A Survey on Awesome Korean NLP Datasets

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ABSTRACT

English based datasets are commonly available from Kaggle, GitHub, or recently published papers. Although benchmark tests with English datasets are sufficient to show off the performances of new models and methods, still a researcher need to train and validate the models on Korean based datasets to produce a technology or product, suitable for Korean processing. This paper introduces 15 popular Korean based NLP datasets with summarized details such as volume, license, repositories, and other research results inspired by the datasets. Also, I provide high-resolution instructions with sample or statistics of datasets. The main characteristics of datasets are presented on a single table to provide a rapid summarization of datasets for researchers.

KEYWORDS

I. INTRODUCTION

NATURAL language processing, NLP, with various neural network models has recently received a large amount of interest from both linguists and AI engineers. NLP has benefited from LSTM [1-3] and RNN models, due to their high performances on sequential data.

Although a CNN has hierarchical structures, YN Dauphin, et al. showed that application of CNN on natural languages outperformed traditional recurrent models [4]. Recent approaches on natural language processing utilize transformer architectures for language processing [5] – [8].

Noble approaches and brand-new applications inspired the researchers all around the world, to reproduce such high-performance models trained with various languages. For example, H Zhuang, et al. [9] and Y Cui, et al. [10] introduced Chinese based model, and M Al-Smadi, et al. [11] and S Romeo, et al. [12] showed models for Arabic natural language. Also, various Korean based NLP models have been introduced on international conferences [13] – [16] and Journals [17] – [18].

Researchers, who are working with non-English NLP technologies or multilanguage models, are highly interested in datasets in different languages. Even for researchers whose native language is a low-share language, the craving for datasets in their mother tongue langue would be much greater. The same goes for the industrial demands. NLP-related product holders are trying to research and develop models in official language of their country. Therefore, natural language processing researchers in Korea are very interested in Korean based NLP datasets. Not only academic institutions [19], [20], [25] and individual researchers [21], [22], but also large corporations [14], [23], [24] are actively producing Korean based natural language datasets.

II. RELATED WORKS

Simon Ruffieux, et al. provided summarized details of human pose estimation datasets to introduce various useful resources to researchers [49]. They wanted to reduce the time which other researchers spend for exploring useful datasets, and to provide useful tips for dataset construction.

Although there are several surveys on NLP technologies and algorithm themselves [26] – [28] or survey on Korean language processing technologies [29], an academic paper or comprehensive survey on Korean-based NLP dataset is not so many.

Cho, Won Ik, et al. established Open Korean Corpora [40] to provide assorted Korean NLP datasets. They provide the summarized detail of 29 different datasets from text parsing and tagging area, sentence similarity, sentence classification and QA, parallel corpora, multilingual corpora, and speech corpora. They summarized the information of each dataset into a short paragraph of one or two sentences. Their work is suitable for rapid and brief exploration among various datasets. But their work is insufficient to present a rationale for selecting a dataset suitable for the research purpose.

Yeongsook Song published a GitHub Repository named "AwesomeKorean_data" to provide information on various Korean datasets [30]. She introduced 31 datasets with academic references, and 9 datasets by individual researchers, and 5 government driven datasets. AwesomeKorean_data provides summarized detailed of datasets in a table which is easy to read quickly. It also provides hyperlink to the original webpage of each dataset. However, it categorized the license of datasets into too simple format (commercially available or not) so a researcher should figure out additional information on restrictions related to indication of same origin and impossibility of reprocessing and manipulations. Also, it does not provide published applications of datasets.

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TABLE I. Dataset Summarization

Name	Category	Domain & Task	Size	License	Author	Year	Citation Score[e]	Related Research
Chatbot_data	Conversation	Chatbot conversation (text)	11.8k	MIT	Song, Youngsook [31]	2018	3	Yun., et al. (2021) [39]
ClovaCall		Call based dialogue (speech)	125h, 81k samples	NC/AC[d]	Ha, Jung-woo, et al. [23]	2020	6	Cho., et al. (2020) [40]
KorQuAD	Question Answering	Q&A pairs from Wikipedia articles	103k	CC BY-ND 2.0 KR	Lim, Seungyoung, et al. [32]	2019	31	Lee., et al. (2020) [41]
Song-NER	Named Entity Recognition	Korean word based NER	30k	CC BY-SA 2.0	Park, Hyewoong, et al. [33]	2017	-	Kim., et al. (2019) [42]
KMOUNLP -NER			24k	NC/AC	Cheon, Minah [20]	2021	5	Yoo., et al. (2020) [43]
Sci-News- Sum-Kr-50	Text Summarization	News article summarization	50	NC/AC	Seol, Jinsuk [34]	2016	3	Cho., et al. (2020) [40]
SAE4K		Structured Argument Extraction	50.8k	CC BY-SA 4.0	Cho, Won Ik, et al. [35]	2019	3	Cho., et al. (2020) [36]
KLUE	NLU[a]	Korean NLU benchmark	239k	CC BY-SA 4.0	Park, Sungjoon, et al. [24]	2021	4	Kim., et al. (2021) [44]
KorNLU	NLI[b] / STS[c]	Korean NLI & NLU	NLI: 950k NLU: 8.6k	CC BY-SA 4.0	Ham, Jiyeon, et al. [14]	2020	9	Lee., et al. (2020) [45]
ParaKQC	STS	Parallel questions and commands	545k utterances	CC BY-SA 4.0	Cho, Won Ik, et al. [36]	2020	4	Park., et al. (2021) [24]
NSMC	Semantic Textual Analysis	Movie reviews & positive/negative indicate	200k	CC0 1.0	Park, Eunjeong [37]	2015	50+	Lee., et al. (2020) [46]
Toxic Comment		More specified emotional labels on NSMC	20k	MIT	Song, Youngsook [21]	2018	-	-
KHateSpeech		Malicious comments from news articles	Labeld:9.4k Raw: 2m	CC BY-SA 4.0	Moon, Jihyung, et al. [38]	2020	13	Lee., et al. (2021) [47]
3i4K	Semantic Speech Analysis	Utterance intent inference	Corpus:19k Text: 61k Speech: 7k	CC BY-SA 4.0	Cho, Won Ik, et al. [25]	2018	8	Cho., et al. (2019) [48]
KAIST Corpus	NLU and Machine Translation	Various corpus and Machine Translation	35 datasets	NC/AC	Ku-sun Choi [72]	1997 ~ 2005	11	

[a] Natural language understanding [b] Natural language inferences [c] Semantic textual similarity [d] Noncommercial and academic use only [e] Number of citations on 2021.10.15.

III. SURVEY

I selected 15 datasets which are famous among Korean research communities. Summarization over whole datasets is presented on Table 1. The table shows the name, category, domain and task, size, license, author, year, citation score and related research articles. This section also provides details of each dataset. For example, additional information such as repository URL, format, statistics of dataset or data sample, and application of the data.

A. Chatbot_data

TABLE II. CHATBOT_DATA OVERVIEW

Dataset overview

Category	Conversation (text)
Size	11,876 Q&A pairs
Format	CSV
License	MIT
URL	https://github.com/songys/Chatbot_data
Author	Song, Youngsook

Citation text

Song, Youngsook, Chatbot_data. 2018. Available at https://github.com/songys/Chatbot_data.

TABLE III. CHATBOT_DATA SAMPLE

Q&A data pair sample	Label
Q1. 12 시 땡! A1. 하루가 또 가네요.	0
Q2. 3 박 4 일 정도 놀러가고 싶다 A2. 여행은 언제나 좋죠	0
Q3. PPL 심하네 A3. 눈살이 찌푸려지죠.	0

Chatbot_data was published by Youngsook Song in 2018 [31]. The answers were composed of sentences that could comfort a person who has gone through a breakup with a lover. Answer sentences are labeled into 3 classes; 0 for daily life dialogue, 1 for negative (breakup), and 2 for positive (love).

This dataset has MIT license, which allows commercial use, modification, distribution and private use. However, the author is not responsible for any liability or warranty.

Hyeonseo Yun has published a paper on transformer-based AI model to detect unethical sentences from given text data, with this dataset [39].

B. ClovaCall

ClovaCall was provided by Jung-Woo Ha, et al. in 2020 [23]. It is a large scale Korean speech corpus dataset gathered from recorded phone calls, from more than 11,000 people under a given situation: restaurant reservation.

TABLE IV. CLOVACALL OVERVIEW

Dataset overview

Category	Conversation (Speech) 81,222 samples
Size	125 hours of raw data 67 hours of clean data
Format	WAV & JSON
License	Noncommercial use for AI Research only
URL	https://github.com/clovaai/ClovaCall
Author	Jung-Woo Ha, et al.

Citation text

Ha, Jung-Woo, et al. "ClovaCall: Korean goal-oriented dialog speech corpus for automatic speech recognition of contact centers." arXiv preprint arXiv:2004.09367 (2020).

TABLE V. CLOVACALL SAMPLE

ClovaCall data sample

```
[
  {
    "wav": "42_0603_748_0_03319_00.wav",
    "text": "단체 할인이 가능한 시간대가 따로 있나요?",
    "speaker_id" : "03319"
  },
  …,
  {
    "wav": "42_0610_778_0_03607_01.wav",
    "text": "애기들이 놀만한 놀이방이 따로 있나요?",
    "speaker_id": "03607"
  }
]
```

License-free ASR related datasets are old fashioned and most of them are established with English. Therefore, the authors constructed a license-free Korean phone call dataset with baseline codes.

Won Ik Cho, et al. included ClovaCall dataset in their work on Open Korean Corpora [40]. Jihwan Bang, et al. followed a variant version of LAS model proposed on ClovaCall paper [50]. As ClovaCall is recently released, a research article using ClovaCall for training or model validation could not be found yet. However, many recent works have mentioned ClovaCall as related recent works [51] – [54].

C. KorQuAD

KorQuAD dataset was published by Seungyoung Lim in 2019 [32]. This dataset is inspired by SQuAD [55], a reading comprehension-based question answering dataset driven from Wikipedia articles. It is the largest Korean question answering dataset. The authors drove data from Wikipedia.

KorQuAD is actively applied on Korean NLP conferences. Dongheon Lee, et al. applied KorQuAD for benchmark test of reading comprehension model in 2019 [56]. Minho Kim, et al. has developed a machine reading comprehension-based question and answering system and applied KorQuAD for performance test in 2020 [57]. Seohyung Jeon, et al. applied KorQuAD dataset on BERT-based multilingual model for machine reading comprehension task in 2020 [58].

TABLE VI.   KORQUAD OVERVIEW

Dataset overview	
Category	Question Answering
Size	102,960 Pairs
Format	JSON
License	CC BY-ND 2.0 KR
URL	https://korquad.github.io/
Author	Seungyoung Lim, et al.

Citation text
Lim, Seungyoung, Myungji Kim, and Jooyoul Lee. "KorQuAD1.0: Korean QA dataset for machine reading comprehension." arXiv preprint arXiv:1909.07005 (2019).

TABLE VII.   KORQUAD SAMPLE

KorQuAD Data Sample	Class
Q. 외국인들을 위해 먹는 샘물이 일시 판매되었던 년도는 언제일까? A. (전략) 1988년 서울 올림픽 무렵 외국인들을 위하여 일시 판매를 허용했던 적이 있으나, 다시 판매를 제한하였다. (후략)	Short Answer/ Syntax Variation
Q. 2009년 시즌 도중 경질된 지바 롯데의 감독은? A. (전략) 시즌 도중에 바비 밸런타인 감독의 해임이 발표되자 일부 팬들은 (후략)	Short Answer/ Vocabulary Variation
Q. 피터슨과 노먼 그란츠의 관계는 어떤 과정을 통해 형성되었는가? Title. 오스카 피터슨 - #생애 - #노먼 그란츠	Long Answer/ Subheading Duplication
Q. 이경직의 가족 관계는 어떻게 이루어져 있는가? Title. 이경직 - #가계	Long Answer/ Subheading Variation

D. Song-NER

Song_NER dataset was established by Hyewoong Park and Yeongsook Song in 2017 [33]. It consists of 4 categorical corpus; date (DT), location (LG), personal name (PS), time (TI). This dataset could be applied for named entity recognition model for chatbot system.

A chatbot model trained with Song_NER could perform information extraction from user's message. For example, a sentence "내일 저녁 7 시에 이태원 파스타집 5 명 예약해줘 (Please make a reservation for 5 people at the pasta restaurant in Itaewon tomorrow at 7pm)" could processed as below;

DT : tomorrow

LC : Itaewon

PS : 5 people

TI : 7pm.

Hyunjoong Kim, et al. has included this dataset on Korpora in 2019 [42].

TABLE VIII.   SONG-NER OVERVIEW

Dataset overview			
Category	Named Entity Recognition		
Size	DT 272		LG 29,799
	PS 11,354	TI 48	
Format	TSV		
License	CC BY-SA 2.0		
URL	https://github.com/songys/entity		
Author	Park, Hyewoong and Song, Youngsook		

Citation text
박혜웅, and 송영숙. "음절 기반의 CNN을 이용한 개체명 인식." 한국어정보학회 학술대회 (2017): 330-332.

TABLE IX.   SONG-NER SAMPLE

Corpus samples	Category
가윗날, 가을, 가을밤, 가을봄, 가을철, 간밤, 개동	DT
고양, 광명, 광주, 구리, 구미, 군산, 군포, 김포	LC
가규, 가도, 가밀, 가사도, 가의, 가중명, 가충	PS
간밤, 그날밤, 그밤, 긴밤, 날낮, 날밤, 낮, 대낮	TI

E. KMOUNLP-NER

TABLE X.   KMOUNLP-NER OVERVIEW

Dataset overview	
Category	Named Entity Recognition
Size	23,964 corpuses
Format	TEXT
License	Noncommercial Research Only
URL	https://github.com/kmounlp/NER
Author	Cheon, Minah

Citation text
Minah Cheon, "다중 생성 단위의 관계 점수를 이용한 학습 말뭉치 생성: 개체명 말뭉치를 중심으로", Ph.D. dissertion, department of Computer Science, Korea Maritime & Ocean University, Busan-si, Republic of Korea, 2021.

KMOUNLP-NER was openly provided at GitHub since 2016, and was officially published by Minah Cheon in 2021 [20]. Her paper proposed a criteria and method for Korean sentence tokenization. KMOUNLP-NER dataset was processed with the tokenization method on Korean sentences from various resources such as news articles.

TABLE XI.   KMOUNLP-NER SAMPLE

Tokenized sentence sample

## 사라예보여인 이스라엘 정착			
## \<사라예보: LOC\>여인 \<이스라엘: ORG\> 정착			
사라예보	사라예보	NNP	B-LOC
여인	여인	NNG	O
_	_	_	O
이스라엘	이스라엘	NNP	B-ORG
_	_	_	O
정착	정착	NNG	O

Won Ik Cho, et al. cited KMOUNLP-NER on Open Korean Corpora in 2020 [40]. So-Yeop Yoo and Jeong Ok-Ran applied BERT and knowledge graph method for Korean contextual information extraction, trained with KMOUNLP-NER for named entity recognition in 2020 [43]. Yeon-SOO You and Hyuk-Ro Park also used corpuses from this dataset to establish syllable-based Korean NER model [59]. The number of citations of KMOUNLP-NER is underestimated because the author has opened dataset for 2 years without any citation request.

F. Sci-News-Sum-Kr-50

TABLE XII.   SCI-NEWS-SUM-KR-50 OVERVIEW

Dataset overview

Category	Text Summarization
Size	50 articles
Format	JSON
License	Noncommercial Research only
URL	https://github.com/theeluwin/sci-news-sum-kr-50
Author	Seol, Jinsuk and Lee, Sang-gu

Citation text

설진석, 이상구. "lexrankr: LexRank 기반 한국어 다중 문서 요약." 한국정보과학회 학술발표논문집 (2016): 458-460.

TABLE XIII.   SCI-NEWS-SUM-KR-50 SAMPLE

Data JSON structure

```
{
    'title': "Title of the article",
    'source': "Resource URL",
    'slug': "can-be-used-as-unique-id",
    'length': 23,
    'summaries': [0, 1, 4, 7],
    'sentences': [
        "Sentence 1",
        "Sentence 2",
        ...
    ]
}
```

Sci-News-Sum-Kr-50 dataset was proposed by Jinsuk Seol and Sang-gu Lee in 2016 [34]. They collected 50 news articles from IT and Science section of news curation service. Each article is attached with human-written summarization. As copyright of each raw article belongs to the press, this dataset is not available for commercial use. Although the size of this dataset is small, the reliability of this dataset is quite high because the summarized sentences are written by human, without any augmentation algorithm. This dataset was enlisted on Open Korean Corpora [40].

G. SAE4K

TABLE XIV.   SAE4K OVERVIEW

Dataset overview

Category	Text Summarization
Size	30,837 raw and 50,837 augmented pairs
Format	Text
License	CC BY-SA 4.0
URL	https://github.com/warnikchow/sae4k
Author	Cho, Won Ik, et al.

Citation text

Cho, Won Ik, et al. "Discourse component to sentence (DC2S): An efficient human-aided construction of paraphrase and sentence similarity dataset." Proceedings of the 12th Language Resources and Evaluation Conference. 2020.

TABLE XV.   SAE4K SAMPLE

Sample data pairs (original / summary)	Label
그 외에 다른 물품은 없나요 # 다른 물품 여부	0
택시를 타는 것이 빠를까 지하철을 타는 것이 빠를까 # 택시와 지하철 중 빠른 것	1
이번주 전체적인 일기예보가 어떻게 되니 # 이번주 일기예보	2
후기 작성시 사용하셔도 됩니다. 악평 쓰실거면 사용하지마세요 # 후기 작성시 악평 쓰지 않기	3
실적이 좋지 않으면 명예퇴직 일 순위라는 걸 명심해 # 실적 내기	4
총무과에 묻지 말고 관리과에 물어보세요 # 관리과에 물어보기	5

TABLE XVI.   LABELS OF SAE4K_v1

Description	Label	Volume	Portion
Question			
Yes / No	0	5,718	31.99%
Alternative	1	227	1.27%
Wh-	2	11,924	66.73%
Commands			
Prohibition	3	477	3.67%
Requirement	4	12,369	95.38%
Strong requirement	5	122	0.94%

SAE4K dataset was published by Won Ik Cho, et al. in 2019 [36]. They opened SAE4K_v1 dataset with 30,837 raw sentence pairs and SAE4K_v2 dataset with 50,837 augmented data. Each data pair has original sentence and extracted structured argument with sentence type

label. The labels for sentence categorization and dataset statistics are described on Table XVI. This dataset was enlisted on Open Korean Corpora [40].

H. KLUE

Dataset overview

Category	Language Understanding Evaluation
Size	8 Datasets, total 239k samples
Format	-
License	CC BY-SA 4.0
URL	https://github.com/KLUE-benchmark/KLUE
Author	Park, Sungjoon, et al.

Citation text

Park, Sungjoon, et al. (2021). KLUE: Korean Language Understanding Evaluation. In Thirty-fifth Conference on Neural Information Processing Systems Datasets and Benchmarks Track (Round 2).

TABLE XVIII.   KLUE SUBDATASET OVERVIEW

Name	Type	Size (Train/Dev/Test)
KLUE-TC (YNAT)	Topic Classification	45k / 9k / 9k
KLUE-STS	Semantic Textual Similarity	11k / 0.5k / 1k
KLUE-NLI	Natural Language Inference	25k / 3k / 3k
KLUE-NER	Named Entity Recognition	21k / 5k / 5k
KLUE-RE	Relation Extraction	32k / 8k / 8k
KLUE-DP	Dependency Parsing	10k / 2k / 2.5k
KLUE-MRC	Machine Reading Comprehension	12k / 8k / 9k
KLUE-DST (WoS)	Dialogue State Tracking	8k / 1k / 1k

KLUE is the first Korean-based natural language understanding evaluation dataset. KLUE dataset was created through collaboration among academia and industry, and published by Sungjoon Park, et al. in 2021.

KLUE consists of 8 different large datasets for various NLP tasks. KLUE-TC is a topic classification dataset with 63k data, driven from news headlines. KLUE-STS dataset stands for semantic textual similarity task with 12.5k samples, whose source are news, review and query. KLUE-NLI dataset has 31k samples for natural language inference task, from news, Wikipedia and review. KLUE-NER is a collection of 31k named entity recognition data constructed with news and review articles. KLUE-RE is a relation extraction dataset with 48k datasets driven from Wikipedia and news articles. KLUE-DP dataset consists of 14.5k news and review data for dependency parsing task. KLUE-MRC is a dataset for machine reading comprehension task, with 29k data from Wikipedia and news articles. And the last dataset, KLUE-DST, is a dialogue state tracking dataset with 10k data driven from task oriented dialogue.

As KLUE provides an amount benchmark data for various NLP tasks, it would provide a persuasive criteria for performance measurement on Korean language processing research area.

Myeongjun Jang, et al. has applied KLUE-NLI and KLUE-STS on natural language inference and semantic text similarity experiment for analysis on language understanding models in 2021 [60]. Boseop Kim,

et al. has shown the effect and efficiency of large-scale language models by experiments on KLUE-TC and KLUE-STS datasets in 2021 [61].

I. KorNLU

TABLE XIX.   KORNLU OVERVIEW

Dataset overview

Category	Natural Language Inference, Semantic Textual Similarity
Size	950k data for NLI, 8.6k data for STS
Format	TSV
License	CC BY-SA 4.0
URL	https://github.com/kakaobrain/ KorNLUDatasets
Author	Ham, Jiyeon, et al.

Citation text

Ham, Jiyeon, et al. "KorNLI and KorSTS: New Benchmark Datasets for Korean Natural Language Understanding." arXiv preprint arXiv:2004.03289 (2020).

TABLE XX.   KORNLI SAMPLE

KorNLI data example	Label
P: 저는, 그냥 알아내려고 거기 있었어요. H: 이해하려고 노력하고 있었어요.	Entailment
P: 저는, 그냥 알아내려고 거기 있었어요. H: 나는 처음부터 그것을 잘 이해했다.	Contradiction
P: 저는, 그냥 알아내려고 거기 있었어요. H: 나는 돈이 어디로 갔는지 이해하려고 했어요.	Neutral

TABLE XXI.   KORSTS SAMPLE

KorSTS data example	Label
S1. 한 남자가 음식을 먹고 있다. S2. 한 남자가 뭔가를 먹고 있다.	4.2
S1. 한 비행기가 착륙하고 있다. S2. 애니메이션화된 비행기 하나가 착륙하고 있다.	2.8
S1. 한 여성이 고기를 요리하고 있다. S2. 한 남자가 말하고 있다.	0.0

KorNLU was established by Jiyeon Ham, et al. in 2020 [14]. It consists of two sub-datasets; KorNLI for natural language inference and KorSTS for semantic textual similarity.

KorNLI has 94k data for train, 2.5k data for development and 5k data for test, driven from SNLI [62], MNLI [63], and XNLI [64]. This dataset classifies the relationship between a pair of sentences into 3 classes: entailment, contradiction, neutral. KorSTS has 5.7k training data, 1.5k development data and 1.4 test data, and the source of KorSTS dataset is STS-B [65]. KorSTS provides a score between 0(dissimilar) and 5(equivalent) for each pair of sentences.

Myeongjun Jang applied KorNLI for experiments on language understanding models in 2021 [60]. Hyunjae Lee proposed a lite BERT model for Korean understanding with benchmark performance experiment on KorNLI and KorSTS [45]. Yongmin Yoo applied KorSTS for sentence similarity measurement in 2021 [66].

J. ParaKQC

Dataset overview	
Category	Semantic Textual Similarity
Size	545k utterances
Format	Text
License	CC BY-SA 4.0
URL	https://github.com/warnikchow/paraKQC
Author	Cho, Won Ik, et al.

Citation text
Cho, Won Ik, et al. "Discourse component to sentence (DC2S): An efficient human-aided construction of paraphrase and sentence similarity dataset." Proceedings of the 12th Language Resources and Evaluation Conference. 2020.

Sentence set examples
S1. 메일을 다 비울까 아니면 안읽은 것만 지울까?
S2. 메일 중에 안읽은 것만 지울까? 다 지울까?
S1. 나한테 집안 습도 조정할 때 어떻게 해야하는 지 좀 알려줄래?
S2. 저기요 집안 습도 좀 조정할 수 있는 방법 좀 알려주세요
S3. 오후 말고 밤에는 거실 무드등만 켜놓자
S3. 아침에 말고 밤에 거실 무드등만 켜놓자

ParaKQC is a dataset for parallel Korean questions and commands, proposed by Won Ik Cho, et al. in 2020 [36]. It contains 10k utterances that consist with 1,000 sets of 10 similar sentences, provided with an augmentation script which make up whole corpus of 545k utterances.

ParaKQC contributed as a resource of KLUE dataset [24]. Also it is enlisted on Open Korean Corpora [40]. Won Ik Cho, et al. applied the sentence classification scheme of ParaKQC for StyleKQC, a style-variant paraphrase corpus for Korean question and commands [67].

K. NSMC

NSMC dataset was constructed by Eunjeong Park in 2015, with sentences scrapped from Naver movie reviews [37]. Raw materials have user-written comments on the movie with score ratings between 1 (negative) to 10 (positive). The sentences were classified into 3 categories by rating scores; negative (1 ~ 4 score), neutral (5 ~ 8 score), positive (9 ~ 10 score). NSMC only contain the negative (label 0) and positive (label 1) sentences for semantic textual analysis task.

Although NSMC is a highly attractive dataset for Korean NLP, the author has not published related paper or provided official citation request text. Therefore, the exact citation number is not known; search result on Google Scholar indicates that at least 50 papers has applied NSMC for experiment or benchmark test. Yong-Jun Lee, et al. Used NSMC dataset for experiment on Korean-specific emotion annotation model in 2020 [46]. Sangwan Moon and Naoaki Okazaki applied NSMC to evaluate a just-in-time BERT model in 2020 [68]. Kyubong Park, et al. has analyzed the performance benchmark of various Korean NLP with NSMC dataset in 2020 [69]. NSMC also contributed to KLUE [24] and Open Korean Corpora [40].

Dataset overview	
Category	Semantic Textual Analysis
Size	20k reviews
Format	Text
License	CC0 1.0
URL	https://github.com/e9t/nsmc
Author	Eunjeong Park

Citation text
Eunjeong Park, NSMC: Naver sentiment movie corpus v1.0. (2015). Available at https://github.com/e9t/nsmc

Movie review sample	Label
아 더빙.. 진짜 짜증나네요 목소리	0
흠...포스터보고 초딩영화줄....오버연기조차 가볍지 않구나	1
너무재밓었다그래서보는것을추천한다	0
교도소 이야기구먼 ..솔직히 재미는 없다..평점 조정	0
사이몬페그의 익살스런 연기가 돋보였던 영화!스파이더맨에서 늘어보이기만 했던 커스틴 던스트가 너무나도 이뻐보였다	1
막 걸음마 뗀 3 세부터 초등학교 1 학년생인 8 살용영화.ㅋㅋㅋ...별반개도 아까움.	0
원작의 긴장감을 제대로 살려내지못했다.	0
액션이 없는데도 재미 있는 몇안되는 영화	1

L. Toxic Comment

Dataset overview	
Category	Semantic Textual Analysis
Size	20k sentences
Format	CSV
License	MIT
URL	https://github.com/songys/Toxic_comment_data
Author	Song, Youngsook

Citation text
Song, Youngsook, Toxic Comment. 2018. Available at https://github.com/songys/Toxic_comment_data.

Movie review sample	Label
부패한 로마노프 왕조를 기리는 뭣 같은 영화... 온몸으로 항거했던 러시아 민중들이 그저 폭도냐	1,0,0,0,0
빨갱이는 있따...	1,0,1,0,0
박찬욱 각본. 박찬욱의 흑역사네.	1,0,0,1,0
정일우의 발연기, 깨는 나레이션, 밋밋한 일드풍의 연출.. 화면 때깔만 좋더라!	1,0,0,0,1
마이클 더글러스의 여름날 신경질내기	1,0,0,1,0
조폭 살인범 형사놈들 나오는 영화는 예전이나 지금이나 한국영화 단골손님들이구만 ㅉㅉㅉ	1,0,0,0,1
그냥 짜증나는 영화, 리암니슨영화는 대체적으로 오바가많은듯	1,0,0,1,1

Toxic Comment dataset is a collection of negative movie review sentences from NSMC datasets, with more specific emotional labels. The label of each sentence is a 5-dim vector, similar to one-hot expression. The parameters of label vector indicates toxic, obscene, threat, insult, and identity hate. Sentences has at least one '1' indicate for those categories.

M.KHateSpeech

KHateSpeech dataset was published by Jihyung Moon, et al. in 2020 [38]. They scrapped malicious replies from news articles from entertainment and celebrity sections, where the largest amount of negative comments are produced. This dataset provides 9,381 human-labeled data with 2,033,893 unlabeled raw comments. Each comment is annotated on two aspect; existence of social bias and hate speech. And additional binary label has attached to indicate whether a comment contains gender bias or not.

TABLE XXVIII.   KHateSpeech Overview

Dataset overview

Category	Semantic Textual Analysis
Size	Labeled: 9.4k Unlabeled: 2m
Format	TSV
License	CC BY-SA 4.0
URL	https://github.com/kocohub/korean-hate-speech
Author	Moon, Jihyung, et al.

Citation text

Moon, Jihyung, Won Ik Cho, and Junbum Lee. "BEEP! Korean Corpus of Online News Comments for Toxic Speech Detection." Proceedings of the Eighth International Workshop on Natural Language Processing for Social Media. 2020.

TABLE XXIX. KHateSpeech Sample

Comment samples	Gender Bias/ Bias / Hate
송중기 시대극은 믿고본다. 첫회 신선하고 좋았다.	False / None / None
지현우 나쁜놈	False / None / Offensive
알바쓰고많이만들면되지 돈욕심없으면골목식당왜나온겨 기댕기게나하고 산에가서 팔어라	False / None / Hate
설마 ㅈ현정 작가 아니지??	True / Gender / Hate

Chanhee Lee, et al. has applied KHateSpeech dataset to analyzed the data efficiency of cross-lingual post-training in pretrained language models in 2021 [70]. Seyoung Lee and Saerom Park used KHateSpeech dataset to proposed a hate speech classification algorithm using ordinal regression in 2021 [47]. Hyeonsang Lee, et al. proposed a CNN based model for toxic comments classification, trained with KHateSpeech dataset in 2020 [71].

N. 3i4K

TABLE XXX.   3i4K Overview

Dataset overview

Category	Semantic Textual Analysis
Size	19k corpuses, 61k texts, 7k speeches
Format	Text
License	CC BY-SA 4.0
URL	https://github.com/warnikchow/3i4k
Author	Cho, Won Ik, et al.

Citation text

Cho, Won Ik, et al. "Speech intention understanding in a head-final language: A disambiguation utilizing intonation-dependency." arXiv preprint arXiv:1811.04231 (2018).

TABLE XXXI. 3i4K Corpus Composition

Text-based Seiving	Intention	Label	Size
Fragments	-	0	6,538
	Statements	1	29,559
	Questions	2	18,418
Clear-cut cases	Commands	3	17,626
	RQ[a]s	4	3,312
	RC[b]s	5	1,818
Intonation-dependent utterances	unknown	6	5,300

[a] Rhetorical Question   [b] Rhetorical Commands

3i4K was published by Won Ik Cho, et al. in 2018 [25]. They collected corpus data from released works of SNU-SLP[1] and Natural Institute of Korean Language[2] to establish FCI (fragments, clear-cut cases, intonation-dependent utterances) dataset. They also manually created questions and commands for dataset.

3i4K dataset is enlisted on Open Korean Corpora [40]. Won Ik Cho, et al. has applied 3i4K to investigate the effectiveness of character-level embedding in Korean sentence classification in 2019 [48].

O. KAIST Corpus

KAIST Corpus dataset is a collection of various corpus and machine translation datasets, constructed since 1997 to 2005, published by KAIST Semantic Web Research Center [72]. IT has over 70 million Korean text corpus, position annotated corpus, tree-annotated corpus, Korean-Chinese parallel corpus, Korean-English parallel corpus.

TABLE XXXII.   KAIST Corpus Overview

Dataset overview

Category	Various Corpus and Machine Translation
Size	70 million corpuses
License	Noncommercial Research Only
URL	http://semanticweb.kaist.ac.kr/home/index.php/KAIST_Corpus
Provider	Ki-sun Choi

Citation text

[1] http://slp.snu.ac.kr/
[2] https://krean.go.kr

Ki-sun Choi (2001), KAIST Language Resources 2001 edition. Result of the core software project from Ministry of Science and Technology, Korea.

TABLE XXXIII.   KAIST CORPUS – QUALIFIELD CORPUS

Dataset Title	Language	Size
KAIST Raw corpus	Korean	70m
High quality morpho-syntactically annotated corpus		1m
Automatically Analyzed Large Scale KAIST Corpus		40m
Korean Tree-Tagging Corpus		3k
Tree-tagged Corpus 2		30k
Chinese-Tagged corpus		10k
Chinese-English-Korean Multilingual corpus	Kor-Chn-Eng	60k
Chinese-English multilingual corpus	Chn-Eng	60k
Chinese-Korean multilingual corpus	Kor-Chn	60k
Newspaper Corpus (Hankyorh)	Korean	620 files
Newspaper Corpus (Donga-Korean, English, Japanese, Chinese)	Kor-Eng-Jpn-Chn	1,791 files

TABLE XXXIV.   KAIST CORPUS – PROCESSED RESOURCES

Dataset Title	Language	Size
Nouns Definition of General Vocabulary	Korean	29k
Noun Definition Corpus of General Vocabulary		29k
Co-occurrence data	Kor-Eng	47m
Alignment Model for Extracting English-Korean Translation of Term Constituents	Korean	24k
Terminology corpus– medicine		220k
Terminology corpus– architectural engineering		3.7k
Terminology corpus– economics		27.7k
Terminology corpus– engineering		13.6k
Terminology corpus– physical metallurgy		7.5k
Terminology corpus- mechanical engineering		50k
Terminology corpus– physics		107k
Terminology corpus– biology		84k
Terminology corpus– electronic engineering		13k
Terminology corpus– computer science		8.7k
Terminology corpus– chemistry		66.7k
Terminology corpus– chemical engineering		20k
Terminology corpus– environmental engineering		21k
Terminology corpus– Adverbs and Frequency		2.5k
Terminology corpus– Nouns and Frequency		4.3m
Terminology corpus– Adjectives and Frequency		1.7k
Terminology corpus– Verbs and Frequency		20k
Terminology corpus– Verbal case Frames		135k
Terminology corpus– Co-occurrence		16m
One-syllable nouns		1k
Off-line Korean Handwriting Database (Image)		1.2k

KAIST corpus was established by Ki-sun Choi, and published in 2001.[72]. KAIST corpus has various sub-datasets described on Table XXXIII and TABLE XXXIV.

Qualified corpus has 7 Korean corpus datasets and 4 multilingual corpus datasets. Processed resources section provides 23 Korean corpus dataset and 1 Korean-English co-occurrence dataset, and an off-line Korean handwriting image dataset. KAIST corpus is also enlisted on Open Korean Corpora [40].

Considering the year of publication, the number of citations of KAIS corpus dataset is very low. So it's difficult to find a benchmark performance of recent algorithms tested with KAIST corpus. However, as the size of datasets are very large and the quality of each dataset is excellent, it still worth using for algorithm design and model training.

IV. DISCUSSION

As the interests and demands of companies on Korean language processing dataset has dramatically increased, fund and investment seems to be increased too. Therefore, great dataset such as KLUE has been published and accepted to Neural IPS this year. As described on Table 1, most of the datasets popular today were published within last 3 years. This reflects the recent advance in popularity of Korean NLP dataset construction.

Since the datasets were recently published, I guess that many research projects using them are currently in progress, or have not yet published. This may explain the low citation scores of useful datasets. The number of citation is considered as a good indicator to evaluate a popularity of dataset. I agree that a dataset which are frequently cited is very useful to produce a reasonable benchmark result. However, many dataset papers are cited because of the novel method proposed by the authors, rather than the dataset itself.

A researcher should not underestimate or overestimate a dataset by the paper's citation score only. I suggest exploring various datasets to find one, best appropriate for your research purpose.

V. CONCLUSION

This paper provided a survey of Korean-based natural language processing datasets. The survey section proposed brief and comprehensive summarization and detailed information. It covered conversation log, question answering, named entity recognition, text summarization, natural language understanding, semantic sentence similarity, semantic textual analysis, semantic speech analysis and machine translation. The discussion outlined a brief guide to consider when choosing a dataset. In conclusion, I hope this paper to help researchers' to reduce time consuming works for dataset exploring and to choose appropriate dataset in Korean NLP area.

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