		Hammi	na loce			Rankin	g loss↓	
Data set	GRROfast	GRROfast _o	GRRO	GRRO _o	GRROfast	GRROfast _o	GRRO GRRO	GRRO _o
Bibtex	0.0136 ± 0.0004	0.0138±0.0003	$0.0136 {\pm} 0.0004$	0.0137±0.0003	0.2006 ± 0.0349	0.2074±0.0335	$0.1986 {\pm} 0.0334$	0.2060 ± 0.0343
Birds	0.0581 ± 0.0023	0.0549 ± 0.0060	0.0551 ± 0.0025	0.0537 ± 0.0038	0.1301 ± 0.0120	0.1241 ± 0.0067	0.1284 ± 0.0145	$0.1265 {\pm} 0.0085$
Chemistry	0.0121 ± 0.0001	0.0121 ± 0.0000	0.0121 ± 0.0000	0.0121 ± 0.0000	$0.1542 {\pm} 0.0082$	0.1546 ± 0.0079	0.1540 ± 0.0077	0.1549 ± 0.0071
Chess	0.0100 ± 0.0001	0.0100 ± 0.0001	0.0100 ± 0.0001	0.0101 ± 0.0001	0.1459 ± 0.0081	0.1490 ± 0.0072	0.1441 ± 0.0083	0.1470 ± 0.0071
Coffee	0.0161 ± 0.0003	0.0159 ± 0.0003	0.0158±0.0002	0.0159 ± 0.0004	0.1564 ± 0.0142	0.1630 ± 0.0138	0.1627±0.0110	0.1646 ± 0.0140
Cooking	0.0052 ± 0.0001	0.0053 ± 0.0001	0.0052 ± 0.0001	0.0052 ± 0.0001	0.1850 ± 0.0161	0.1857 ± 0.0163	0.1836±0.0156	0.1852 ± 0.0159
Cs Philosophy	$0.0088 \pm 0.0001 \\ 0.0091 \pm 0.0001$	$0.0088 {\pm} 0.0001 \\ 0.0091 {\pm} 0.0001$	$0.0088 \pm 0.0001 \ 0.0091 \pm 0.0001$	$0.0088 {\pm} 0.0001 \ 0.0091 {\pm} 0.0001$	$0.1477{\pm}0.0100 \ 0.1399{\pm}0.0057$	0.1500 ± 0.0089 0.1419 ± 0.0052	$0.1457 \pm 0.0117 \ 0.1383 \pm 0.0067$	0.1492 ± 0.0097 0.1403 ± 0.0060
Corel5k	0.0091 ± 0.0001 0.0095 ± 0.0000	0.0091 ± 0.0001 0.0095 ± 0.0000	0.0091 ± 0.0001 0.0094 ± 0.0000	0.0091 ± 0.0001 0.0095 ± 0.0000	0.1379 ± 0.0037 0.1370 ± 0.0036	0.1376 ± 0.0032	0.1358 ± 0.0038	0.1376 ± 0.0030
Corel16k001	0.0188 ± 0.0000	0.0188 ± 0.0000	0.0188 ± 0.0000	0.0188 ± 0.0000	$0.1864{\pm}0.0026$	0.1867 ± 0.0024	0.1864 ± 0.0026	0.1867 ± 0.0024
Corel16k002	0.0174 ± 0.0000	0.0174 ± 0.0000	0.0174 ± 0.0000	0.0174 ± 0.0000	0.1846 ± 0.0023	$0.1841 {\pm} 0.0026$	0.1844 ± 0.0025	0.1840 ± 0.0027
Genbase	0.0067 ± 0.0077	$0.0066 {\pm} 0.0078$	0.0069 ± 0.0077	0.0070 ± 0.0076	0.0153 ± 0.0216	0.0154 ± 0.0215	0.0149 ± 0.0206	0.0152 ± 0.0208
Langlog	0.0156 ± 0.0002	0.0156 ± 0.0001	0.0156 ± 0.0001	0.0156 ± 0.0001	$0.1545{\pm}0.0083$	0.1573 ± 0.0069	0.1578 ± 0.0065	0.1559 ± 0.0070
Medical	0.0142 ± 0.0022	0.0142 ± 0.0022	0.0138±0.0025	0.0142 ± 0.0022	0.0573 ± 0.0191	0.0572 ± 0.0189	0.0571±0.0189	0.0572 ± 0.0189
Slashdot	0.0486 ± 0.0010	0.0492±0.0008	0.0486 ± 0.0011	0.0490 ± 0.0008	0.1792 ± 0.0096	0.1792 ± 0.0100	0.1769±0.0086	0.1776 ± 0.0084
Yeast Arts	$0.2093 \pm 0.0094 \\ 0.0587 \pm 0.0010$	0.2093±0.0096 0.0590±0.0008	0.2086 ± 0.0103 0.0586 ± 0.0011	0.2082 ± 0.0093 0.0589 ± 0.0008	0.1837±0.0089 0.1515±0.0085	0.1834 ± 0.0092 0.1531 ± 0.0076	$0.1834 {\pm} 0.0085 \ 0.1514 {\pm} 0.0087$	0.1834 ± 0.0086 0.1529 ± 0.0074
Business	0.0274 ± 0.0016	0.0275 ± 0.0005	0.0274 ± 0.0005	0.0274 ± 0.0005	0.0417 ± 0.0003	0.0416 ± 0.0020	0.0423 ± 0.0007	0.0417 ± 0.0019
Entertainment	0.0585 ± 0.0024	0.0590 ± 0.0024	0.0585 ± 0.0024	0.0590 ± 0.0025	0.1224 ± 0.0087	0.1240 ± 0.0078	0.1222 ± 0.0094	0.1244 ± 0.0077
Health	$0.0405 {\pm} 0.0017$	0.0406 ± 0.0019	0.0403 ± 0.0019	0.0404 ± 0.0020	0.0599 ± 0.0061	0.0599 ± 0.0064	$0.0594{\pm}0.0065$	0.0595 ± 0.0065
Recreation	0.0574 ± 0.0014	0.0573 ± 0.0014	0.0572 ± 0.0015	0.0574 ± 0.0014	0.1709 ± 0.0138	0.1718 ± 0.0138	0.1692 ± 0.0149	0.1713 ± 0.0141
Reference	0.0286 ± 0.0009	$0.0284{\pm}0.0009$	0.0286 ± 0.0008	$0.0285{\pm}0.0008$	$0.0894{\pm}0.0064$	0.0907 ± 0.0065	$0.0894{\pm}0.0065$	0.0911 ± 0.0065
Science	0.0336 ± 0.0005	0.0337 ± 0.0004	0.0336 ± 0.0005	0.0337 ± 0.0004	0.1346 ± 0.0071	0.1372 ± 0.0065	0.1323 ± 0.0076	0.1355 ± 0.0060
Social	0.0243 ± 0.0014	0.0237±0.0017	0.0245 ± 0.0015	0.0240 ± 0.0018	0.0673 ± 0.0053	0.0694±0.0038	0.0670±0.0050	0.0692 ± 0.0040
Data set	GRROfast	GRROfast _o	rage↓ GRRO	GRRO	GRROfast	Average p	recision↑ GRRO	GRRO _o
Bibtex	0.3166±0.0434	0.3269 ± 0.0409	0.3128±0.0424	0.3248 ± 0.0422	0.3569±0.0697	GRROfast _o 0.3351 ± 0.0718	0.3526±0.0633	0.3371 ± 0.0758
Birds	0.1826 ± 0.0156	0.1758 ± 0.0082	0.3123 ± 0.0424 0.1831 ± 0.0185	0.1805 ± 0.0102	0.6720 ± 0.0097	0.6924 ± 0.0237	0.6910 ± 0.0253	0.6981 ± 0.0262
Chemistry	0.2552 ± 0.0094	0.2558 ± 0.0087	0.2551 ± 0.0091	0.2563 ± 0.0079	0.2947 ± 0.0252	0.2925 ± 0.0228	0.2971 ± 0.0238	0.2927 ± 0.0230
Chess	0.2724 ± 0.0103	0.2754 ± 0.0098	0.2694 ± 0.0106	0.2743 ± 0.0090	0.3275 ± 0.0394	0.3116 ± 0.0328	0.3325 ± 0.0392	0.3241 ± 0.0335
Coffee	$0.2598 \!\pm\! 0.0143$	0.2630 ± 0.0157	$0.2667{\pm}0.0074$	0.2695 ± 0.0155	$0.3613\!\pm\!0.0438$	0.3480 ± 0.0355	$0.3671 {\pm} 0.0436$	0.3625 ± 0.0423
Cooking	0.3096 ± 0.0187	0.3105 ± 0.0193	$0.3082 {\pm} 0.0181$	0.3102 ± 0.0188	$0.2626 {\pm} 0.0618$	0.2533 ± 0.0617	0.2659 ± 0.0604	0.2603 ± 0.0633
Cs	0.2708 ± 0.0135	0.2740 ± 0.0126	0.2684 ± 0.0154	0.2732 ± 0.0134	0.3211 ± 0.0324	0.3138 ± 0.0285	0.3263 ± 0.0352	0.3156 ± 0.0289
Philosophy	0.2498 ± 0.0067	0.2522 ± 0.0058	0.2474 ± 0.0081	0.2500 ± 0.0068	0.3355 ± 0.0335	0.3159 ± 0.0273	0.3366±0.0341	0.3262 ± 0.0291
Corel5k Corel16k001	0.3155 ± 0.0042 0.3565 ± 0.0033	0.3157 ± 0.0041	0.3128 ± 0.0048	0.3160 ± 0.0036	$0.2374 \pm 0.0101 \\ 0.2597 \pm 0.0052$	0.2303 ± 0.0067 0.2592 ± 0.0046	$0.2425 \pm 0.0116 \ 0.2597 \pm 0.0052$	0.2336 ± 0.0078
Corel16k001	0.3549 ± 0.0033	0.3574 ± 0.0031 0.3536 ± 0.0041	0.3565±0.0033 0.3544±0.0037	0.3574 ± 0.0031 0.3534 ± 0.0044	0.2597 ± 0.0032 0.2501 ± 0.0042	0.2592 ± 0.0046 0.2501 ± 0.0046	0.2597 ± 0.0032 0.2501 ± 0.0042	0.2591 ± 0.0046 0.2499 ± 0.0044
Genbase	0.0297 ± 0.0224	0.0298 ± 0.0224	0.0294 ± 0.0214	0.0296 ± 0.0216	0.9527 ± 0.0991	0.9526 ± 0.0990	0.9525 ± 0.0940	0.9517 ± 0.0956
Langlog	0.1594 ± 0.0077	0.1630 ± 0.0057	0.1632 ± 0.0065	0.1617 ± 0.0058	0.3132 ± 0.0285	0.3035 ± 0.0297	0.3038 ± 0.0226	0.3095 ± 0.0286
Medical	0.0804 ± 0.0206	0.0803 ± 0.0206	0.0799 ± 0.0205	0.0803 ± 0.0206	0.7950 ± 0.0857	0.7917 ± 0.0826	$0.7998 {\pm} 0.0878$	0.7920 ± 0.0827
Slashdot	0.1954 ± 0.0086	0.1949 ± 0.0093	0.1930 ± 0.0080	0.1934 ± 0.0078	$0.4746{\pm}0.0285$	0.4732 ± 0.0267	$0.4767{\pm}0.0291$	0.4767 ± 0.0272
Yeast	0.4702 ± 0.0111	0.4701 ± 0.0114	0.4690 ± 0.0099	0.4696 ± 0.0101	0.7426 ± 0.0122	0.7424 ± 0.0123	0.7435 ± 0.0123	0.7432 ± 0.0120
Arts	0.2103 ± 0.0082	0.2115 ± 0.0074	0.2101 ± 0.0084	0.2115 ± 0.0071	0.5142 ± 0.0239	0.5103 ± 0.0221	0.5151±0.0247	0.5106 ± 0.0210
Business Entertainment	0.0777 ± 0.0023 0.1584 ± 0.0090	0.0774 ± 0.0025 0.1602 ± 0.0082	0.0782 ± 0.0019 0.1577 ± 0.0100	0.0775±0.0025 0.1608±0.0079	$0.8743 \pm 0.0041 \\ 0.5730 \pm 0.0313$	0.8740 ± 0.0042 0.5728 ± 0.0328	0.8736±0.0036 0.5755±0.0345	0.8739 ± 0.0042 0.5713 ± 0.0329
Health	0.1334 ± 0.0030 0.1031 ± 0.0073	0.1002 ± 0.0082 0.1031 ± 0.0075	0.1377 ± 0.0100 0.1025 ± 0.0079	0.1008 ± 0.0079 0.1025 ± 0.0077	0.7094 ± 0.0195	0.5728 ± 0.0328 0.7116 ± 0.0224	0.5753 ± 0.0345 0.7118 ± 0.0225	0.5713 ± 0.0329 0.7135 ± 0.0231
Recreation	0.2131 ± 0.0140	0.2140 ± 0.0139	0.2116 ± 0.0150	0.2137 ± 0.0141	0.5326 ± 0.0353	0.5302 ± 0.0347	0.5368 ± 0.0377	0.5303 ± 0.0251 0.5303 ± 0.0351
Reference	0.1048 ± 0.0063	0.1061 ± 0.0065	0.1047 ± 0.0065	0.1064 ± 0.0064	0.6231 ± 0.0242	0.6224 ± 0.0223	0.6207 ± 0.0232	0.6198 ± 0.0223
Science	0.1706 ± 0.0075	0.1735 ± 0.0066	$0.1684{\pm}0.0081$	0.1716 ± 0.0060	$0.4852 {\pm} 0.0199$	0.4790 ± 0.0186	$0.4873\!\pm\!0.0218$	0.4747 ± 0.0167
Social	0.0923 ± 0.0059	0.0950 ± 0.0035	0.0919 ± 0.0056	0.0947 ± 0.0039	0.7166 ± 0.0160	0.7118 ± 0.0145	$0.7168 {\pm} 0.0174$	0.7124 ± 0.0150
Data set		Macro				Micro		
	GRROfast	GRROfast _o	GRRO	GRRO _o	GRROfast	GRROfast _o	GRRO	GRRO _o
Bibtex Birds	0.0538 ± 0.0335 0.1025 ± 0.0210	0.0499 ± 0.0280	0.0545 ± 0.0332 0.1222 ± 0.0246	0.0495 ± 0.0283	0.2214 ± 0.0689 0.4350 ± 0.0588	0.2151 ± 0.0595 0.4784 ± 0.0713	0.2205±0.0715 0.4890±0.0322	0.2165 ± 0.0601
Chemistry	0.1023 ± 0.0210 0.0103 ± 0.0066	0.1314±0.0316 0.0093±0.0060	0.1222 ± 0.0246 0.0117 ± 0.0060	0.1318±0.0236 0.0103±0.0060	0.4350 ± 0.0388 0.0439 ± 0.0233	0.4784 ± 0.0713 0.0411 ± 0.0207	0.4890 ± 0.0322 0.0508 ± 0.0236	0.5045 ± 0.0344 0.0456 ± 0.0230
Chess	0.0211 ± 0.0095	0.0152 ± 0.0058	0.0209 ± 0.0081	0.0165 ± 0.0058	0.1874 ± 0.0364	0.1704 ± 0.0284	0.1887 ± 0.0257	0.1704 ± 0.0247
Coffee	0.4925 ± 0.0035	0.4946 ± 0.0052	0.4973 ± 0.0047	0.4947 ± 0.0063	0.0294 ± 0.0190	0.0375 ± 0.0237	0.0435 ± 0.0233	0.0454 ± 0.0357
Cooking	$0.0285{\pm}0.0152$	0.0247 ± 0.0138	0.0283 ± 0.0147	0.0258 ± 0.0147	$0.1679\!\pm\!0.0563$	0.1527 ± 0.0557	0.1699 ± 0.0575	0.1585 ± 0.0601
Cs	$0.0263 {\pm} 0.0106$	0.0222 ± 0.0086	$0.0286{\pm}0.0116$	0.0229 ± 0.0086	0.1469 ± 0.0370	0.1405 ± 0.0362	$0.1564{\pm}0.0419$	0.1410 ± 0.0320
Philosophy	0.0275 ± 0.0097	0.0173 ± 0.0058	0.0298 ± 0.0107	0.0224 ± 0.0072	0.1795 ± 0.0269	0.1561 ± 0.0213	0.1825 ± 0.0361	0.1694 ± 0.0235
Corel5k	0.2994 ± 0.0015	0.2985 ± 0.0012	0.3010±0.0024	0.2979 ± 0.0015	0.0103 ± 0.0058	0.0064 ± 0.0043	0.0170±0.0095	0.0064 ± 0.0041
Corel16k001	0.0035 ± 0.0016	0.0020 ± 0.0013	0.0035±0.0016	0.0021 ± 0.0013	0.0072 ± 0.0045	0.0053 ± 0.0038	0.0072±0.0045	0.0052 ± 0.0038
Corel16k002 Genbase	0.0048 ± 0.0013 0.5856 ± 0.1372	$0.0048 {\pm} 0.0014 \\ 0.5894 {\pm} 0.1407$	0.0050±0.0015 0.5803±0.1446	0.0049 ± 0.0014 0.5858 ± 0.1435	0.0085 ± 0.0033 0.9093 ± 0.1317	$0.0089 \pm 0.0039 \\ 0.9100 \pm 0.1319$	0.0095 ± 0.0035 0.9066 ± 0.1290	0.0089 ± 0.0036 0.9065 ± 0.1285
Langlog	0.1200 ± 0.0042	0.1202 ± 0.0041	0.1178 ± 0.0030	0.1199 ± 0.0027	0.0896 ± 0.0168	0.0928 ± 0.0199	0.0782 ± 0.0175	0.0973 ± 0.0169
Medical	0.3596 ± 0.0590	0.3522 ± 0.0574	0.3520 ± 0.0573	0.3516 ± 0.0596	0.7038 ± 0.0760	0.7029 ± 0.0708	0.7117 ± 0.0771	0.7022 ± 0.0707
Slashdot	0.2193 ± 0.0323	0.2151 ± 0.0298	0.2254 ± 0.0318	0.2193 ± 0.0272	$0.2347{\pm}0.0488$	0.2236 ± 0.0439	0.2330 ± 0.0492	0.2276 ± 0.0423
Yeast	$0.3244{\pm}0.0478$	0.3236 ± 0.0469	$0.3220\!\pm\!0.0472$	0.3205 ± 0.0473	$0.6044{\pm}0.0325$	$0.6044 {\pm} 0.0323$	0.6054 ± 0.0349	$0.6059\!\pm\!0.0340$
Arts	0.0778 ± 0.0215	0.0772 ± 0.0192	0.0759 ± 0.0212	0.0777 ± 0.0191	$0.1987 {\pm} 0.0447$	0.1969 ± 0.0390	$0.1996 {\pm} 0.0468$	0.1967 ± 0.0381
Business	0.1548 ± 0.0153	0.1556 ± 0.0152	0.1533 ± 0.0137	0.1556 ± 0.0162	0.6915 ± 0.0092	0.6912 ± 0.0089	0.6907±0.0086	0.6905 ± 0.0087
Entertainment	0.1249 ± 0.0403	0.1097 ± 0.0343	0.1227 ± 0.0399	0.1102 ± 0.0363	0.2965 ± 0.0809	0.2848 ± 0.0839	0.2931±0.0773	0.2866 ± 0.0858
Health	0.2170 ± 0.0297	0.2135 ± 0.0289	0.2280 ± 0.0330	0.2237 ± 0.0345	0.4930 ± 0.0290	0.5066 ± 0.0325	0.5123±0.0245	0.5167 ± 0.0242
Recreation Reference	0.1345 ± 0.0338 0.1208 ± 0.0173	0.1302±0.0319 0.1248±0.0173	0.1371 ± 0.0356 0.1220±0.0177	0.1297 ± 0.0316 0.1236 ± 0.0181	0.2689 ± 0.0534 0.3854 ± 0.0459	0.2676 ± 0.0530 0.3874 ± 0.0385	0.2713 ± 0.0552 0.3830 ± 0.0421	0.2671 ± 0.0532 0.3796 ± 0.0353
Science	0.0590 ± 0.0173	0.0546 ± 0.0135	0.0604 ± 0.0143	0.0534 ± 0.0116	0.1816 ± 0.0359	0.3674 ± 0.0363 0.1725 ± 0.0330	0.3830 ± 0.0421 0.1830 ± 0.0423	0.1659 ± 0.0346
Social	0.1284 ± 0.0243	0.1160 ± 0.0160	0.1317 ± 0.0220	0.1190 ± 0.0180	0.5118 ± 0.0633	0.5002 ± 0.0537	0.5152 ± 0.0627	0.5040 ± 0.0550