Additional Expermental Results for Distributions and Bootstrap for Data-based Stochastic Programming

Xiaotie Chen - Department of Mathematics
David L. Woodruff - Graduate School of Management

UC Davis, Davis CA, USA

August 10, 2023

Abstract

This document contains results of additionla experiments related to the paper "Distributions and Bootstrap for Data-based Stochastic Programming."

This document contains results of additionla experiments related to the paper "Distributions and Bootstrap for Data-based Stochastic Programming."

A Tables

method	N	B-I	B-MC	MMW-n	len-ave	len-std	coverage-2	coverage-1	time-ave	time-s
smoothed_bagging_MH	40	10	20	20	2048.81	581.39	0.984	0.995	18.24	0.
smoothed_bagging_MH	40	10	100	20	1615.52	476.09	0.930	0.979	68.35	2.

Table 1: Results for multi_knapsack_fit with α=0.05 based on 800 replications.

method	N	B-I	B-MC	MMW-n	len-ave	len-std	coverage-2	coverage-1	time-ave	time-
smoothed_bagging_MH	40	10	20	20	7752.49	1451.95	0.999	1.000	21.97	1
smoothed_bagging_MH	40	10	100	20	6918.52	1025.79	1.000	1.000	80.36	4
smoothed_bagging_MH	40	20	20	20	7891.63	983.35	1.000	1.000	22.23	0
smoothed_bagging_MH	40	20	100	20	7042.36	761.73	1.000	1.000	81.56	2

Table 2: Results for farmer_fit with α=0.05 based on 800 replications.

method	N	B-I	B-MC	MMW-n	len-ave	len-std	coverage-2	coverage-1	time-ave	time-s
smoothed_bagging_MH	40	10	20	20	1.69	0.75	0.968	0.994	3.22	0.
smoothed_bagging_MH	40	10	40	20	1.39	0.61	0.912	0.983	5.60	0.
smoothed_bagging_MH	40	10	100	20	1.22	0.62	0.879	0.968	11.06	0.
smoothed_bagging_MH	40	20	20	20	1.77	0.67	0.981	0.995	3.65	0.
smoothed_bagging_MH	40	20	40	20	1.47	0.56	0.963	0.989	6.52	0.
smoothed_bagging_MH	40	20	80	20	1.29	0.52	0.916	0.981	10.69	0.
smoothed_bagging_MH	40	20	100	20	1.30	0.54	0.934	0.980	13.06	0.
smoothed_bagging_MH	40	30	20	20	1.78	0.63	0.983	0.995	7.70	2.
smoothed_bagging_MH	40	30	100	20	1.33	0.51	0.949	0.984	26.87	7.

Table 3: Results for cvar_fit with α=0.05 based on 800 replications.

method	N	nB	MMW-n	len-ave	len-std	coverage-2	coverage-1	time-ave	time-std
smoothed_bagging	40	100	10	1.30	0.50	0.851	0.988	0.81	0.13
smoothed_bagging	40	200	10	1.32	0.47	0.880	0.994	1.15	0.18
smoothed_bagging	40	400	10	1.35	0.44	0.891	0.998	1.90	0.25
smoothed_bagging	40	800	10	1.33	0.42	0.906	0.998	3.33	0.36
smoothed_bagging	40	1200	10	1.35	0.42	0.904	0.998	4.57	0.42
smoothed_bagging	40	100	20	1.21	0.52	0.865	0.964	1.31	0.23
smoothed_bagging	40	200	20	1.26	0.49	0.912	0.980	1.83	0.26
smoothed_bagging	40	400	20	1.29	0.46	0.929	0.988	3.05	0.36
smoothed_bagging	40	800	20	1.28	0.43	0.945	0.983	5.38	0.50
smoothed_bagging	40	1500	20	1.30	0.43	0.938	0.988	9.43	0.74
smoothed_bagging	40	2000	20	1.28	0.43	0.945	0.985	12.03	0.80
smoothed_bagging	40	100	40	1.12	0.54	0.824	0.932	2.24	0.38
smoothed_bagging	40	200	40	1.19	0.51	0.897	0.965	3.25	0.46
smoothed_bagging	40	400	40	1.25	0.48	0.925	0.974	5.33	0.60
smoothed_bagging	40	800	40	1.24	0.45	0.938	0.964	9.50	0.75

Table 4: Results for cvar_fit with α=0.05 based on 800 replications.

method	N	nB	MMW-n	len-ave	len-std	coverage-2	coverage-1	time-ave	time-std
smoothed_bagging	40	100	10	4244.31	389.61	0.954	0.999	4.49	0.69
smoothed_bagging	40	200	10	4274.51	296.60	0.965	1.000	5.96	0.77
smoothed_bagging	40	400	10	4282.44	250.35	0.968	1.000	9.59	0.97
smoothed_bagging	40	800	10	4283.14	218.37	0.964	1.000	16.66	1.26
smoothed_bagging	40	100	20	3994.59	491.18	0.963	0.996	7.36	1.06
smoothed_bagging	40	200	20	4063.41	369.44	0.975	1.000	9.66	1.20
smoothed_bagging	40	400	20	4081.57	297.11	0.978	1.000	15.68	1.43
smoothed_bagging	40	800	20	4090.25	251.64	0.971	0.998	27.86	2.02
smoothed_bagging	40	100	40	3801.69	624.32	0.953	0.989	13.05	1.89
smoothed_bagging	40	200	40	3911.25	465.83	0.981	0.999	17.45	2.13
smoothed_bagging	40	400	40	3972.89	367.00	0.981	0.999	28.41	2.66
smoothed_bagging	40	800	40	3995.92	298.06	0.974	0.998	50.26	3.39

Table 5: Results for farmer_fit with α=0.05 based on 800 replications.

method	N	nB	MMW-n	len-ave	len-std	coverage-2	coverage-1	time-ave	time-std
smoothed_bagging	40	100	10	1716.17	324.63	0.874	0.996	4.37	0.40
smoothed_bagging	40	200	10	1745.87	279.21	0.901	0.999	5.68	0.37
smoothed_bagging	40	400	10	1754.31	229.31	0.924	1.000	9.00	0.42
smoothed_bagging	40	800	10	1763.86	217.84	0.916	1.000	15.41	0.52
smoothed_bagging	40	100	20	1610.07	389.46	0.948	0.975	6.92	0.49
smoothed_bagging	40	200	20	1657.78	336.08	0.968	0.991	9.15	0.49
smoothed_bagging	40	400	20	1683.82	270.78	0.978	0.995	14.70	0.57
smoothed_bagging	40	800	20	1697.83	251.39	0.980	0.996	25.96	0.74
smoothed_bagging	40	100	40	1470.24	459.37	0.907	0.925	11.95	0.70
smoothed_bagging	40	200	40	1565.41	389.77	0.943	0.951	15.80	0.63
smoothed_bagging	40	400	40	1618.27	309.96	0.960	0.973	26.49	0.85
smoothed_bagging	40	800	40	1644.07	281.02	0.979	0.985	47.56	1.13

Table 6: Results for multi_knapsack_fit with α=0.05 based on 800 replications.

method	N	nB	MMW-n	len-avg	len-std	coverage-2	coverage-1	time-ave	time-std
smoothed_bagging	40	100	20	1.21	0.52	0.865	0.964	1.35	0.24
smoothed_bagging	40	200	20	1.26	0.49	0.912	0.980	1.83	0.28
smoothed_bagging	40	400	20	1.29	0.46	0.929	0.988	3.01	0.39
smoothed_bagging	40	800	40	1.24	0.45	0.938	0.964	9.35	0.73
smoothed_bagging	40	100	40	1.12	0.54	0.824	0.932	2.27	0.37
smoothed_bagging	40	200	40	1.19	0.51	0.897	0.965	3.18	0.47
smoothed_bagging	40	400	40	1.25	0.48	0.925	0.974	5.36	0.59
bagging_with_replacement	40	100	20	1.19	0.52	0.911	0.935	0.50	0.12
bagging_with_replacement	40	200	20	1.10	0.47	0.900	0.926	0.94	0.24
bagging_with_replacement	40	400	20	1.07	0.45	0.900	0.930	1.83	0.40
bagging_with_replacement	40	800	20	1.02	0.44	0.884	0.917	3.09	0.58

Table 7: Results for cvar_fit with α=0.05 based on 800 replications.

method	N	nB	MMW-n	len-avg	len-std	coverage-2	coverage-1	time-ave	time-std
smoothed_bagging	20	100	10	6077.24	599.66	0.980	0.998	4.10	0.60
smoothed_bagging	20	400	10	6129.12	437.28	0.986	1.000	9.07	0.89
smoothed_bagging	20	200	10	6113.04	498.07	0.981	1.000	5.66	0.68
smoothed_bagging	40	100	20	3994.59	491.18	0.963	0.996	7.36	1.06
smoothed_bagging	40	200	20	4063.41	369.44	0.975	1.000	9.66	1.20
smoothed_bagging	40	400	20	4081.57	297.11	0.978	1.000	15.68	1.43
bagging_with_replacement	40	100	20	7829.56	1352.41	0.931	0.980	2.97	0.57
bagging_with_replacement	40	200	20	7231.19	1156.03	0.921	0.981	5.12	1.10
bagging_with_replacement	40	400	20	6975.07	997.06	0.912	0.970	10.32	2.16
bagging_with_replacement	40	800	20	6847.20	937.95	0.912	0.971	19.77	3.51
bagging_with_replacement	40	100	10	7732.33	1296.52	0.895	0.984	1.65	0.29
bagging_with_replacement	40	200	10	7135.52	1100.24	0.892	0.988	2.50	0.49
bagging_with_replacement	40	400	10	6854.71	944.33	0.897	0.988	5.64	1.37
bagging_with_replacement	40	800	10	6735.89	884.38	0.884	0.983	11.27	2.30

Table 8: Results for farmer_fit with α=0.05 based on 800 replications.

method	N	nB	MMW-n	len-avg	len-std	coverage-2	coverage-1	time-ave	time-std
smoothed_bagging	20	100	10	2525.84	496.56	0.945	1.000	3.89	0.36
smoothed_bagging	20	200	10	2534.64	429.03	0.965	0.998	5.19	0.32
smoothed_bagging	20	400	10	2565.11	404.88	0.973	0.998	8.52	0.40
smoothed_bagging	40	100	20	1605.73	384.87	0.963	0.980	6.89	0.46
smoothed_bagging	40	200	20	1669.15	335.82	0.973	0.998	9.02	0.43
smoothed_bagging	40	400	20	1681.70	287.34	0.970	0.993	14.73	0.54
bagging_with_replacement	20	100	10	2073.25	703.55	0.765	1.000	3.06	0.28
bagging_with_replacement	20	200	10	1920.37	616.58	0.743	0.998	4.73	0.30
bagging_with_replacement	20	400	10	1851.81	630.36	0.675	0.998	9.14	0.38
bagging_with_replacement	40	100	20	1450.20	443.55	0.870	0.995	5.92	0.36
bagging_with_replacement	40	200	20	1363.55	388.91	0.818	0.995	9.09	0.39
bagging_with_replacement	40	400	20	1278.33	362.00	0.805	0.998	17.84	0.55
bagging_with_replacement	100	800	50	725.17	143.44	0.880	0.995	88.16	1.96

Table 9: Results for multi_knapsack_fit with α=0.05 based on 400 replications.

method	N	nB	MMW-n	len-ave	len-std	coverage-2	coverage-1	time-ave	time-std
smoothed_bagging_quantile	20	100	10	1.74	0.84	0.910	0.949	0.71	0.12
smoothed_bagging_quantile	20	200	10	1.78	0.83	0.930	0.954	1.04	0.16
smoothed_bagging_quantile	20	400	10	1.80	0.81	0.943	0.953	1.75	0.22
smoothed_bagging_quantile	20	800	10	1.87	0.85	0.966	0.973	3.11	0.32
smoothed_bagging_quantile	40	100	20	1.15	0.52	0.851	0.924	1.34	0.23
smoothed_bagging_quantile	40	200	20	1.19	0.50	0.909	0.948	1.85	0.26
smoothed_bagging_quantile	40	400	20	1.23	0.46	0.919	0.955	2.97	0.36
smoothed_bagging_quantile	40	800	20	1.21	0.44	0.930	0.946	5.28	0.50

Table 10: Results for cvar_fit with α=0.05 based on 800 replications.

method	N	nB	MMW-n	len-ave	len-std	coverage-2	coverage-1	time-ave	time-std
bagging_with_replacement	20	800	10	9240.00	1738.31	0.873	0.956	10.88	2.16
bagging_with_replacement	40	800	20	6847.20	937.95	0.912	0.971	20.98	3.75
smoothed_bagging_quantile	20	800	10	6110.85	419.54	0.990	1.000	15.82	1.09
smoothed_bagging_quantile	40	800	20	4075.84	265.14	0.970	0.998	27.70	2.01

Table 11: Results for farmer_fit with α=0.05 based on 800 replications.