Sample Pruner	Token Pruner	LLaMA2-7B ARC-E	ARC-C	GSM8K	SQuAD	TriviaQA	Avg	Mistral-7B ARC-E	ARC-C	GSM8K	SQuAD	TriviaQA	Avg
Zero-Shot		53.44	38.98	5.31	12.18	43.00	30.58	66.67	46.10	18.35	10.01	43.77	36.98
12.5% Samples, 50% Tokens													
Random	Random	59.25	41.02	8.11	12.75	48.75	33.98	70.55	48.14	22.74	19.57	52.63	42.73
	PPL	60.49 ↑1.24	43.39 ↑2.37	7.20 ↓0.91	12.20 ↓0.55	48.04 ↓0.71	34.26 ↑0.28	70.72 ↑0.17	48.47 ↑0.33	25.78 ↑3.04	21.36 ↑1.79	53.92 ↑1.29	44.05 ↑1.32
	FastV	59.96 ↑0.71	42.37 ↑1.35	5.76 ↓2.35	11.31 ↓1.44	46.42 ↓2.33	33.17 ↓0.81	70.72 ↑0.17	46.44 ↓1.70	18.80 ↓3.94	19.14 ↓0.43	51.56 ↓1.07	41.33 ↓1.40
	SparseVLM	54.32 ↓4.93	37.97 ↓3.05	7.35 ↓0.76	12.76 ↑0.01	44.65 ↓4.10	31.41 ↓2.57	67.02 ↓3.53	44.75 ↓3.39	20.24 ↓2.50	10.97 ↓8.60	44.61 ↓8.02	37.52 ↓5.21
Longest	Random	59.96 ↑0.71	**44.41 ↑3.39**	7.51 ↓0.60	15.34 ↑2.59	48.91 ↑0.16	35.22 ↑1.24	74.25 ↑3.70	48.81 ↑0.67	28.73 ↑5.99	17.66 ↓1.91	55.73 ↑3.10	45.04 ↑2.31
	PPL	61.19 ↑1.94	43.73 ↑2.71	6.82 ↓1.29	16.33 ↑3.58	48.16 ↓0.59	35.24 ↑1.26	**75.49 ↑4.94**	**50.17 ↑2.03**	27.98 ↑5.24	21.49 ↑1.92	56.55 ↑3.92	46.33 ↑3.60
	FastV	59.25 ↑0.00	43.05 ↑2.03	5.69 ↓2.42	13.64 ↑0.89	46.98 ↓1.77	33.72 ↓0.26	74.43 ↑3.88	49.15 ↑1.01	25.70 ↑2.96	22.89 ↑3.32	54.15 ↑1.52	45.26 ↑2.53
	SparseVLM	54.32 ↓4.93	38.31 ↓2.71	7.13 ↓0.98	10.92 ↓1.83	43.77 ↓4.98	30.89 ↓3.09	69.49 ↑1.06	46.10 ↓2.04	28.89 ↑6.15	8.62 ↓10.95	50.30 ↓2.33	40.68 ↓2.05
InfoBatch	Random	60.31 ↑1.06	41.36 ↑0.34	5.38 ↓2.73	15.71 ↑2.96	47.74 ↓1.01	34.10 ↑0.12	69.31 ↓1.24	45.76 ↓2.38	18.95 ↓3.79	21.23 ↑1.66	50.39 ↓2.24	41.13 ↓1.60
	PPL	59.43 ↑0.18	40.34 ↓0.68	5.91 ↓2.20	13.18 ↑0.43	48.31 ↓0.44	33.44 ↓0.54	70.72 ↑0.17	47.12 ↓1.02	18.12 ↓4.62	24.10 ↑4.53	51.26 ↓1.37	42.26 ↓0.47
	FastV	58.90 ↓0.35	43.39 ↑2.37	3.34 ↓4.77	12.37 ↓0.38	46.88 ↓1.87	32.98 ↓1.00	69.14 ↓1.41	45.42 ↓2.72	14.86 ↓7.88	23.19 ↑3.62	50.58 ↓2.05	40.64 ↓2.09
	SparseVLM	54.67 ↓4.58	40.00 ↓1.02	7.73 ↓0.38	12.41 ↓0.34	45.07 ↓3.68	31.98 ↓2.00	68.25 ↓2.30	45.08 ↓3.06	23.43 ↑0.69	10.17 ↓9.40	45.34 ↓7.29	38.46 ↓4.27
Entropy	Random	60.31 ↑1.06	42.37 ↑1.35	6.44 ↓1.67	14.10 ↑1.35	48.09 ↓0.66	34.27 ↑0.29	72.13 ↑1.58	48.81 ↑0.67	20.09 ↓2.65	17.55 ↓2.02	54.69 ↑2.06	42.66 ↓0.07
	PPL	60.49 ↑1.24	43.73 ↑2.71	6.90 ↓1.21	14.53 ↑1.78	48.76 ↑0.01	34.88 ↑0.90	72.84 ↑2.29	47.80 ↓0.34	24.18 ↑4.44	22.80 ↑3.23	54.69 ↑2.06	44.46 ↑1.73
	FastV	58.91 ↓0.34	43.05 ↑2.03	6.37 ↓1.74	13.03 ↑0.28	47.05 ↓1.70	33.68 ↓0.30	73.90 ↑3.35	47.12 ↓1.02	24.56 ↑1.82	23.96 ↑4.39	54.67 ↑2.04	44.84 ↑2.11
	SparseVLM	55.20 ↓4.05	38.98 ↓2.04	7.51 ↓0.60	12.65 ↓0.10	46.14 ↓2.61	32.10 ↓1.88	68.08 ↓2.47	44.07 ↓4.07	24.87 ↑2.13	10.72 ↓8.85	47.00 ↓5.63	38.95 ↓3.78
Q-Tuning (Ours)		**64.20 ↑4.95**	42.03 ↑1.01	**10.54 ↑2.43**	**18.79 ↑6.04**	**53.12 ↑4.37**	**37.74 ↑3.76**	71.60 ↑1.05	48.14 ↑0.00	**29.34 ↑6.60**	**27.75 ↑8.18**	**57.78 ↑5.15**	**46.92 ↑4.19**
Full Dataset		61.55	42.37	8.64	13.80	50.45	35.36	71.25	45.76	26.68	31.81	53.67	45.84
12.5% Samples, 70% Tokens													
Random	Random	59.43	41.02	6.97	13.64	47.97	33.81	71.08	47.46	24.34	21.64	53.15	43.53
	PPL	60.14 ↑0.71	43.39 ↑2.37	6.22 ↓0.75	12.18 ↓1.46	48.18 ↑0.21	34.02 ↑0.21	70.72 ↓0.36	47.80 ↑0.34	25.09 ↑0.75	21.28 ↓0.36	53.83 ↑0.68	43.74 ↑0.21
	FastV	58.20 ↓1.23	41.02 ↑0.00	6.29 ↓0.68	13.42 ↓0.22	45.32 ↓2.65	32.85 ↓0.96	70.72 ↓0.36	46.44 ↓1.02	19.56 ↓4.78	21.38 ↓0.26	53.34 ↑0.19	42.29 ↓1.24
	SparseVLM	54.67 ↓4.76	37.97 ↓3.05	8.04 ↑1.07	13.06 ↓0.58	44.87 ↓3.10	31.72 ↓2.09	67.72 ↓3.36	44.75 ↓2.71	23.65 ↓0.69	11.76 ↓9.88	44.90 ↓8.25	38.58 ↓4.95
Longest	Random	59.44 ↑0.01	43.39 ↑2.37	7.35 ↑0.38	15.59 ↑1.95	50.02 ↑2.05	35.15 ↑1.34	73.37 ↑2.29	48.81 ↑1.35	27.82 ↑3.48	21.31 ↓0.33	55.77 ↑2.62	45.42 ↑1.89
	PPL	60.85 ↑1.42	43.39 ↑2.37	7.73 ↑0.76	16.21 ↑2.57	48.57 ↑0.60	35.35 ↑1.54	**74.96 ↑3.88**	49.83 ↑2.37	28.73 ↑4.39	21.62 ↓0.02	56.59 ↑3.44	46.35 ↑2.82
	FastV	59.44 ↑0.01	42.71 ↑1.69	6.29 ↓0.68	14.53 ↑0.89	47.46 ↓0.51	34.09 ↑0.28	74.07 ↑2.99	49.83 ↑2.37	24.18 ↓0.16	25.74 ↑4.10	55.86 ↑2.71	45.94 ↑2.41
	SparseVLM	54.85 ↓4.58	37.97 ↓3.05	7.05 ↑0.08	11.20 ↓2.44	44.16 ↓3.81	31.04 ↓2.77	69.14 ↓1.94	44.75 ↓2.71	31.01 ↑6.67	6.25 ↓15.39	52.94 ↓0.21	40.82 ↓2.71
InfoBatch	Random	59.26 ↓0.17	42.37 ↑1.35	6.22 ↓0.75	16.10 ↑2.46	47.72 ↓0.25	34.33 ↑0.52	70.19 ↓0.89	47.80 ↑0.34	20.77 ↓3.57	19.03 ↓2.61	52.13 ↓1.02	41.98 ↓1.55
	PPL	60.49 ↑1.06	39.32 ↓1.70	5.76 ↓1.21	14.47 ↑0.83	48.06 ↑0.09	33.62 ↓0.19	70.72 ↑0.36	46.44 ↓1.02	19.03 ↓5.31	23.20 ↑1.56	51.75 ↓1.40	42.23 ↓1.30
	FastV	58.55 ↓0.88	43.39 ↑2.37	5.53 ↓1.44	13.13 ↓0.51	47.64 ↓0.33	33.65 ↓0.16	69.49 ↓1.59	43.39 ↓4.07	16.68 ↓7.66	25.27 ↑3.63	51.47 ↓1.68	41.26 ↓2.27
	SparseVLM	56.61 ↓2.82	38.31 ↓2.71	5.76 ↓1.21	12.47 ↓1.17	44.49 ↓3.48	31.53 ↓2.28	68.25 ↓2.83	44.41 ↓3.05	23.73 ↑0.61	9.07 ↓12.57	45.73 ↓7.42	38.24 ↓5.29
Entropy	Random	61.02 ↑1.59	43.05 ↑2.03	7.66 ↑0.69	14.11 ↑0.47	48.44 ↑0.47	34.86 ↑1.05	73.37 ↑2.29	49.83 ↑2.37	23.05 ↓1.29	16.52 ↓5.12	55.18 ↑2.03	43.59 ↑0.06
	PPL	61.02 ↑1.59	43.39 ↑2.37	6.97 ↑0.00	14.94 ↑1.30	48.94 ↑0.97	35.05 ↑1.24	73.02 ↑1.94	47.46 ↑0.00	24.03 ↑0.68	22.85 ↑1.21	54.89 ↑1.74	44.45 ↑0.92
	FastV	58.73 ↓0.70	**43.39 ↑2.37**	6.14 ↓0.83	14.23 ↑0.59	47.03 ↓0.94	33.90 ↑0.09	74.07 ↑2.99	**50.85 ↑3.39**	24.94 ↑0.60	23.79 ↑2.15	55.94 ↑2.79	45.92 ↑2.39
	SparseVLM	54.85 ↓4.58	37.29 ↓3.73	6.52 ↓0.45	12.73 ↓0.91	46.24 ↓1.73	31.53 ↓2.28	68.08 ↓3.00	44.41 ↓3.05	26.38 ↑2.04	11.06 ↓10.58	46.68 ↓6.47	39.32 ↓4.21
Q-Tuning (Ours)		**64.37 ↑4.94**	42.37 ↑1.35	**10.84 ↑3.87**	**17.63 ↑3.99**	**52.17 ↑4.20**	**37.48 ↑3.67**	71.78 ↑0.70	48.14 ↑0.68	**30.33 ↑6.00**	**28.59 ↑6.95**	**57.93 ↑4.78**	**47.35 ↑3.82**
Full Dataset		61.55	42.37	8.64	13.80	50.45	35.36	71.25	45.76	26.68	31.81	53.67	45.84
25% Samples, 50% Tokens													
Random	Random	60.32	41.69	5.76	13.43	48.41	33.92	70.19	46.10	20.62	24.07	53.74	42.95
	PPL	60.32 ↑0.00	42.03 ↑0.34	7.51 ↑1.75	15.94 ↑2.51	48.58 ↑0.17	34.87 ↑0.95	69.66 ↓0.53	47.46 ↑1.36	19.86 ↓0.76	19.51 ↓4.56	53.74 ↑0.00	42.05 ↓0.90
	FastV	59.08 ↓1.24	41.69 ↑0.00	3.56 ↓2.20	12.78 ↓0.65	45.60 ↓2.81	32.54 ↓1.38	71.78 ↑1.59	47.12 ↑1.02	15.77 ↓4.85	26.97 ↑2.90	50.84 ↓2.90	42.50 ↓0.45
	SparseVLM	54.50 ↓5.82	38.64 ↓3.05	6.44 ↑0.68	12.04 ↓1.39	44.79 ↓3.62	31.28 ↓2.64	67.55 ↓2.64	46.44 ↑0.34	24.41 ↑3.79	11.80 ↓12.27	48.14 ↓5.60	39.67 ↓3.28
Longest	Random	61.20 ↑0.88	42.03 ↑0.34	7.88 ↑2.12	15.40 ↑1.97	48.29 ↓0.12	34.96 ↑1.04	**73.54 ↑3.35**	48.14 ↑2.04	23.73 ↑3.11	26.34 ↑2.27	54.06 ↑0.32	45.16 ↑2.21
	PPL	60.85 ↑0.53	**43.39 ↑1.70**	7.20 ↑1.44	13.88 ↑0.45	48.48 ↑0.07	34.76 ↑0.84	72.31 ↑2.12	48.14 ↑2.04	24.34 ↑3.72	23.84 ↑-0.23	55.22 ↑1.48	44.77 ↑1.82
	FastV	59.08 ↓1.24	42.71 ↑1.02	5.16 ↓0.60	14.00 ↑0.57	47.47 ↓0.94	33.68 ↓0.24	72.66 ↑2.47	46.10 ↑0.00	18.88 ↓1.74	31.52 ↑7.45	52.13 ↓1.61	44.26 ↓1.31
	SparseVLM	56.61 ↓3.71	37.29 ↓4.40	7.58 ↑1.82	12.09 ↓1.34	44.76 ↓3.65	31.66 ↓2.26	66.84 ↓3.35	44.41 ↓1.69	29.42 ↑8.80	11.22 ↓12.85	48.47 ↓5.27	40.07 ↓2.88
InfoBatch	Random	58.73 ↓1.59	40.68 ↓1.01	6.67 ↑0.91	9.95 ↓3.48	48.98 ↑0.57	33.00 ↓0.92	70.55 ↑0.36	46.44 ↑0.34	21.53 ↑0.91	23.93 ↓0.14	52.14 ↓1.60	42.92 ↓0.03
	PPL	59.96 ↑0.47	42.71 ↑1.02	6.52 ↑0.76	14.58 ↑1.15	48.57 ↑0.16	34.47 ↑0.55	71.08 ↑0.89	47.80 ↑1.70	20.62 ↑0.00	24.88 ↑0.81	51.61 ↓2.13	43.20 ↑0.25
	FastV	59.08 ↓1.24	42.37 ↑0.68	3.03 ↓2.73	11.13 ↓2.30	47.50 ↓0.91	32.63 ↓1.29	69.31 ↓0.88	44.41 ↓1.69	14.48 ↓6.14	23.63 ↓0.44	49.16 ↓4.58	40.20 ↓2.75
	SparseVLM	55.73 ↓4.59	39.66 ↓2.03	5.31 ↓0.45	11.66 ↓1.77	43.25 ↓5.16	31.12 ↓2.80	67.20 ↓3.00	45.76 ↓0.34	23.58 ↑2.96	9.63 ↓14.44	46.09 ↓7.65	38.45 ↓4.50
Entropy	Random	60.49 ↑0.17	41.69 ↑0.00	7.51 ↑1.75	15.94 ↑2.51	48.76 ↑0.35	34.88 ↑0.96	70.19 ↑0.00	47.12 ↑1.02	22.44 ↑1.82	27.35 ↑3.28	54.78 ↑1.04	44.38 ↑1.43
	PPL	60.49 ↑0.17	41.02 ↓0.67	6.60 ↑0.84	14.92 ↑1.49	49.33 ↑0.92	34.47 ↑0.55	71.43 ↑1.24	**48.14 ↑2.04**	21.30 ↑0.68	25.52 ↑1.45	55.60 ↑1.86	44.40 ↑1.45
	FastV	58.91 ↓1.41	41.69 ↑0.00	6.07 ↑0.31	12.79 ↓0.64	46.11 ↓2.30	33.11 ↓0.81	72.31 ↑2.12	47.46 ↑1.36	18.04 ↓2.58	25.96 ↑1.89	52.46 ↓1.28	43.25 ↑0.30
	SparseVLM	54.67 ↓5.65	38.64 ↓3.05	6.90 ↑1.14	11.64 ↓1.79	45.03 ↓3.38	31.38 ↓2.54	68.25 ↓1.94	44.07 ↓2.03	**26.69 ↑6.07**	9.69 ↓14.38	47.24 ↓6.50	39.19 ↓3.76
Q-Tuning (Ours)		**63.14 ↑2.82**	42.03 ↑0.34	**8.87 ↑3.11**	**16.76 ↑3.33**	**51.52 ↑3.11**	**36.47 ↑2.55**	71.78 ↑1.59	47.12 ↑1.02	26.08 ↑5.46	**32.79 ↑8.72**	**56.17 ↑2.43**	**46.79 ↑3.84**
Full Dataset		61.55	42.37	8.64	13.80	50.45	35.36	71.25	45.76	26.68	31.81	53.67	45.84

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