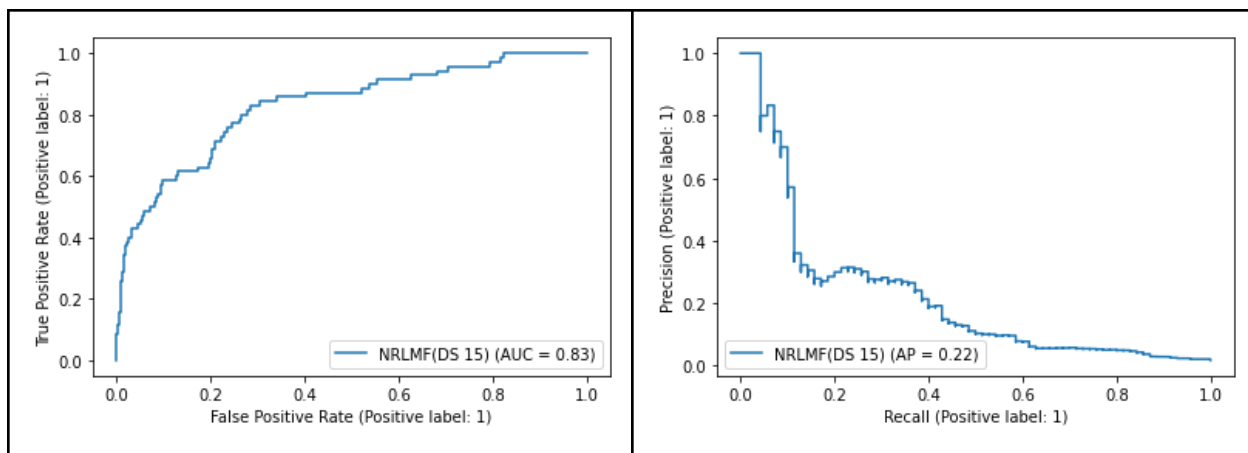
Negative protein set= [30, 56, 58, 37]

Iteration count=8084

AUROC=0.8295886889460155

AUPR=0.21944047195088892





ROC Curve DS-15

PR Curve DS-15

#### AVERAGE RESULTS CVS-2:

AUROC (arithmetic mean) = **0.684584689373465**

AUPR (arithmetic mean) = **0.1485742961852712**

