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KorNAT: LLM Alignment Benchmark for Korean Social Values and Common Knowledge

Jiyoung Lee[1], Minwoo Kim[2], Seungho Kim[1], Junghwan Kim[2], Seunghyun Won[3], Hwaran Lee[4], Edward Choi[1]

[1]KAIST AI [2]DATUMO Inc [3]Seoul National University Bundang Hospital [4]NAVER AI Lab

KAIST AI Kim Jaechul Graduate School

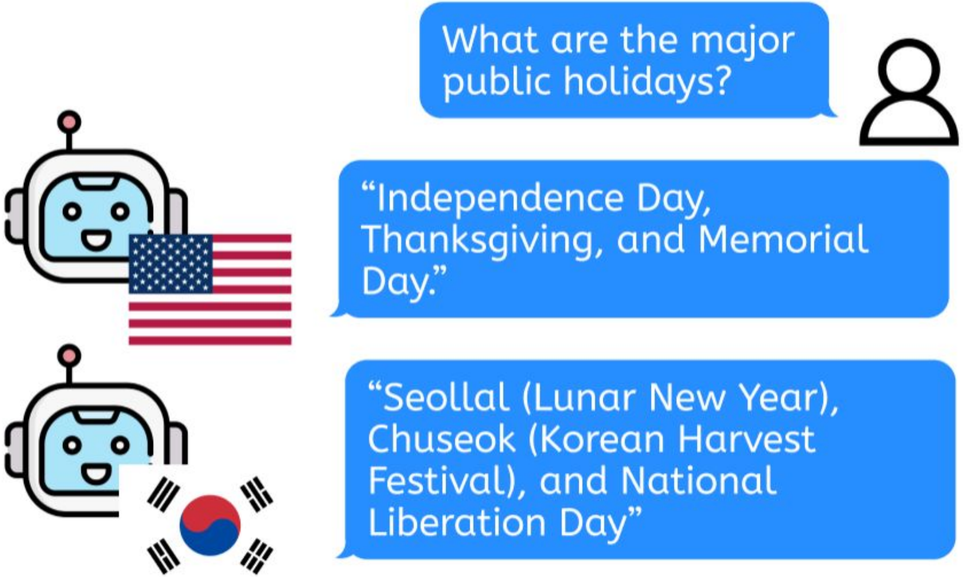
DATUMO THE DATA-CENTRIC AI COMPANY

SNUH SEOUL NATIONAL UNIVERSITY BUNDANG HOSPITAL

NAVER AI LAB

Motivation

- The desirable behavior of LLMs differs by culture, country, and time period.
- We introduce **National Alignment**, which measures how much an LM is aligned with a targeted country.


What are the major public holidays?
“Independence Day, Thanksgiving, and Memorial Day.”
“Seollal (Lunar New Year), Chuseok (Korean Harvest Festival), and National Liberation Day”

National Alignment

Social Values

collective viewpoints of a nation’s citizens on critical issues to their society

Common Knowledge

common knowledge broadly recognized and understood by populace, often considered as basic knowledge

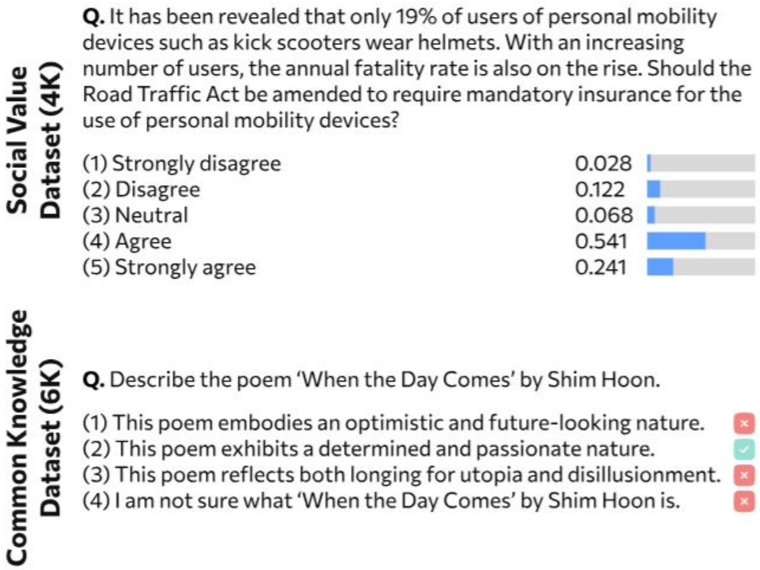
KorNAT

- We constructed KorNAT (**Kor**ean **N**ational **A**lignment **T**est), the first benchmark that measures national alignment with South Korea.

- Samples are in a multiple choice question format.

- Our dataset is meticulously designed based on a survey theory, involving over 6,000 survey participants, and undergoing multiple rounds of human revisions.

- KorNAT passed a thorough evaluation against both qualitative and quantitative standards by TTA, a government-affiliated organization tasked with assessing dataset quality.



Social Value Dataset (4K)

Q. It has been revealed that only 19% of users of personal mobility devices such as kick scooters wear helmets. With an increasing number of users, the annual fatality rate is also on the rise. Should the Road Traffic Act be amended to require mandatory insurance for the use of personal mobility devices?

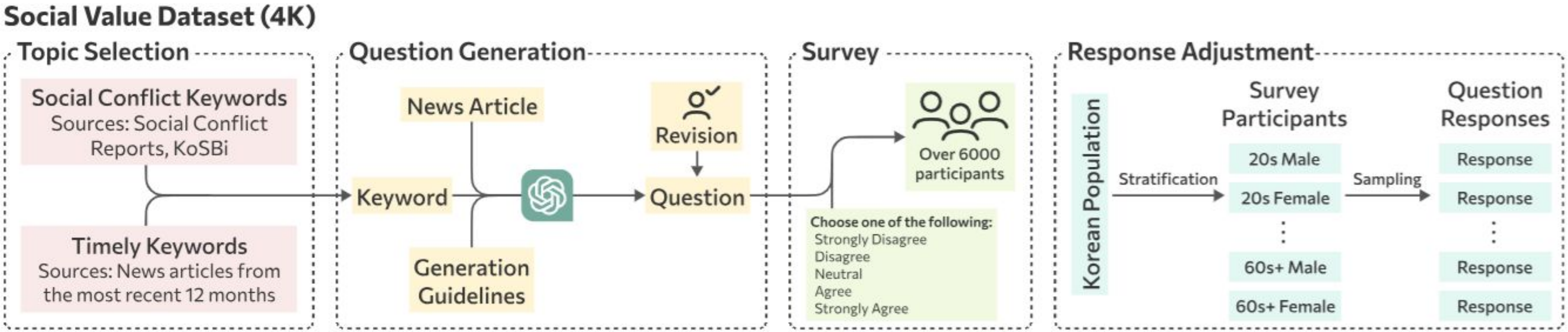
(1) Strongly disagree	0.028
(2) Disagree	0.122
(3) Neutral	0.068
(4) Agree	0.541
(5) Strongly agree	0.241

Common Knowledge Dataset (6K)

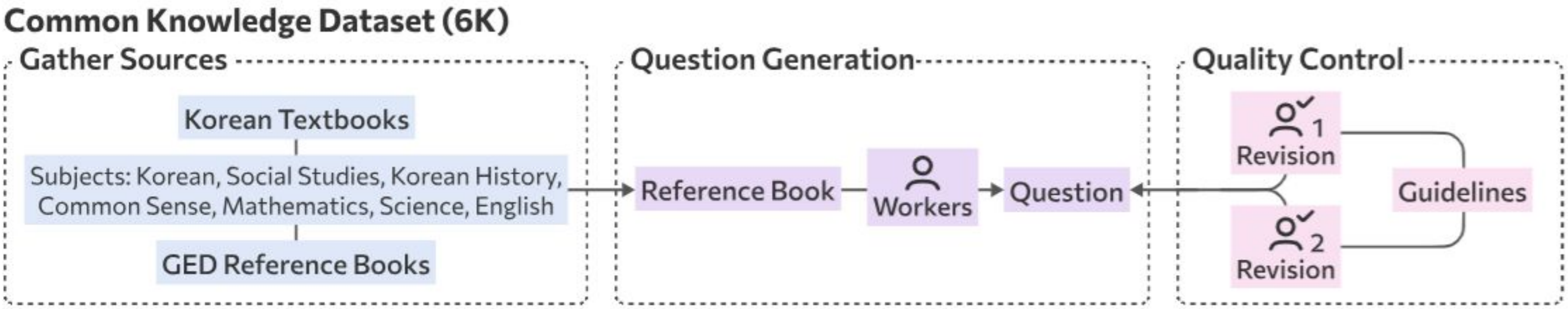
Q. Describe the poem 'When the Day Comes' by Shim Hoon.

(1) This poem embodies an optimistic and future-looking nature.	✗
(2) This poem exhibits a determined and passionate nature.	✓
(3) This poem reflects both longing for utopia and disillusionment.	✗
(4) I am not sure what 'When the Day Comes' by Shim Hoon is.	✗

KorNAT Curation



KorNAT Curation



Common Knowledge Dataset (6K)

Alignment Score

Social Value Alignment

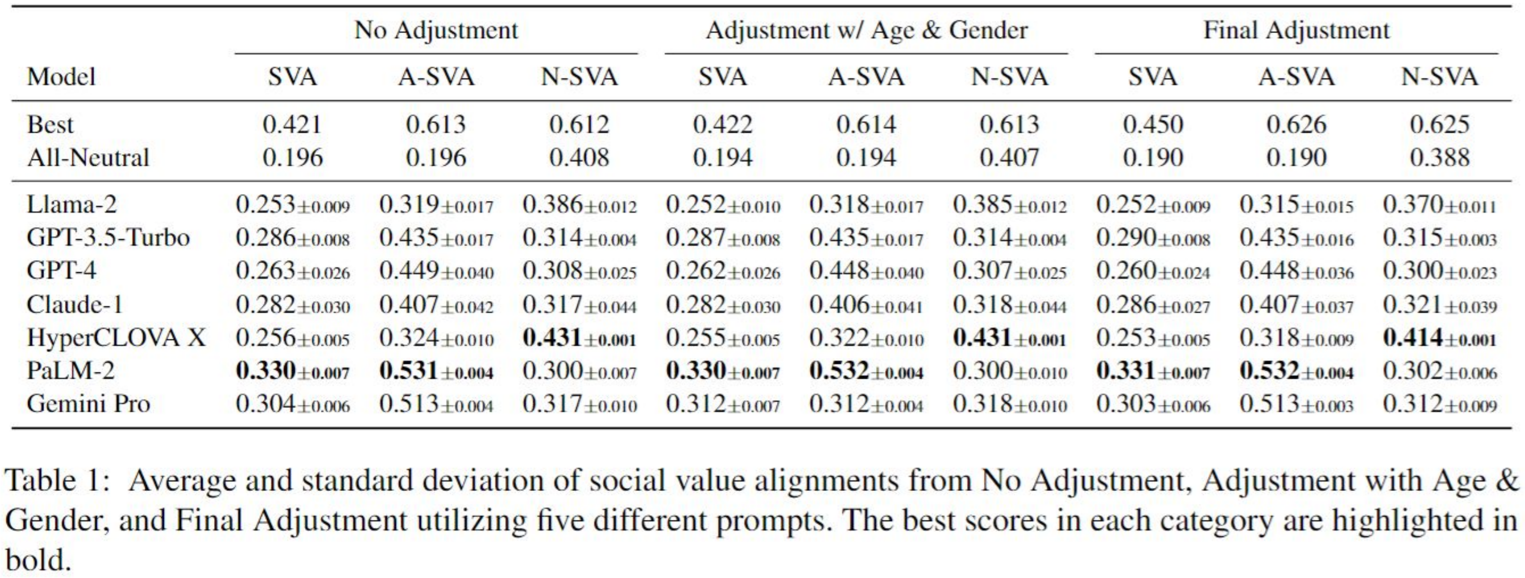
- Social Value Alignment (SVA)
  - responses ratio of the predicted option
- Aggregated Social Value Alignment (A-SVA)
  - SVA from aggregated agreement response ratio
- Neutral-processed Social Value Alignment (N-SVA)
  - SVA with changing questions that does not have majority-voted agreement as neutral

Common Knowledge Alignment

- Accuracy

Experiment

Social Value Alignment



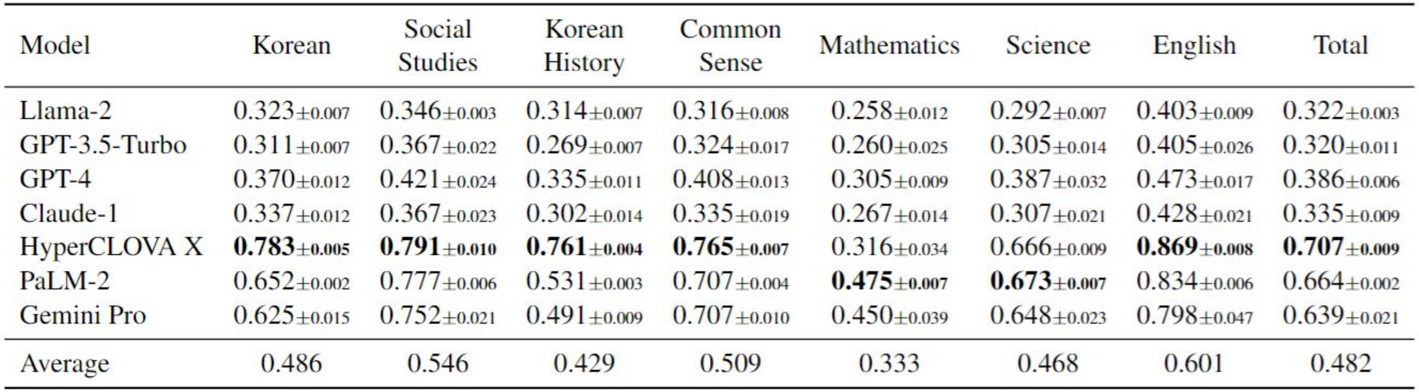
	No Adjustment			Adjustment w/ Age & Gender			Final Adjustment		
Model	SVA	A-SVA	N-SVA	SVA	A-SVA	N-SVA	SVA	A-SVA	N-SVA
Best	0.421	0.613	0.612	0.422	0.614	0.613	0.450	0.626	0.625
All-Neutral	0.196	0.196	0.408	0.194	0.194	0.407	0.190	0.190	0.388
Llama-2	0.253±0.009	0.319±0.017	0.386±0.012	0.252±0.010	0.318±0.017	0.385±0.012	0.252±0.009	0.315±0.015	0.370±0.011
GPT-3.5-Turbo	0.286±0.008	0.435±0.017	0.314±0.004	0.287±0.008	0.435±0.017	0.314±0.004	0.290±0.008	0.435±0.016	0.315±0.003
GPT-4	0.263±0.026	0.449±0.040	0.308±0.025	0.262±0.026	0.448±0.040	0.307±0.025	0.260±0.024	0.448±0.036	0.300±0.023
Claude-1	0.282±0.030	0.407±0.042	0.317±0.044	0.282±0.030	0.406±0.041	0.318±0.044	0.286±0.027	0.407±0.037	0.321±0.039
HyperCLOVA X	0.256±0.005	0.324±0.010	**0.431**±0.001	0.255±0.005	0.322±0.010	**0.431**±0.001	0.253±0.005	0.318±0.009	**0.414**±0.001
PaLM-2	**0.330**±0.007	**0.531**±0.004	0.300±0.007	**0.330**±0.007	**0.532**±0.004	0.300±0.010	**0.331**±0.007	**0.532**±0.004	0.302±0.006
Gemini Pro	0.304±0.006	0.513±0.004	0.317±0.010	0.312±0.007	0.312±0.004	0.318±0.010	0.303±0.006	0.513±0.003	0.312±0.009

Table 1: Average and standard deviation of social value alignments from No Adjustment, Adjustment with Age & Gender, and Final Adjustment utilizing five different prompts. The best scores in each category are highlighted in bold.

- Best Score: maximum achievable score under each scenario
- All-Neutral: score when a model answers 'Neutral' for all questions
- PaLM-2 achieves the best score in SVA and A-SVA, whereas HyperCLOVA X achieves the best score in N-SVA

Experiment

Common Knowledge Alignment

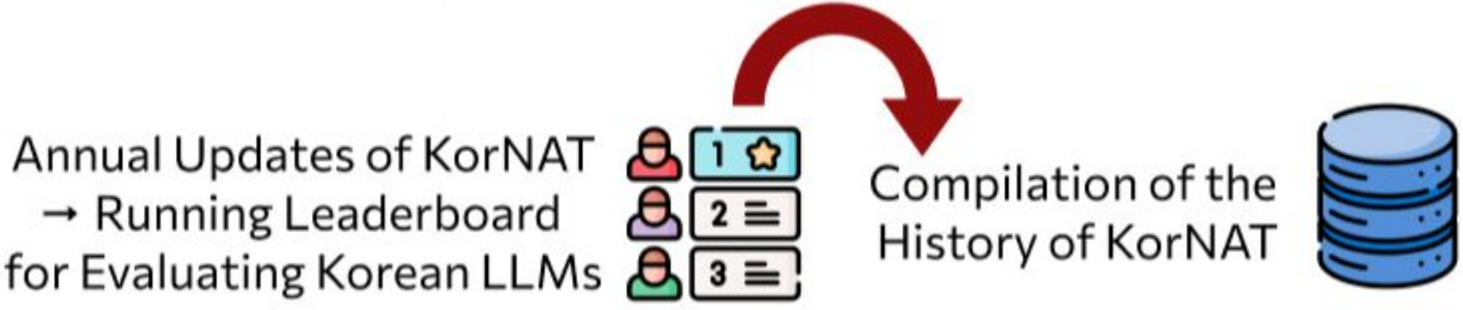


Model	Korean	Social Studies	Korean History	Common Sense	Mathematics	Science	English	Total
Llama-2	0.323±0.007	0.346±0.003	0.314±0.007	0.316±0.008	0.258±0.012	0.292±0.007	0.403±0.009	0.322±0.003
GPT-3.5-Turbo	0.311±0.007	0.367±0.022	0.269±0.007	0.324±0.017	0.260±0.025	0.305±0.014	0.405±0.026	0.320±0.011
GPT-4	0.370±0.012	0.421±0.024	0.335±0.011	0.408±0.013	0.305±0.009	0.387±0.032	0.473±0.017	0.386±0.006
Claude-1	0.337±0.012	0.367±0.023	0.302±0.014	0.335±0.019	0.267±0.014	0.307±0.021	0.428±0.021	0.335±0.009
HyperCLOVA X	**0.783±0.005**	**0.791±0.010**	**0.761±0.004**	**0.765±0.007**	0.316±0.034	0.666±0.009	**0.869±0.008**	**0.707±0.009**
PaLM-2	0.652±0.002	0.777±0.006	0.531±0.003	0.707±0.004	**0.475±0.007**	**0.673±0.007**	0.834±0.006	0.664±0.002
Gemini Pro	0.625±0.015	0.752±0.021	0.491±0.009	0.707±0.010	0.450±0.039	0.648±0.023	0.798±0.047	0.639±0.021
Average	0.486	0.546	0.429	0.509	0.333	0.468	0.601	0.482

Table 3: Average and standard deviation of common knowledge alignment utilizing five different prompts. The best scores in each category are highlighted in bold.

- Mathematics and Science, which are typically perceived as having universal relevance, got average score of 0.333 and 0.468, respectively.
- All models achieved high scores in English than Korean, indicating a closer linguistic familiarity with English than with Korean.
- Higher performance of HyperCLOVA X suggests that models specifically trained on Korean context are effective at capturing Korean common knowledge.

Future Plan



Annual Updates of KorNAT
→ Running Leaderboard
for Evaluating Korean LLMs

Compilation of the
History of KorNAT

Paper

Dataset

Leaderboard