TABLE 1

Comparison Results of Eight MLFS Methods (Mean±Std. Deviation) in Terms of *Hamming Loss*, *Ranking Loss*, and *Coverage*

Hamming Loss↓

Data set	GRROfast	GRRO	PMU	MDMR	FIMF	SCLS	MICO	LRFS
Bibtex	**0.0136±0.0004**	**0.0136±0.0004**	0.0151±0.0000	0.0141±0.0001	0.0147±0.0002	0.0138±0.0002	0.0138±0.0003	0.0138±0.0003
Birds	0.0581±0.0023	0.0551±0.0025	0.0688±0.0027	0.0630±0.0020	0.0645±0.0022	0.0595±0.0021	0.0523±0.0022	**0.0512±0.0023**
Chemistry	**0.0121±0.0001**	0.0121±0.0000	0.0122±0.0000	0.0122±0.0000	0.0122±0.0000	**0.0121±0.0001**	**0.0121±0.0000**	**0.0121±0.0000**
Chess	**0.0100±0.0001**	**0.0100±0.0001**	0.0103±0.0001	0.0103±0.0001	0.0103±0.0001	0.0101±0.0001	0.0101±0.0001	0.0101±0.0001
Coffee	0.0161±0.0003	**0.0158±0.0002**	0.0160±0.0002	**0.0159±0.0002**	0.0161±0.0003	0.0161±0.0002	0.0161±0.0003	0.0160±0.0002
Cooking	**0.0052±0.0001**	**0.0052±0.0001**	0.0055±0.0001	0.0054±0.0001	0.0055±0.0001	0.0053±0.0001	0.0053±0.0001	0.0053±0.0001
Cs	**0.0088±0.0001**	**0.0088±0.0001**	0.0091±0.0000	0.0090±0.0000	0.0090±0.0000	0.0089±0.0001	**0.0088±0.0001**	**0.0088±0.0001**
Philosophy	**0.0091±0.0001**	**0.0091±0.0001**	0.0094±0.0001	0.0093±0.0000	0.0094±0.0001	**0.0091±0.0001**	**0.0091±0.0001**	**0.0091±0.0001**
Corel5k	0.0095±0.0000	**0.0094±0.0000**	**0.0094±0.0000**	**0.0094±0.0000**	**0.0094±0.0000**	0.0095±0.0000	0.0095±0.0000	0.0095±0.0000
Corel16k001	0.0188±0.0000	0.0188±0.0000	0.0188±0.0000	**0.0187±0.0000**	0.0188±0.0000	0.0188±0.0000	0.0188±0.0000	0.0188±0.0000
Corel16k002	**0.0174±0.0000**	**0.0174±0.0000**	**0.0174±0.0000**	**0.0174±0.0000**	**0.0174±0.0000**	**0.0174±0.0000**	**0.0174±0.0000**	**0.0174±0.0000**
Genbase	**0.0067±0.0077**	0.0069±0.0077	0.0094±0.0076	0.0075±0.0073	0.0079±0.0082	0.0070±0.0075	0.0076±0.0077	0.0075±0.0075
Langlog	**0.0156±0.0002**	**0.0156±0.0001**	0.0158±0.0001	0.0157±0.0001	0.0158±0.0001	**0.0156±0.0002**	**0.0156±0.0003**	**0.0156±0.0001**
Medical	**0.0142±0.0022**	0.0138±0.0025	0.0192±0.0008	0.0158±0.0020	0.0157±0.0024	0.0159±0.0017	0.0157±0.0019	0.0153±0.0020
Slashdot	**0.0486±0.0010**	0.0486±0.0011	0.0510±0.0005	0.0503±0.0007	0.0499±0.0007	0.0492±0.0007	0.0491±0.0008	0.0492±0.0007
Yeast	0.2093±0.0094	0.2086±0.0103	0.2117±0.0081	0.2142±0.0100	0.2140±0.0100	0.2088±0.0091	**0.2085±0.0094**	0.2090±0.0087
Arts	**0.0587±0.0010**	0.0586±0.0011	0.0611±0.0007	0.0596±0.0006	0.0611±0.0010	0.0592±0.0009	0.0592±0.0008	0.0591±0.0009
Business	**0.0274±0.0005**	**0.0274±0.0005**	0.0284±0.0002	0.0279±0.0004	0.0282±0.0003	0.0275±0.0004	**0.0274±0.0006**	**0.0274±0.0004**
Entertainment	**0.0585±0.0024**	**0.0585±0.0024**	0.0650±0.0007	0.0612±0.0009	0.0645±0.0016	0.0591±0.0017	0.0600±0.0026	0.0596±0.0018
Health	**0.0405±0.0017**	0.0403±0.0019	0.0439±0.0013	0.0427±0.0012	0.0425±0.0015	0.0417±0.0016	0.0411±0.0017	0.0411±0.0017
Recreation	**0.0574±0.0014**	0.0572±0.0015	0.0650±0.0002	0.0585±0.0009	0.0616±0.0014	0.0576±0.0012	0.0574±0.0015	0.0574±0.0014
Reference	**0.0286±0.0009**	**0.0286±0.0008**	0.0302±0.0004	0.0300±0.0004	0.0296±0.0008	0.0288±0.0009	0.0288±0.0009	0.0287±0.0010
Science	**0.0336±0.0005**	**0.0336±0.0005**	0.0355±0.0002	0.0346±0.0002	0.0345±0.0002	0.0340±0.0003	0.0337±0.0004	0.0337±0.0005
Social	0.0243±0.0014	0.0245±0.0015	0.0254±0.0010	0.0253±0.0011	0.0246±0.0013	0.0245±0.0014	0.0243±0.0020	**0.0241±0.0017**

Ranking Loss↓

Data set	GRROfast	GRRO	PMU	MDMR	FIMF	SCLS	MICO	LRFS
Bibtex	**0.2006±0.0349**	0.1986±0.0334	0.2936±0.0107	0.2299±0.0099	0.2808±0.0161	0.2044±0.0231	0.2146±0.0306	0.2134±0.0313
Birds	0.1301±0.0120	0.1284±0.0145	0.1352±0.0091	**0.1266±0.0101**	0.1347±0.0119	0.1380±0.0133	0.1404±0.0172	0.1344±0.0153
Chemistry	**0.1542±0.0082**	0.1540±0.0077	0.1642±0.0052	0.1609±0.0040	0.1606±0.0060	0.1551±0.0070	0.1553±0.0068	0.1554±0.0068
Chess	0.1459±0.0081	**0.1441±0.0083**	0.1579±0.0048	0.1570±0.0045	0.1566±0.0057	0.1495±0.0071	0.1487±0.0085	0.1485±0.0083
Coffee	**0.1564±0.0142**	0.1627±0.0110	0.1724±0.0120	0.1740±0.0124	0.1733±0.0112	0.1746±0.0092	0.1679±0.0113	0.1668±0.0111
Cooking	**0.1850±0.0161**	0.1836±0.0156	0.2131±0.0034	0.2052±0.0040	0.2102±0.0050	0.1865±0.0154	0.1857±0.0159	0.1857±0.0160
Cs	**0.1477±0.0100**	0.1457±0.0117	0.1689±0.0035	0.1573±0.0045	0.1659±0.0055	0.1500±0.0091	0.1515±0.0082	0.1513±0.0082
Philosophy	**0.1399±0.0057**	0.1383±0.0067	0.1526±0.0020	0.1500±0.0015	0.1520±0.0024	0.1431±0.0041	0.1421±0.0050	0.1427±0.0046
Corel5k	**0.1370±0.0036**	0.1358±0.0038	0.1414±0.0008	0.1417±0.0007	0.1414±0.0008	0.1382±0.0023	0.1377±0.0031	0.1378±0.0030
Corel16k001	**0.1864±0.0026**	**0.1864±0.0026**	0.1917±0.0005	0.1898±0.0005	0.1914±0.0005	0.1869±0.0023	0.1869±0.0023	0.1868±0.0023
Corel16k002	0.1846±0.0023	0.1844±0.0025	0.1900±0.0003	0.1875±0.0009	0.1899±0.0006	**0.1841±0.0026**	0.1842±0.0026	0.1843±0.0025
Genbase	0.0153±0.0216	0.0149±0.0206	0.0154±0.0210	0.0136±0.0197	0.0166±0.0229	**0.0134±0.0198**	0.0158±0.0199	0.0153±0.0196
Langlog	**0.1545±0.0083**	0.1578±0.0065	0.1697±0.0030	0.1719±0.0029	0.1689±0.0060	0.1635±0.0045	0.1628±0.0035	0.1635±0.0055
Medical	**0.0573±0.0191**	0.0571±0.0189	0.0769±0.0123	0.0660±0.0150	0.0637±0.0176	0.0593±0.0181	0.0645±0.0168	0.0631±0.0182
Slashdot	0.1792±0.0096	**0.1769±0.0086**	0.1890±0.0038	0.1853±0.0046	0.1805±0.0081	0.1783±0.0089	0.1790±0.0080	0.1788±0.0081
Yeast	0.1837±0.0089	0.1834±0.0085	0.1843±0.0098	0.1848±0.0095	0.1895±0.0095	**0.1809±0.0096**	0.1841±0.0085	0.1838±0.0090
Arts	**0.1515±0.0085**	0.1514±0.0087	0.1610±0.0040	0.1569±0.0048	0.1565±0.0059	0.1517±0.0071	0.1533±0.0066	0.1525±0.0068
Business	**0.0417±0.0018**	0.0423±0.0015	0.0463±0.0019	0.0446±0.0010	0.0457±0.0019	0.0426±0.0015	0.0425±0.0017	0.0423±0.0015
Entertainment	**0.1224±0.0087**	0.1222±0.0094	0.1383±0.0067	0.1360±0.0028	0.1398±0.0086	**0.1224±0.0081**	0.1277±0.0084	0.1311±0.0058
Health	**0.0599±0.0061**	0.0594±0.0065	0.0657±0.0029	0.0641±0.0033	0.0629±0.0044	0.0615±0.0050	0.0610±0.0056	0.0602±0.0057
Recreation	**0.1709±0.0138**	0.1692±0.0149	0.2151±0.0034	0.1797±0.0089	0.1980±0.0110	0.1731±0.0113	0.1733±0.0123	0.1726±0.0126
Reference	**0.0894±0.0064**	**0.0894±0.0065**	0.0952±0.0034	0.0949±0.0034	0.0927±0.0055	0.0894±0.0061	0.0924±0.0058	0.0906±0.0056
Science	**0.1346±0.0071**	0.1323±0.0076	0.1464±0.0028	0.1408±0.0031	0.1434±0.0040	0.1378±0.0049	0.1367±0.0063	0.1353±0.0061
Social	**0.0673±0.0053**	0.0670±0.0050	0.0698±0.0024	0.0695±0.0027	0.0699±0.0031	0.0692±0.0029	0.0693±0.0044	0.0689±0.0041

Coverage↓

Data set	GRROfast	GRRO	PMU	MDMR	FIMF	SCLS	MICO	LRFS
Bibtex	**0.3166±0.0434**	0.3128±0.0424	0.4445±0.0144	0.3661±0.0095	0.4304±0.0199	0.3323±0.0260	0.3367±0.0374	0.3350±0.0383
Birds	0.1826±0.0156	0.1831±0.0185	0.1860±0.0103	**0.1763±0.0137**	0.1856±0.0157	0.1928±0.0173	0.1984±0.0183	0.1898±0.0180
Chemistry	**0.2552±0.0094**	0.2551±0.0091	0.2663±0.0059	0.2629±0.0042	0.2625±0.0066	0.2569±0.0076	0.2570±0.0075	0.2570±0.0075
Chess	**0.2724±0.0103**	0.2694±0.0106	0.2866±0.0065	0.2855±0.0063	0.2858±0.0067	0.2767±0.0095	0.2762±0.0113	0.2759±0.0108
Coffee	**0.2598±0.0143**	0.2667±0.0074	0.2752±0.0167	0.2760±0.0167	0.2776±0.0132	0.2810±0.0114	0.2742±0.0110	0.2713±0.0113
Cooking	**0.3096±0.0187**	0.3082±0.0181	0.3448±0.0033	0.3358±0.0039	0.3411±0.0052	0.3112±0.0186	0.3110±0.0186	0.3110±0.0187
Cs	**0.2708±0.0135**	0.2684±0.0154	0.2973±0.0045	0.2831±0.0063	0.2937±0.0070	0.2737±0.0128	0.2765±0.0114	0.2759±0.0114
Philosophy	0.2498±0.0067	**0.2474±0.0081**	0.2639±0.0028	0.2612±0.0015	0.2633±0.0033	0.2537±0.0042	0.2524±0.0056	0.2529±0.0052
Corel5k	**0.3155±0.0042**	0.3128±0.0048	0.3209±0.0012	0.3215±0.0008	0.3210±0.0009	0.3173±0.0024	0.3157±0.0044	0.3157±0.0042
Corel16k001	**0.3565±0.0033**	**0.3565±0.0033**	0.3639±0.0010	0.3612±0.0007	0.3635±0.0006	0.3574±0.0030	0.3577±0.0030	0.3574±0.0030
Corel16k002	0.3549±0.0033	0.3544±0.0037	0.3627±0.0006	0.3587±0.0013	0.3625±0.0010	**0.3533±0.0041**	0.3538±0.0040	0.3540±0.0038
Genbase	0.0297±0.0224	0.0294±0.0214	0.0302±0.0217	0.0282±0.0198	0.0312±0.0237	**0.0280±0.0199**	0.0297±0.0203	0.0292±0.0200
Langlog	**0.1594±0.0077**	0.1632±0.0065	0.1756±0.0024	0.1780±0.0034	0.1744±0.0052	0.1680±0.0045	0.1682±0.0033	0.1690±0.0046
Medical	0.0804±0.0206	**0.0799±0.0205**	0.1033±0.0121	0.0906±0.0155	0.0879±0.0185	0.0836±0.0191	0.0890±0.0178	0.0874±0.0191
Slashdot	0.1954±0.0086	**0.1930±0.0080**	0.2043±0.0036	0.2008±0.0042	0.1958±0.0074	0.1940±0.0082	0.1948±0.0072	0.1945±0.0073
Yeast	0.4702±0.0111	0.4690±0.0099	0.4710±0.0103	0.4711±0.0112	0.4783±0.0101	**0.4655±0.0116**	0.4705±0.0101	0.4708±0.0121
Arts	**0.2103±0.0082**	0.2101±0.0084	0.2203±0.0035	0.2162±0.0045	0.2153±0.0055	0.2104±0.0072	0.2121±0.0065	0.2112±0.0068
Business	0.0777±0.0023	0.0782±0.0019	0.0833±0.0025	0.0814±0.0011	0.0830±0.0024	0.0787±0.0018	0.0784±0.0022	**0.0781±0.0020**
Entertainment	0.1584±0.0090	**0.1577±0.0100**	0.1726±0.0068	0.1710±0.0037	0.1740±0.0090	**0.1581±0.0084**	0.1633±0.0086	0.1662±0.0062
Health	**0.1031±0.0073**	0.1025±0.0079	0.1097±0.0031	0.1080±0.0037	0.1062±0.0051	0.1042±0.0059	0.1044±0.0065	0.1034±0.0067
Recreation	**0.2131±0.0140**	0.2116±0.0150	0.2530±0.0033	0.2221±0.0089	0.2385±0.0097	0.2151±0.0111	0.2156±0.0122	0.2145±0.0126
Reference	**0.1048±0.0063**	0.1047±0.0065	0.1105±0.0036	0.1104±0.0036	0.1079±0.0056	0.1048±0.0061	0.1076±0.0058	0.1059±0.0056
Science	**0.1706±0.0075**	0.1684±0.0081	0.1826±0.0030	0.1772±0.0034	0.1797±0.0043	0.1738±0.0053	0.1728±0.0070	0.1714±0.0063
Social	**0.0923±0.0059**	0.0919±0.0056	0.0949±0.0028	0.0946±0.0029	0.0946±0.0035	0.0944±0.0030	0.0946±0.0046	0.0947±0.0042

TABLE 2
Comparison Results of Eight MLFS Methods (Mean±Std. Deviation) in Terms of *Average Precision*, *Macro-F1*, and *Micro-F1*

| Data set | *Average Precision↑* | | | | | | | |
	GRROfast	GRRO	PMU	MDMR	FIMF	SCLS	MICO	LRFS
Bibtex	**0.3569±0.0697**	**0.3526±0.0633**	0.1787±0.0131	0.2896±0.0208	0.2040±0.0235	0.3356±0.0485	0.3094±0.0601	0.3121±0.0617
Birds	0.6720±0.0161	0.6910±0.0253	0.6274±0.0166	0.6646±0.0119	0.6555±0.0147	0.6632±0.0171	0.6827±0.0275	**0.6918±0.0228**
Chemistry	**0.2947±0.0252**	**0.2971±0.0238**	0.2624±0.0108	0.2700±0.0097	0.2719±0.0140	0.2914±0.0214	0.2914±0.0219	0.2918±0.0216
Chess	**0.3275±0.0394**	**0.3325±0.0392**	0.2591±0.0176	0.2648±0.0136	0.2682±0.0244	0.3104±0.0273	0.3138±0.0373	0.3151±0.0366
Coffee	**0.3613±0.0438**	**0.3671±0.0436**	0.2923±0.0287	0.3006±0.0225	0.2889±0.0174	0.3030±0.0175	0.3526±0.0408	0.3513±0.0399
Cooking	**0.2626±0.0618**	**0.2659±0.0604**	0.1365±0.0163	0.1843±0.0152	0.1527±0.0249	0.2543±0.0604	0.2544±0.0621	0.2547±0.0624
Cs	**0.3211±0.0324**	**0.3263±0.0352**	0.2178±0.0082	0.2788±0.0116	0.2372±0.0190	0.3124±0.0281	0.3094±0.0280	0.3104±0.0272
Philosophy	**0.3355±0.0335**	**0.3366±0.0341**	0.2464±0.0053	0.2670±0.0070	0.2481±0.0068	0.3107±0.0211	0.3158±0.0247	0.3146±0.0240
Corel5k	**0.2374±0.0101**	**0.2425±0.0116**	0.2153±0.0031	0.2163±0.0031	0.2157±0.0030	0.2286±0.0054	0.2323±0.0077	0.2316±0.0071
Corel16k001	**0.2597±0.0052**	**0.2597±0.0052**	0.2499±0.0017	0.2560±0.0026	0.2496±0.0012	0.2573±0.0032	0.2588±0.0045	0.2589±0.0043
Corel16k002	0.2501±0.0042	0.2501±0.0042	0.2411±0.0010	0.2455±0.0022	0.2414±0.0014	0.2486±0.0038	**0.2503±0.0050**	0.2497±0.0046
Genbase	0.9527±0.0991	0.9525±0.0940	0.9551±0.0966	**0.9584±0.0939**	0.9505±0.1022	**0.9584±0.0940**	0.9469±0.0964	0.9493±0.0941
Langlog	**0.3132±0.0285**	**0.3038±0.0226**	0.2580±0.0113	0.2600±0.0108	0.2589±0.0157	0.2912±0.0188	0.2694±0.0112	0.3031±0.0239
Medical	**0.7950±0.0857**	**0.7998±0.0878**	0.6852±0.0453	0.7454±0.0656	0.7558±0.0783	0.7656±0.0757	0.7520±0.0747	0.7627±0.0791
Slashdot	**0.4746±0.0285**	**0.4767±0.0291**	0.4406±0.0122	0.4554±0.0147	0.4659±0.0236	0.4729±0.0263	0.4719±0.0244	0.4722±0.0247
Yeast	0.7426±0.0122	0.7435±0.0123	0.7417±0.0124	0.7397±0.0120	0.7360±0.0123	**0.7460±0.0132**	0.7422±0.0118	0.7428±0.0119
Arts	**0.5142±0.0239**	**0.5151±0.0247**	0.4861±0.0132	0.5021±0.0152	0.4923±0.0167	0.5120±0.0204	0.5076±0.0196	0.5096±0.0196
Business	**0.8743±0.0041**	0.8736±0.0036	0.8658±0.0036	0.8701±0.0026	0.8669±0.0037	0.8731±0.0030	0.8736±0.0040	**0.8739±0.0036**
Entertainment	0.5730±0.0313	**0.5755±0.0345**	0.5138±0.0161	0.5224±0.0098	0.5111±0.0202	**0.5754±0.0307**	0.5559±0.0315	0.5494±0.0245
Health	**0.7094±0.0195**	**0.7118±0.0225**	0.6763±0.0099	0.6870±0.0110	0.6902±0.0164	0.7001±0.0179	0.7025±0.0195	0.7054±0.0205
Recreation	**0.5326±0.0353**	**0.5368±0.0377**	0.3881±0.0102	0.5013±0.0198	0.4452±0.0291	0.5278±0.0303	0.5285±0.0341	0.5295±0.0342
Reference	**0.6231±0.0242**	**0.6207±0.0232**	0.5988±0.0100	0.5977±0.0089	0.6064±0.0196	0.6200±0.0198	0.6129±0.0224	0.6200±0.0200
Science	**0.4852±0.0199**	**0.4873±0.0218**	0.4303±0.0100	0.4582±0.0088	0.4542±0.0112	0.4677±0.0133	0.4774±0.0204	0.4788±0.0197
Social	**0.7166±0.0160**	**0.7168±0.0174**	0.6974±0.0077	0.6989±0.0112	0.7039±0.0097	0.7073±0.0124	0.7078±0.0156	0.7099±0.0141

| Data set | *Macro-F1↑* | | | | | | | |
	GRROfast	GRRO	PMU	MDMR	FIMF	SCLS	MICO	LRFS
Bibtex	**0.0538±0.0335**	**0.0545±0.0332**	0.0026±0.0017	0.0225±0.0050	0.0062±0.0032	0.0355±0.0160	0.0362±0.0188	0.0369±0.0194
Birds	0.1025±0.0210	0.1222±0.0246	0.0890±0.0215	0.1061±0.0146	0.0769±0.0175	0.1012±0.0205	0.1110±0.0286	**0.1312±0.0328**
Chemistry	**0.0103±0.0066**	**0.0117±0.0060**	0.0024±0.0011	0.0037±0.0015	0.0033±0.0017	0.0085±0.0046	0.0100±0.0058	0.0100±0.0057
Chess	**0.0211±0.0095**	**0.0209±0.0081**	0.0038±0.0019	0.0052±0.0020	0.0061±0.0041	0.0124±0.0037	0.0149±0.0065	0.0154±0.0066
Coffee	0.4925±0.0035	**0.4973±0.0047**	0.4905±0.0018	0.4897±0.0016	0.4901±0.0023	0.4904±0.0019	**0.4934±0.0046**	0.4929±0.0044
Cooking	**0.0285±0.0152**	**0.0283±0.0147**	0.0024±0.0022	0.0089±0.0022	0.0043±0.0034	0.0228±0.0125	0.0245±0.0141	0.0243±0.0140
Cs	**0.0263±0.0106**	**0.0286±0.0116**	0.0013±0.0008	0.0116±0.0022	0.0033±0.0019	0.0188±0.0064	0.0205±0.0076	0.0206±0.0075
Philosophy	**0.0275±0.0097**	**0.0298±0.0107**	0.0028±0.0011	0.0068±0.0010	0.0030±0.0012	0.0194±0.0059	0.0196±0.0065	0.0193±0.0061
Corel5k	**0.2994±0.0015**	**0.3010±0.0024**	0.2968±0.0006	0.2968±0.0006	0.2968±0.0008	0.2981±0.0014	0.2979±0.0013	0.2980±0.0011
Corel16k001	**0.0035±0.0016**	**0.0035±0.0016**	0.0001±0.0001	0.0019±0.0013	0.0025±0.0018	0.0016±0.0013	0.0017±0.0012	0.0018±0.0013
Corel16k002	**0.0048±0.0013**	**0.0050±0.0015**	0.0001±0.0001	0.0035±0.0004	0.0001±0.0000	0.0039±0.0006	0.0044±0.0014	0.0043±0.0013
Genbase	0.5856±0.1372	0.5803±0.1446	0.5393±0.1225	0.5533±0.1231	**0.5903±0.1571**	0.5663±0.1317	0.5646±0.1425	0.5676±0.1384
Langlog	**0.1200±0.0042**	**0.1178±0.0030**	0.1079±0.0015	0.1103±0.0022	0.1070±0.0005	0.1139±0.0029	0.1150±0.0051	0.1142±0.0033
Medical	**0.3596±0.0590**	**0.3520±0.0573**	0.2472±0.0162	0.3022±0.0342	0.3122±0.0559	0.3228±0.0490	0.3139±0.0555	0.3228±0.0549
Slashdot	**0.2193±0.0323**	**0.2254±0.0318**	0.1718±0.0106	0.1893±0.0155	0.2024±0.0203	0.2126±0.0244	0.2167±0.0271	0.2150±0.0262
Yeast	0.3244±0.0478	0.3220±0.0472	0.3049±0.0410	0.2987±0.0402	0.3008±0.0500	**0.3320±0.0522**	0.3196±0.0468	0.3240±0.0430
Arts	**0.0778±0.0215**	0.0759±0.0212	0.0499±0.0143	0.0632±0.0107	0.0529±0.0182	**0.0773±0.0180**	0.0702±0.0152	0.0751±0.0176
Business	0.1548±0.0153	0.1533±0.0137	0.0519±0.0095	0.1404±0.0071	0.1329±0.0149	0.1519±0.0121	**0.1582±0.0179**	0.1566±0.0146
Entertainment	**0.1249±0.0403**	**0.1227±0.0399**	0.0641±0.0120	0.0864±0.0121	0.0642±0.0197	0.1183±0.0319	0.0927±0.0342	0.1007±0.0227
Health	0.2170±0.0297	**0.2280±0.0330**	0.1291±0.0193	0.2008±0.0190	0.2048±0.0247	**0.2175±0.0304**	0.2141±0.0257	0.2163±0.0266
Recreation	**0.1345±0.0338**	**0.1371±0.0356**	0.0073±0.0077	0.1231±0.0228	0.0585±0.0266	0.1302±0.0270	0.1284±0.0305	0.1286±0.0290
Reference	0.1208±0.0173	**0.1220±0.0177**	0.0399±0.0074	0.1004±0.0068	0.1040±0.0138	0.1200±0.0170	0.1168±0.0186	**0.1215±0.0176**
Science	**0.0590±0.0139**	**0.0604±0.0143**	0.0163±0.0069	0.0416±0.0074	0.0387±0.0099	0.0486±0.0092	0.0541±0.0136	0.0571±0.0129
Social	**0.1284±0.0243**	**0.1317±0.0220**	0.1138±0.0111	0.1149±0.0125	0.1099±0.0149	0.1213±0.0159	0.1121±0.0170	0.1139±0.0167

| Data set | *Micro-F1↑* | | | | | | | |
	GRROfast	GRRO	PMU	MDMR	FIMF	SCLS	MICO	LRFS
Bibtex	**0.2214±0.0689**	**0.2205±0.0715**	0.0153±0.0107	0.1610±0.0124	0.0794±0.0354	0.1957±0.0382	0.1988±0.0475	0.1995±0.0483
Birds	0.4350±0.0588	0.4890±0.0322	0.3661±0.0390	0.4080±0.0383	0.3607±0.0403	0.4314±0.0353	0.4999±0.0316	**0.5156±0.0353**
Chemistry	**0.0439±0.0233**	**0.0508±0.0236**	0.0153±0.0091	0.0235±0.0098	0.0190±0.0100	0.0411±0.0194	0.0430±0.0208	0.0430±0.0197
Chess	**0.1874±0.0364**	**0.1887±0.0257**	0.0854±0.0328	0.0995±0.0147	0.0919±0.0351	0.1566±0.0257	0.1621±0.0383	0.1657±0.0360
Coffee	0.0294±0.0190	**0.0435±0.0233**	0.0196±0.0133	0.0171±0.0137	0.0162±0.0179	0.0196±0.0144	**0.0391±0.0264**	0.0367±0.0265
Cooking	**0.1679±0.0563**	**0.1699±0.0575**	0.0156±0.0156	0.0789±0.0145	0.0337±0.0253	0.1491±0.0547	0.1532±0.0625	0.1525±0.0612
Cs	**0.1469±0.0370**	**0.1564±0.0419**	0.0115±0.0069	0.0853±0.0147	0.0309±0.0158	0.1266±0.0285	0.1356±0.0363	0.1353±0.0340
Philosophy	**0.1795±0.0269**	**0.1825±0.0361**	0.0505±0.0193	0.0903±0.0149	0.0513±0.0200	0.1637±0.0226	0.1640±0.0224	0.1644±0.0226
Corel5k	**0.0103±0.0058**	**0.0170±0.0095**	0.0003±0.0006	0.0004±0.0009	0.0010±0.0012	0.0050±0.0044	0.0055±0.0042	0.0054±0.0039
Corel16k001	**0.0072±0.0045**	**0.0072±0.0045**	0.0001±0.0002	0.0015±0.0010	0.0018±0.0012	0.0033±0.0031	0.0046±0.0036	0.0044±0.0036
Corel16k002	0.0085±0.0033	**0.0095±0.0035**	0.0002±0.0002	0.0038±0.0005	0.0001±0.0001	0.0078±0.0027	**0.0086±0.0039**	0.0081±0.0034
Genbase	0.9093±0.1317	0.9066±0.1290	0.8778±0.1282	0.9003±0.1258	0.8948±0.1378	0.9053±0.1280	0.8974±0.1285	0.9003±0.1263
Langlog	**0.0896±0.0168**	**0.0782±0.0175**	0.0058±0.0080	0.0306±0.0231	0.0011±0.0016	0.0536±0.0236	0.0638±0.0435	0.0563±0.0269
Medical	0.7038±0.0760	**0.7117±0.0771**	0.5447±0.0362	0.6576±0.0710	0.6587±0.0870	0.6599±0.0628	0.6624±0.0674	0.6750±0.0696
Slashdot	**0.2347±0.0488**	**0.2330±0.0492**	0.1338±0.0182	0.1739±0.0243	0.1990±0.0321	0.2220±0.0407	0.2240±0.0419	0.2209±0.0400
Yeast	0.6044±0.0325	0.6054±0.0349	0.5949±0.0280	0.5884±0.0281	0.5976±0.0341	**0.6085±0.0340**	0.6065±0.0344	0.6069±0.0294
Arts	**0.1987±0.0447**	**0.1996±0.0468**	0.1227±0.0355	0.1693±0.0274	0.1276±0.0482	0.1891±0.0368	0.1797±0.0339	0.1912±0.0398
Business	**0.6915±0.0092**	0.6907±0.0086	0.6757±0.0039	0.6825±0.0046	0.6789±0.0057	0.6894±0.0065	**0.6913±0.0098**	0.6908±0.0078
Entertainment	**0.2965±0.0809**	**0.2931±0.0773**	0.1085±0.0216	0.2158±0.0316	0.1217±0.0438	0.2806±0.0544	0.2387±0.0838	0.2628±0.0572
Health	0.4930±0.0290	**0.5123±0.0245**	0.4376±0.0290	0.4585±0.0290	0.4682±0.0270	0.4777±0.0254	0.4996±0.0216	**0.5070±0.0224**
Recreation	**0.2689±0.0534**	**0.2713±0.0552**	0.0105±0.0117	0.2302±0.0329	0.1174±0.0492	0.2623±0.0449	0.2636±0.0535	0.2649±0.0503
Reference	**0.3854±0.0459**	**0.3830±0.0421**	0.3265±0.0266	0.3267±0.0254	0.3289±0.0366	0.3693±0.0390	0.3665±0.0390	0.3741±0.0427
Science	**0.1816±0.0359**	**0.1830±0.0423**	0.0407±0.0194	0.1187±0.0223	0.1148±0.0240	0.1502±0.0312	0.1700±0.0379	0.1750±0.0410
Social	**0.5118±0.0633**	**0.5152±0.0627**	0.4379±0.0527	0.4468±0.0595	0.4740±0.0469	0.4813±0.0491	0.4936±0.0531	0.4880±0.0579