

Model	Size	ar	bg	de	el	es	fr	hi	ru	sw	th	tr	ur	vi	zh	avg
NLLB	0.6B	83.91	86.05	87.17	87.14	88.19	87.09	85.53	82.75	80.69	82.53	85.94	80.09	85.02	82.64	84.6
	1.3B	85.27	86.97	88.16	88.04	88.74	87.84	86.38	83.78	82.06	83.71	87.08	81.13	86.03	83.52	85.6
	1.3B	84.92	86.91	88.00	88.02	88.73	87.82	86.22	83.66	81.82	83.37	86.92	81.06	85.84	83.63	85.5
	3.3B	85.38	87.19	88.29	88.40	88.97	88.07	86.74	84.05	82.22	84.22	87.40	81.53	86.31	84.47	85.9
XGLM	0.6B	60.80	73.87	73.76	71.82	72.89	74.99	64.73	69.33	57.49	65.94	62.75	60.62	65.27	52.02	66.2
	1.7B	72.72	80.62	80.64	81.78	80.82	80.95	72.41	76.01	69.78	76.53	72.42	67.55	76.38	73.10	75.8
	2.9B	75.17	82.24	83.02	83.77	82.63	82.55	77.06	78.67	73.39	77.61	75.16	71.51	79.16	77.66	78.5
	7.5B	79.66	84.69	85.78	85.73	85.97	85.55	80.19	81.00	77.22	81.23	79.88	74.83	81.87	79.85	81.7
BLOOM	0.6B	74.45	47.03	63.00	46.67	82.34	82.67	74.18	48.84	53.88	46.89	49.18	66.12	78.31	76.58	63.6
	1.7B	77.11	51.94	67.78	50.11	84.05	84.46	76.28	61.11	62.78	49.06	50.15	69.20	80.43	78.53	67.4
	3B	79.00	53.83	72.10	52.79	85.41	85.44	78.44	65.10	68.50	48.98	49.89	71.53	82.09	80.02	69.5
	7.1B	81.29	61.50	78.12	58.62	86.95	86.78	81.33	70.10	72.72	51.97	53.47	74.65	83.44	82.21	73.1
LLaMA	7B	66.76	83.89	86.57	72.61	86.94	86.65	66.69	81.54	51.36	58.09	64.03	54.27	62.59	78.32	71.5
	13B	72.16	85.07	87.45	77.56	87.82	87.32	72.59	82.65	53.52	63.76	72.12	59.76	68.36	80.35	75.0
	30B	77.03	86.36	88.14	82.33	88.32	87.78	78.50	83.40	60.13	66.14	76.34	67.02	74.72	81.74	78.4

Table 14: XNLI COMET translation metrics for different models.

Model	Size	de	es	fr	ja	ko	zh	avg
NLLB	0.6B	87.06	87.60	87.31	82.93	84.59	82.73	85.4
	1.3B	87.26	87.81	87.55	84.24	85.46	83.84	86.0
	1.3B	87.33	87.87	87.59	84.19	85.15	83.58	86.0
	3.3B	87.38	87.91	87.66	84.38	85.67	84.16	86.2
XGLM	0.6B	74.77	74.42	76.62	55.72	61.30	53.28	66.0
	1.7B	81.66	82.19	82.06	68.13	72.94	68.66	75.9
	2.9B	83.38	83.78	83.72	73.40	76.78	74.16	79.2
	7.5B	84.96	85.34	85.41	77.03	80.24	76.53	81.6
BLOOM	0.6B	60.17	74.43	76.62	49.91	38.58	63.76	60.6
	1.7B	74.49	83.75	84.28	63.20	51.49	75.14	72.1
	3B	78.48	85.31	85.35	68.30	53.03	77.74	74.7
	7.1B	82.27	86.42	86.50	73.90	63.02	80.72	78.8
LLaMA	7B	85.97	86.47	86.16	76.41	75.19	74.98	80.9
	13B	86.28	86.77	86.65	79.96	78.81	77.40	82.6
	30B	86.64	87.26	86.99	81.35	81.29	79.34	83.8

Table 15: PAWS-X COMET translation metrics for different models.

Model	Size	es	fr	de	ru	zh	ja	th	sw	bn	te	avg
NLLB	0.6B	83.35	81.43	83.48	78.24	79.93	77.46	75.73	77.38	82.09	83.17	80.2
	1.3B	85.87	84.95	86.28	82.53	81.98	83.34	78.59	82.22	86.59	85.94	83.8
	1.3B	85.47	84.44	85.72	81.47	82.34	84.20	78.43	82.18	86.18	84.72	83.5
	3.3B	86.11	85.03	86.31	82.37	83.50	84.37	80.86	83.11	86.98	86.46	84.5
XGLM	0.6B	61.85	63.52	66.69	58.59	52.41	50.28	52.25	45.19	49.66	46.16	54.7
	1.7B	77.49	74.92	77.79	71.00	64.53	64.92	68.06	63.58	58.97	62.38	68.4
	2.9B	81.03	79.37	81.37	77.40	69.27	74.94	70.80	71.23	65.38	64.14	73.5
	7.5B	83.08	81.77	83.00	79.92	77.53	79.17	77.06	76.18	77.61	77.03	79.2
BLOOM	0.6B	64.35	64.33	42.94	34.70	61.24	40.60	32.91	37.54	56.54	47.12	48.2
	1.7B	71.25	74.20	64.94	51.54	72.33	59.10	41.21	52.78	68.19	61.26	61.7
	3B	83.14	83.27	72.70	61.37	77.96	66.53	42.30	61.34	74.30	67.71	69.1
	7.1B	85.39	84.36	78.50	66.82	82.18	74.39	43.42	70.81	82.77	76.45	74.5
LLAMA	7B	73.82	83.28	85.25	81.04	78.29	78.41	51.07	47.93	49.61	31.69	66.0
	13B	79.72	85.36	84.27	83.05	80.52	81.41	58.73	54.15	57.64	31.44	69.6
	30B	48.21	71.07	86.85	78.93	82.97	80.89	62.67	63.28	67.77	31.88	67.5

Table 16: MGSM COMET translation metrics for different models.

Model	Size	ru	zh	es	ar	hi	id	te	sw	eu	my	avg
NLLB	0.6B	40.98	30.04	47.98	49.46	45.07	38.44	29.45	41.51	35.24	22.00	38.0
	1.3B	44.12	30.57	50.52	53.09	48.62	40.98	32.19	43.86	33.77	28.18	40.6
	1.3B	43.22	32.07	50.42	52.91	48.08	41.13	31.39	44.17	35.63	29.94	40.9
	3.3B	44.59	34.80	51.33	54.80	49.16	42.27	33.09	45.00	33.55	29.69	41.8
XGLM	0.6B	15.67	1.54	14.36	6.16	7.52	16.92	1.28	3.82	2.81	0.67	7.1
	1.7B	25.62	16.08	28.64	21.40	16.22	26.07	10.46	21.17	11.38	7.94	18.5
	2.9B	29.08	21.68	36.22	26.32	24.91	28.86	11.37	27.19	20.04	12.40	23.8
	7.5B	34.40	25.20	40.85	34.45	30.32	33.59	17.05	33.48	23.33	16.84	29.0
BLOOM	0.6B	0.37	9.67	20.55	14.70	9.94	19.55	1.93	0.43	1.96	0.11	7.9
	1.7B	9.03	22.26	35.84	26.14	18.45	27.74	9.01	12.67	11.56	0.06	17.3
	3B	11.42	25.12	39.51	28.93	22.60	29.62	11.11	18.32	15.80	0.07	20.2
	7.1B	16.37	30.53	43.21	35.44	31.19	34.16	15.07	23.71	22.27	0.10	25.2
LLaMA	7B	36.15	20.08	43.75	11.84	10.27	21.49	0.11	2.12	0.78	0.07	14.7
	13B	39.22	25.29	45.85	18.78	15.92	27.28	0.18	3.10	1.20	0.07	17.7
	30B	41.26	27.88	47.42	27.04	26.12	33.00	0.32	7.77	1.35	0.06	21.2

Table 17: XStoryCloze BLEU translation metrics for different models.

Model	Size	et	ht	it	id	qu	sw	zh	ta	th	tr	vi	avg
NLLB	0.6B	39.07	33.85	45.88	33.15	9.26	32.29	35.16	32.33	21.23	37.66	32.81	32.1
	1.3B	45.42	40.40	51.01	37.41	12.02	35.57	38.20	37.47	24.75	42.61	37.47	36.6
	1.3B	43.75	38.26	50.93	37.22	10.48	35.39	38.52	37.36	23.36	40.93	35.67	35.6
	3.3B	45.57	40.42	52.45	38.12	11.38	36.91	42.42	38.34	26.36	43.06	38.90	37.6
XGLM	0.6B	12.08	9.37	10.06	12.99	0.35	2.96	0.92	2.29	7.67	4.62	8.73	6.5
	1.7B	25.29	20.36	28.12	23.88	1.16	15.62	22.94	12.69	12.80	15.54	20.31	18.1
	2.9B	34.93	25.21	32.88	27.51	1.91	21.70	29.21	17.77	22.52	22.32	29.36	24.1
	7.5B	39.55	28.41	40.18	31.90	4.11	27.25	32.50	25.27	24.79	26.41	32.14	28.4
BLOOM	0.6B	0.09	0.22	2.40	16.07	0.17	0.11	13.70	4.35	0.08	0.10	15.63	4.8
	1.7B	0.24	0.59	13.94	25.17	0.37	6.59	28.91	12.37	0.08	0.20	27.26	10.5
	3B	0.29	1.39	19.83	27.15	0.31	10.67	34.77	18.77	0.13	0.20	29.82	13.0
	7.1B	0.76	2.88	26.80	32.87	0.48	15.72	39.41	26.92	0.18	0.70	34.91	16.5
LLaMA	7B	2.02	1.55	41.18	15.44	0.59	1.00	25.01	0.16	1.86	5.15	3.98	8.9
	13B	3.19	3.10	44.11	22.01	0.54	1.49	32.41	0.14	6.06	14.36	8.48	12.4
	30B	5.67	5.67	48.64	26.64	1.10	5.20	35.41	0.68	6.62	18.91	14.96	15.4

Table 18: XCOPA BLEU translation metrics for different models.

Model	Size	ar	bg	de	el	es	fr	hi	ru	sw	th	tr	ur	vi	zh	avg
NLLB	0.6B	37.99	41.39	44.65	46.13	50.92	45.09	38.09	31.41	34.09	28.16	36.28	30.61	39.10	27.71	38.0
	1.3B	41.09	43.80	46.97	48.54	53.02	47.17	40.78	33.49	36.30	30.00	39.24	32.84	41.81	29.48	40.3
	1.3B	40.56	43.62	46.69	48.37	53.05	46.81	40.40	33.36	36.45	29.90	39.00	32.28	41.41	29.52	40.1
	3.3B	42.19	45.08	47.66	50.05	53.80	47.73	41.73	33.98	37.89	31.35	40.61	33.86	43.20	31.31	41.5
XGLM	0.6B	5.54	17.83	19.91	14.67	17.56	20.52	5.91	12.07	4.97	7.25	4.38	4.50	8.85	1.67	10.4
	1.7B	16.34	27.20	30.30	30.86	31.54	29.73	12.77	18.83	16.63	15.23	11.78	9.81	21.11	12.36	20.3
	2.9B	19.63	30.91	34.54	35.14	34.76	32.98	17.96	22.45	20.83	17.68	15.09	13.58	24.71	16.84	24.1
	7.5B	26.52	35.23	38.80	39.16	41.56	38.93	22.09	25.91	26.29	22.56	19.71	17.61	29.08	19.80	28.8
BLOOM	0.6B	17.71	1.35	12.21	1.08	33.99	33.08	12.62	2.10	4.35	0.92	0.90	7.53	22.30	14.71	11.8
	1.7B	21.61	3.34	16.19	2.71	37.73	36.64	15.36	8.77	10.58	1.07	1.21	10.26	26.12	16.82	14.9
	3B	24.10	4.43	19.05	4.42	40.60	38.84	17.61	11.22	15.99	1.48	1.35	12.46	28.96	19.12	17.1
	7.1B	29.03	9.79	28.06	8.66	45.07	42.44	22.74	15.50	21.16	2.53	3.08	16.73	31.94	23.17	21.4
LLaMA	7B	12.20	34.86	40.86	21.27	45.28	41.66	8.71	27.39	4.21	4.52	7.48	2.47	9.31	18.84	19.9
	13B	18.52	37.83	43.71	28.47	47.70	44.06	14.83	29.60	5.95	8.62	14.10	5.78	15.83	21.96	24.1
	30B	23.77	40.77	45.77	35.73	49.45	45.64	21.00	31.00	9.46	9.96	18.75	10.62	21.48	24.90	27.7

Table 19: XNLI BLEU translation metrics for different models.

Model	Size	de	es	fr	ja	ko	zh	avg
NLLB	0.6B	59.41	64.80	61.18	33.09	38.52	36.94	49.0
	1.3B	60.52	65.56	62.66	37.53	41.48	40.08	51.3
	1.3B	60.66	65.72	62.52	36.80	40.77	38.89	50.9
	3.3B	61.19	66.02	62.91	38.12	41.97	41.21	51.9
XGLM	0.6B	30.41	31.70	34.00	2.89	5.64	3.42	18.0
	1.7B	44.35	47.33	43.03	9.13	14.64	11.34	28.3
	2.9B	48.69	51.59	48.39	14.21	19.19	16.79	33.1
	7.5B	51.22	54.58	53.12	18.27	24.89	20.09	37.0
BLOOM	0.6B	15.95	33.98	34.67	2.79	1.06	8.69	16.2
	1.7B	32.25	50.68	49.56	7.38	5.61	17.85	27.2
	3B	39.59	54.56	53.02	11.09	6.83	21.66	31.1
	7.1B	45.61	58.41	56.59	15.89	12.61	27.48	36.1
LLaMA	7B	56.24	59.61	56.48	20.55	21.77	19.70	39.1
	13B	57.36	61.05	58.86	26.16	26.98	24.52	42.5
	30B	59.61	63.07	60.47	30.07	31.75	27.48	45.4

Table 20: PAWS-X BLEU translation metrics for different models.

Model	Size	es	fr	de	ru	zh	ja	th	sw	bn	te	avg
NLLB	0.6B	48.34	34.85	44.57	31.39	28.14	17.99	17.37	34.62	28.58	34.68	32.1
	1.3B	57.94	44.44	54.21	45.11	33.23	29.69	19.62	46.91	40.80	41.54	41.3
	1.3B	56.78	44.00	52.64	42.11	33.91	33.51	19.83	47.51	39.82	38.45	40.9
	3.3B	57.91	44.26	53.41	44.85	38.44	35.59	24.30	51.37	42.89	44.02	43.7
XGLM	0.6B	12.94	11.30	15.94	7.53	1.77	0.82	1.22	1.27	0.77	0.60	5.4
	1.7B	36.77	24.31	33.33	23.89	8.26	6.14	9.32	16.76	5.43	6.50	17.1
	2.9B	44.50	32.70	40.77	33.20	13.25	14.41	10.71	24.70	11.80	9.28	23.5
	7.5B	45.04	33.37	41.55	34.70	20.75	20.09	18.44	31.32	19.11	18.63	28.3
BLOOM	0.6B	19.40	13.29	4.75	0.38	7.83	1.14	0.06	0.67	4.33	1.97	5.4
	1.7B	28.14	25.34	17.91	9.39	15.72	5.40	0.14	7.56	9.10	7.23	12.6
	3B	47.91	37.39	27.37	16.90	22.32	9.92	0.08	15.02	15.92	10.25	20.3
	7.1B	54.44	41.80	35.30	23.42	29.46	15.98	0.36	29.03	27.69	19.46	27.7
LLaMA	7B	44.51	41.92	51.04	43.48	25.82	20.86	2.86	5.77	3.02	0.00	23.9
	13B	53.27	44.99	52.85	47.92	29.82	26.69	6.26	9.66	7.61	0.00	27.9
	30B	14.17	33.08	56.09	45.29	35.58	30.84	8.40	17.40	14.19	0.00	25.5

Table 21: MGSM BLEU translation metrics for different models.