338, Gwanggyojungang-ro, Suji-gu, Yongin-si, Gyeonggi-do, Republic of Korea □ (+82) 10-2580-9066 | **□** chanjun.park@upstage.ai / bcj1210@naver.com | **□** parkchanjun | **□** bcj1210

# Research Interests\_

I am currently working as an AI Research Engineer at Upstage. Also I am a Ph.D candidate in the Department of Computer Science and Engineering at Korea University (Advisor: Heuiseok Lim). I am the founder and leader of KU-NMT Group, I received Naver Ph.D. Fellowship 2021. I have published more than 140 papers in the field of Natural Language Processing, especially Machine Translation. I have registered 5 patents and applied for 13 patents.

- · Data-centric Al
- · Machine Translation
- · Language Resource and Evaluation
- Real-World-centric AI

# **Education**

**Korea University** Seoul, South Korea

Ph.D in Computer Science and Engineering, GPA: 4.44 / 4.5 Sep. 2019 - Aug.2023

Busan, South Korea

Mar. 2015 - Aug. 2018

- · Advisor: Heuiseok Lim
- · Natural Language Processing & Artificial Intelligence Lab
- · Founder and Leader of KU-NMT Group.

#### **Busan University of Foreign Studies (BUFS)**

B.S. IN NATURAL LANGUAGE PROCESSING & CREATIVE CONVERGENCE, GPA: 4.2 / 4.5

- · Advisor: Pummo Rvu Full Scholarship
- **Academic Services**

**COLING 2022** South Korea

Sep.2021-Present VIRTUAL SOCIAL CHAIR

- COLING 2022: http://coling2022.org/
- · Virtual Social Chair

**Program committe** South Korea

PROGRAM COMMITTE January.2021-Present

ACL 2023-Industry Track, EACL 2022, ACL 2022-Insights, NAACL 2022-Industry Track, ARR (ACL 2022, NAACL 2022)

Reviewer South Korea

REVIEWER January.2021-Present

· IEEE Access, Cybernetics and Systems, Applied Sciences, Electronics, Entropy, Connection Science

# Selected Publications \_\_

#### Mimicking Infants' Bilingual Language Acquisition for Domain Specialized Neural Machine Translation

Chanjun Park, Woo-Young Go, Sugyeong Eo, Hyeonseok Moon, Seolhwa Lee, Heuiseok Lim IEEE Access 10 (2022) pp. 38684-38693. IEEE, 2022

FreeTalky: Don't Be Afraid! Conversations Made Easier by a Humanoid Robot using Persona-based Dialogue

Chanjun Park, Yoonna Jang, Seolhwa Lee, Sungjin Park, Heuiseok Lim

LREC 2022 (Proceedings of the Language Resources and Evaluation Conference), 2022, Marseille, France

#### **Priming Ancient Korean Neural Machine Translation**

Chanjun Park, Seolhwa Lee, Jaehyung Seo, Hyeonseok Moon, Sugyeong Eo, Heuiseok Lim

LREC 2022 (Proceedings of the Language Resources and Evaluation Conference), 2022, Marseille, France

# The ASR Post-Processor Performance Challenges of BackTranScription (BTS): Data-Centric and Model-Centric Approaches

Chanjun Park, Jaehyung Seo, Seolhwa Lee, Chanhee Lee, Heuiseok Lim Mathematics 10.19 (2022). 2022

#### **Empirical Analysis of Parallel Corpora and In-Depth Analysis Using LIWC**

Chanjun Park, Midan Shim, Sugyeong Eo, Seolhwa Lee, Jaehyung Seo, Hyeonseok Moon, Heuiseok Lim Applied Sciences 12.11 (2022) p. 5545. Multidisciplinary Digital Publishing Institute, 2022

CHANJUN. PARK · CURRICULUM VITAE

#### QUAK: A Synthetic Quality Estimation Dataset for Korean-English Neural Machine Translation

Sugyeong Eo, **Chanjun Park**, Hyeonseok Moon, Jaehyung Seo, Gyeongmin Kim, Jungseob Lee, Heui-Seok Lim *COLING 2022 - Proceedings of the 29th International Conference on Computational Linguistics*, 2022

#### KU X Upstage's Submission for the WMT22 Quality Estimation: Critical Error Detection Shared Task

Sugyeong Eo, Chanjun Park, Hyeonseok Moon, Jaehyung Seo, Heuiseok Lim

WMT 2022 - EMNLP 2022 - Proceedings of the Seventh Conference on Machine Translation, 2022, Abu Dhabi

#### Focus on FoCus: Is FoCus focused on Context, Knowledge and Persona?

SeungYoon Lee, Jungseob Lee, **Chanjun Park**, Sugyeong Eo, Hyeonseok Moon, Jaehyung Seo, Jeongbae Park, Heui-Seok Lim *Proceedings of the 1st Workshop on Customized Chat Grounding Persona and Knowledge*, 2022

#### A Self-Supervised Automatic Post-Editing Data Generation Tool

Hyeonseok Moon, **Chanjun Park**, Sugyeong Eo, Jaehyung Seo, Seung Jun Lee, Heuiseok Lim *ICML 2022 - DataPerf workshop, 2022* (2022). 2022

#### Empirical Analysis of Noising Scheme based Synthetic Data Generation for Automatic Post-editing

Hyeonseok Moon, **Chanjun Park**, Seolhwa Lee, Jaehyung Seo, Jungseob Lee, Sugyeong Eo, Heuiseok Lim LREC 2022 (Proceedings of the Language Resources and Evaluation Conference), 2022, Marseille, France

#### A Dog Is Passing Over The Jet? A Text-Generation Dataset for Korean Commonsense Reasoning and Evaluation

Jaehyung Seo, Seounghoon Lee, **Chanjun Park**, Yoonna Jang, Hyeonseok Moon, Sugyeong Eo, Seonmin Koo, Heuiseok Lim Findings of the Association for Computational Linguistics: NAACL 2022, 2022, Seattle, United States

#### PU-GEN: Enhancing generative commonsense reasoning for language models with human-centered knowledge

Jaehyung Seo, Dongsuk Oh, Sugyeong Eo, **Chanjun Park**, Kisu Yang, Hyeonseok Moon, Kinam Park, Heuiseok Lim *Knowledge-Based Systems* (2022) p. 109861. Elsevier, 2022

# Should we find another model?: Improving Neural Machine Translation Performance with ONE-Piece Tokenization Method without Model Modification

Chanjun Park, Sugyeong Eo, Hyeonseok Moon, Heui-Seok Lim

NAACL 2021 - Proceedings of the 2021 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies: Industry Papers. 2021

#### FreeTalky: Don't Be Afraid! Conversations Made Easier by a Humanoid Robot using Persona-based Dialogue

Chanjun Park, Yoonna Jang, Seolhwa Lee, Sungjin Park, Heuiseok Lim

AAAI 2022 - Artificial Intelligence for Education(AI4EDU) (2021). 2021

#### PicTalky: Augmentative and Alternative Communication Software for Language Developmental Disabilities

Chanjun Park, Yoonna Jang, Seolhwa Lee, Jaehyung Seo, Kisu Yang, Heuiseok Lim

AACL 2022 - Demo Track (2021). 2021

#### How should human translation coexist with NMT? Efficient tool for building high quality parallel corpus

Chanjun Park, Seolhwa Lee, Hyeonseok Moon, Sugyeong Eo, Jaehyung Seo, Heuiseok Lim

NeurIPS 2021 - Data-centric AI (DCAI) workshop (2021). 2021

#### Two Heads are Better than One? Verification of Ensemble Effect in Neural Machine Translation

Chanjun Park, Sungjin Park, Seolhwa Lee, Taesun Whang, Heuiseok Lim

EMNLP 2021 - Proceedings of the Second Workshop on Insights from Negative Results in NLP, 2021, Online and Punta Cana, Dominican Republic

#### BTS: Back TranScription for Speech-to-Text Post-Processor using Text-to-Speech-to-Text

**Chanjun Park**, Jaehyung Seo, Seolhwa Lee, Chanhee Lee, Hyeonseok Moon, Sugyeong Eo, Heuiseok Lim ACL 2021 - Proceedings of the 8th Workshop on Asian Translation (WAT2021), 2021, Online

#### **Dealing with the Paradox of Quality Estimation**

Sugyeong Eo, Chanjun Park, Hyeonseok Moon, Jaehyung Seo, Heuiseok Lim, (Equal Contribution (First Co-Author))

MT Summit - Proceedings of the 4th Workshop on Technologies for MT of Low Resource Languages (LoResMT2021), 2021, Virtual

#### A New Tool for Efficiently Generating Quality Estimation Datasets

Sugyeong Eo, Chanjun Park, Jaehyung Seo, Hyeonseok Moon, Heuiseok Lim NeurIPS 2021 - Data-centric Al (DCAI) workshop, 2021

#### Syntax-enhanced Dialogue Summarization using Syntax-aware information

Seolhwa Lee, Kisu Yang, **Chanjun Park**, João Sedoc, Heui-Seok Lim

NerIPS 2021 16th Women in Machine Learning Workshop, 2021

#### Towards Syntax-Aware Dialogue Summarization using Multi-task Learning

Seolhwa Lee, Kisu Yang, Chanjun Park, João Sedoc, Heui-Seok Lim

EMNLP 2021 - Widening NLP (WiNLP2021) workshop, 2021

#### Who speaks like a style of Vitamin: Towards Syntax-Aware Dialogue Summarization using Multi-task Learning

Seolhwa Lee, Kisu Yang, Chanjun Park, João Sedoc, Heuiseok Lim

IEEE Access (2021). IEEE, 2021

# Automatic Knowledge Augmentation for Generative Commonsense Reasoning

Jaehyung Seo, Chanjun Park, Sugyeong Eo, Hyeonseok Moon, Heuiseok Lim

NeurIPS 2021 - Data-centric AI (DCAI) workshop, 2021

#### Neural Spelling Correction: Translating Incorrect sentences to Correct sentences for Multimedia

Chanjun Park, Kuekyeng Kim, Yeong Wook Yang, Minho Kang, Heui Seok Lim

Multimedia Tools and Applications (2020) pp. 1–18. Springer, 2020

#### **Ancient Korean Neural Machine Translation**

Chanjun Park, Chanhee Lee, YeongWook Yang, Heuiseok Lim

#### Comparison of the evaluation metrics for Neural Grammatical Error Correction with Overcorrection

Chanjun Park, YeongWook Yang, Chanhee Lee, Heuiseok Lim

IEEE Access 8 (2020) pp. 106264-106272. 2020

#### **Decoding Strategies for Improving Low-Resource Machine Translation**

Chanjun Park, Yeongwook Yang, Kinam Park, Heuiseok Lim

Electronics 9.10 (2020) p. 1562. Multidisciplinary Digital Publishing Institute, 2020

# **Honors & Awards**

2022.12	1st place in WMT 2022 QE Task 3, 2022, WMT 2022 - EMNLP 2022	Abu Dhabi
2022.10	<b>Best Paper Award, 2022</b> , The 34th Annual Conference on Human & Cognitive Language Technology (HCLT2022)	South Korea
2021.12	Naver Ph.D. Fellowship, 2021, Naver	South Korea
2021.10	<b>Best Paper Award (NLP Application 2 Section), 2021,</b> The 33rd Annual Conference on Human & Cognitive Language Technology (HCLT2021)	South Korea
2021.10	<b>Best Paper Award (Language Resource Section), 2021,</b> The 33rd Annual Conference on Human & Cognitive Language Technology (HCLT2021)	South Korea
2021.10	<b>Best Paper Award (QA and Speech Section), 2021,</b> The 33rd Annual Conference on Human & Cognitive Language Technology (HCLT2021)	South Korea
2021.07	Ranked 4th on the CommonGen 1.1 Leaderboard (Nov. 2022 Ranked 7th, CommonGen 1.1), CommonGen 1.1	South Korea
2020.11	1st Place in Flitto Hackathon (Team Lead), 2020, Flitto	South Korea
2020.10	<b>Best Paper Award, 2020</b> , The 32nd Annual Conference on Human & Cognitive Language Technology (HCLT2020)	South Korea
2020.05	Best practices for using NIA AI training data(Korean-English Neural Machine Translation model), AI Hub	South Korea
2019.10	<b>Best Paper Award, 2019,</b> The 31st Annual Conference on Human & Cognitive Language Technology (HCLT2019)	South Korea
2019.10	1st Place Microsoft AI Accessibility Hackathon in Korea (Team Lead), Microsoft	South Korea
2019.03	<b>Graduate School Associate Scholarship,</b> Sungkyunkwan University	South Korea
2018.10	<b>Next Generation Information Processing NLP Competition 2018: Participation Award,</b> Next-generation information computing technology development business	South Korea
2017.06	Bit Computer Excellence Award (President Award), Bit Computer	South Korea
2015-2019	Full Scholarship, BUFS	South Korea
2016-2017	Scholarship for academic excellence, Sooyoungro Church	South Korea

# Selected Research Experience \_

#### **DataOps and Data Management**

Seoul, South Korea
June. 2022. - Present

RESEARCHER IN UPSTAGE

• DataOps research related to OCR and Product Search

- Building training and evaluation data for OCR and Product Search
- Data Management for OCR and Product Search.
- Skills: Data Management, DataOps, OCR, Product Search

# (Project) Polyglot: Large Language Models of Well-balanced Competence in Multi-languages

Seoul, South Korea

RESEARCHER IN ELEUTHER AI

September. 2022. - Present

- Various multilingual models such as mBERT, BLOOM, and XGLM have been released. Therefore, someone might ask, "why do we need to make
  multilingual models again?" Before answering the question, we would like to ask, "Why do people around the world make monolingual models
  in their language even though there are already many multilingual models?" We would like to point out there is a dissatisfaction with the nonEnglish language performance of the current multilingual models as one of the most significant reason. So we want to make multilingual
  models with higher non-English language performance. This is the reason we need to make multilingual models again and why we name them
  'Polyglot'.
- Skills: Language Model, Data management

#### (Project) LGU + VOD Search POC Project

Seoul, South Korea

June. 2022. - October.2022

RESEARCHER IN UPSTAGE

- Gold Testset and evaluation system design for tag extraction model comparison
- Responsible for designing search system evaluation. Planning and designing blind tests for comparison with commercial systems.
- Skills: Customer Experience (CX), Quality Assurance (QA)

#### (Project) Amorepacific Search commercialization Project

Seoul. South Korea

March. 2022. - June.2022 RESEARCHER IN UPSTAGE

- · Participated in Amorepacific's AP Mall search commercialization project
- · Stability test planning and design
- Response time testing planning and design
- Establishment of systematic QA process based on bug testing
- Skills: Customer Experience (CX), Quality Assurance (QA)

**Product Search Pack** Seoul, South Korea

RESEARCHER IN UPSTAGE

March. 2022. - October. 2022

- Develop Product Search Pack
- · Establishment of evaluation system to develop Product Search Pack and responsible for data, planning, and evaluation
- Quality Assurance for Search System, Gold Testset Planning
- Skills: Data Manager, User Experience (UX), Customer Experience (CX), Quality Assurance (QA)

#### (Project) Korean-Prompt-based Engineering for Few-shot Research

Seoul South Korea

RESEARCHER IN KOREA UNIV March. 2022. - July. 2022.

- Plain Template Insertion: Korean-Prompt-based Engineering for Few-shot Learners
- Supported by Hyundai Motor
- Publication of research paper in IEEE Access (SCIE): https://ieeexplore.ieee.org/document/9913979
- Skills: Prompt learning, Few-shot learning, Pytorch, Huggingface

#### (Project) Return on Advertising Spend (ROAS) Prediction Research

Seoul, South Korea

RESEARCHER IN KOREA UNIV

December. 2021. - March. 2022.

- Return on Advertising Spend (ROAS) refers to the ratio of revenue generated by advertising projects to its expense.
- · We present a method for predicting ROAS that does not require controlled experiments in data acquisition and validates its effectiveness through comparative experiments. Specifically, we propose a task deposition method that divides the end-to-end prediction task into the two-stage process; occurrence prediction and occurred ROAS regression.
- Supported by Data voucher
- Publication of research paper in Mathematics (SCIE): https://www.mdpi.com/2227-7390/10/10/1637
- · Skills: ROAS, Regression, Pytorch

#### (Project) Hybrid Retriever System for Industrial Frequently Asked Questions Research

Seoul, South Korea

December. 2021. - March. 2022. · We propose a method of returning responses to customer inquiries using only data that can be easily obtained from companies based on

- the deep learning information retrieval module. In this work, we hybridize dense embedding and sparse embedding to make it robust to professional terms and suggest new functions to scale the results returned by the two modules and adjust the weight ratio.
- · Supported by Data voucher
- Publication of research paper in Mathematics (SCIE): https://www.mdpi.com/2227-7390/10/8/1335
- · Skills: Information Retrieval, Pytorch

#### **Fake News Detection Research**

Seoul, South Korea January. 2022. - Present

• Research for Utilization Strategy of User Engagements in Korean Fake News Detection

- Publication of research paper in IEEE Access (SCIE): https://ieeexplore.ieee.org/document/9841541
- Skills: Graph Nerual Network, Pytorch, Fairseq

#### **Simultaneous Speech Translation Research**

Seoul, South Korea

December. 2021. - Present

RESEARCHER IN KOREA UNIV

RESEARCHER IN KOREA UNIV

- Research for Simultaneous Speech Translation for MCN Market
- Skills: Neural Machine Translation, Pytorch, Fairseq

#### (Project) NAVER PAPAGO - Parallel Corpus Filtering and Mining

Seoul, South Korea

December. 2021. - June. 2022.

RESEARCHER IN KOREA UNIV

- Research for Static and Dynamic Parallel Corpus Filtering and Mining
- Human-inspired curriculum learning based NMT
- Supported by NAVER PAPAGO
- · Skills: Neural Machine Translation, Parallel corpus filtering, Pytorch, Fairseq

#### **Data-centric Neural Machine Translation Research**

Seoul, South Korea

RESEARCHER IN KOREA UNIV

July. 2021. - December. 2021.

- Research for Data-centric Neural Machine Translation, Automatic Post Editing, Quality Estimation, Generative Commonsense Reasoning
- Develop Efficient tool for building high quality parallel corpus and A New Tool for Efficiently Generating Quality Estimation Datasets and A Self-Supervised Automatic Post-Editing Data Generation Tool
- Publication of 3 research paper in NeurIPS 2021 Data-centric AI (DCAI) workshop: https://eval.how/dcai2021/index.html
- Publication of research paper in ICML 2022 DataPerf workshop: https://sites.google.com/view/dataperf2022
- Skills: Neural Machine Translation, Web Application, Fairseq

#### **Korean Commonsense Generation and Reasoning Research**

Seoul, South Korea

RESEARCHER IN KOREA UNIV

June. 2021. - Present

- KommonGen: A Dataset for Korean Generative Commonsense Reasoning Evaluation
- Automatic Knowledge Augmentation for Generative Commonsense Reasoning
- Publication of research paper in NAACL 2022: https://aclanthology.org/2022.findings-naacl.172/
- Publication of research paper in Knowledge-Based Systems: https://www.sciencedirect.com/science/article/abs/pii/ S0950705122009546
- Skills: Commonsense Reasoning, Pytorch, Huggingface

#### **Image Retrieval Research**

Seoul, South Korea

June. 2021. - September. 2021.

RESEARCHER IN KOREA UNIV

- Grounded Vocabulary for Image Retrieval Using a Modified Multi-Generator Generative Adversarial Network
- Publication of research paper in IEEE Access (SCIE): https://ieeexplore.ieee.org/document/9585128
- Skills: Image Retrieval, Pytorch, Huggingface

# (Project) Development of patent document invention sentence extraction and key phrase extraction module

Seoul, South Korea

June. 2021. - December. 2021.

RESEARCHER IN KOREA UNIV

- · Al for Patent research
- T5 based Key sentence extraction and key phrase generation
- · Supported by "LG Innotek"
- Publication of research paper in IEEE Access (SCIE): https://ieeexplore.ieee.org/document/9779775
- Skills: Automatic Summarization, Sentence classification, Information Extraction Pytorch, Huggingface

# **Dialogue Summarization Research**

Seoul, South Korea

RESEARCHER IN KOREA UNIV

June. 2021. - Present

- Syntax-Aware Dialogue Summarization using Multi-task Learning
- · Skills: Dialogue system, Automatic Summarization, Pytorch, Huggingface
- Publication of research paper in EMNLP 2021 -Widening NLP (WiNLP2021) workshop
- · Publication of research paper in NeurIPS 2021 Women in Machine Learning (WiML 2021) workshop
- Publication of research paper in IEEE Access (SCIE): https://ieeexplore.ieee.org/abstract/document/9664379/

#### **Dialogue System Research**

Seoul, South Korea

RESEARCHER IN KOREA UNIV

April. 2021. - December, 2021

- Robust Reward Estimator for Multidomain Task-Oriented Dialogue
- Publication of research paper in Applied Science (SCIE): https://www.mdpi.com/2076-3417/11/14/6624
- BlenderBot 2.0 Errors Analysis in terms of Model, Data and User-Centric Approach
- Publication of research paper in Arxiv: https://arxiv.org/abs/2201.03239
- Focus on FoCus: Is FoCus focused on Context, Knowledge and Persona?
- $\bullet \ \ \text{Publication of research paper in COLING 2022 Workshop: } \\ \textbf{https://aclanthology.org/2022.ccgpk-1.1.pdf}$
- · Skills: Dialogue system, Pytorch, Huggingface, ParlAI

# (Project) Subtitle production and editing technology development for colloquial broadcasting contents

Seoul, South Korea

April. 2021. - December, 2021.

RESEARCHER IN KOREA UNIV

- Development of Colloquial Aware Neural Machine Translation (CANMT) model that is robust to colloquial expression based on broadcast content
- Consortium: Korea Univ, Hanyang Univ, ON THE IT, SBS Contents Hub, CBS
- Supported by IITP
- Korean Colloquial-Sentence-Splitter(Ko-CSS) for simultaneous speech translation
- Neural Architecture Search(NAS) based NMT Research
- Speech recognition post-processor research
- · Cross lingual adaptation research
- · Skills: Neural Machine Translation, Automatic Speech Recognition, simultaneous speech translation, Pytorch, Huggingface, Fairseq
- Ko-CSS Demo: http://nlplab.iptime.org:32285/

#### **BTS: Speech recognition post-processor Research**

Seoul, South Korea

RESEARCHER IN KOREA UNIV

January. 2021. - Present

- Proposed BackTranScription(BTS). Back Transcription (BTS) has seen limited success without the role of phonetic transcription for building and creating vast datasets automatically.
- Publication of research paper in WAT 2021 (ACL Workshop): https://aclanthology.org/2021.wat-1.10/
- Publication of research paper in Mathematics: https://www.mdpi.com/2227-7390/10/19/3618
- Skills: Neural Machine Translation, Pytorch, Huggingface, Fairseq

#### **Cross Lingual Pretrained Language Model Research**

Seoul, South Korea

RESEARCHER IN KORFA UNIV January. 2021. - Present

- · Research for Exploring the Data Efficiency of Cross-Lingual Post-Training in Pretrained Language Models
- Research for combining BART and Parallel Corpus Filtering
- Publication of research paper in Applied Science (SCIE): https://www.mdpi.com/2076-3417/11/5/1974
- Skills: Neural Machine Translation, Pytorch, Huggingface, Fairseq

#### **Automatic Post Editing Research**

Seoul, South Korea

January. 2021. - Present

RESEARCHER IN KOREA UNIV

- APE research based on Cross Lingual Pretrained Language Model
- Adpater based APE research
- Publication of research paper in IEEE Access (SCIE): https://ieeexplore.ieee.org/document/9528385/
- Research for Efficient and Simple Data Generation Method Low Resource APE and Pseudo APE data generation
- Publication of research paper in IEEE Access (SCIE): https://ieeexplore.ieee.org/document/9714400
- Research for Synthetic Data Generation Using Noising Strategies for Automatic Post-editing
- Publication of research paper in LREC 2022: http://www.lrec-conf.org/proceedings/lrec2022/pdf/2022.lrec-1.93.pdf
- Skills: Neural Machine Translation, Pytorch, Automatic Post Editing, Huggingface, Fairseq

# **Quality Estimation Research**

Seoul, South Korea

January. 2021. - Present

- RESEARCHER IN KOREA UNIV
- Large Scale PLM based Quality Estimation development and research
- Low Resource QE and Pseudo QE data generation
- Publication of research paper in Applied Science (SCIE): https://www.mdpi.com/2076-3417/11/14/6584
- Publication of research paper in MT Summit 2021 LoresMT Workshop: https://aclanthology.org/2021.mtsummit-loresmt.1/
- Publication of research paper in IEEE Access: https://ieeexplore.ieee.org/document/9761258
- Publication of research paper in COLING 2022: https://aclanthology.org/2022.coling-1.460.pdf
- 1st place in WMT 2022 QE Task 3: KU X Upstage's submission for the WMT22 Quality Estimation: Critical Error Detection Shared Task
- Skills: Neural Machine Translation, Pytorch, Quality Estimation, OpenKiwi, Huggingface, Fairseq

#### **COVID-19 Machine Translation Research**

Seoul, South Korea

RESEARCHER IN KOREA UNIV May. 2020. - November.2020

- Neural Machine translation specialized for COVID-19 domain
- Skills: Neural Machine Translation, Pytorch, Python
- Publication of research paper in Journal of the Korea Convergence Society(KCI): https://bit.ly/2QgQKLK

#### (Project) Domain Specialized Neural Machine Translation (Security)

Seoul, South Korea

May. 2020. - November.2020

• Research on Neural Machine Translation specialized for security domain

- · Supported by "National Security Research Institute"
- · Project Manager, Tech Lead

RESEARCHER IN KOREA UNIV

- · Development of the latest translation model based on Transformer/BERT, Al-based Korean-English translation model suitable for the security field, and research trend of the latest Al-based translation technology research
- · We propose Cross Communication Method (CCM), a new DS-NMT training methodology, inspired by cognitive scientific interpretation of cross language speech perception. This is the first study to reflect cognitive science theory in DS-NMT training methodology.
- Publication of research paper in IEEE Access: https://ieeexplore.ieee.org/document/9751075
- Skills: Neural Machine Translation, Pytorch, Python

#### (Project) A Neural-Symbolic Model for Knowledge Acquisition and Inference Techniques

Seoul, South Korea

RESEARCHER IN KOREA UNIV

April. 2020. - Present

- Neural-Symbolic Model Research and Development
- Skills: Neural Symbolic Computing, Knowledge base, Pytorch, Python
- · Supported by IITP
- Demo: http://nlplab.iptime.org:32245/

#### **Ancient Korean Neural Machine Translation Research**

Seoul, South Korea

RESEARCHER IN KOREA UNIV

March. 2020. - Present

- Ancient Korean Neural Machine Translation Research
- Bilingual Word Embedding for Ancient Korean Neural Machine Translation
- Priming Ancient Korean Neural Machine Translation Research
- Publication of research paper in IEEE Access(SCIE): https://ieeexplore.ieee.org/document/9125904/
- $\bullet \ \ \text{Publication of research paper in LREC 2022: } \ \textbf{http://www.lrec-conf.org/proceedings/lrec2022/pdf/2022.lrec-1.3.pdf}$
- Skills: Pytorch, Python, REST API, Flask, Neural Machine Translation

#### **Deep Learning based Grammar Error Correction Research**

Seoul, South Korea

June 2019 - June 2020

RESEARCHER IN KOREA UNIV

- Deep learning based English grammar corrector development
- Publication of research paper in IEEE Access(SCIE): https://ieeexplore.ieee.org/document/9102992
- Skills: Pytorch, Python, REST API, Flask, Neural Machine Translation

#### **Deep Learning based Korean Spelling Correction Research**

Seoul, South Korea

RESEARCHER IN KOREA UNIV

June. 2019. - Present

- Development of Korean spelling corrector based on deep learning
- We propose a gold test set, K-NCT (Korean Neural grammar Correction Test set), for Korean grammar error correction and a new error type classification guideline.
- Publication of research paper in multimedia tools and applications (SCIE): https://link.springer.com/article/10.1007/s11042-020-09148-2
- Publication of research paper in IEEE Access (SCIE): https://link.springer.com/article/10.1007/s11042-020-09148-2
- Skills: Pytorch, Python, REST API, Flask, Neural Machine Translation

#### **Neural Machine Translation Research**

Seoul, South Korea

RESEARCHER IN KOREA UNIV

June. 2019. - Present

- · Deep learning based Korean-English and English-Korean, Korean-Japanese machine translator development
- Research for Parallel Corpus Filtering, Data Augmentation, Various decoding strategies
- Best practices for using NIA AI training data: http://www.aihub.or.kr/node/4525
- Publication of research paper in ELECTRONICS (SCIE): https://www.mdpi.com/2079-9292/9/10/1562#cite
- Our paper is accepted in NAACL 2021 Industrial Track: "Should we find another model?: Improving Neural Machine Translation Performance with ONE-Piece Tokenization Method without Model Modification"
- · How to improve the performance of NMT without changing the model through data pre- and post-processing
- $\bullet \ \ \text{Publication of research paper in NAACL 2021: } \textbf{https://www.aclweb.org/anthology/2021.naacl-industry.13/2021.pdf} \\ \textbf{All the proposed paper in NAACL 2021: } \textbf{https://www.aclweb.org/anthology/2021.naacl-industry.13/2021.pdf} \\ \textbf{All the proposed paper in NAACL 2021: } \textbf{https://www.aclweb.org/anthology/2021.naacl-industry.13/2021.pdf} \\ \textbf{All the proposed paper in NAACL 2021: } \textbf{https://www.aclweb.org/anthology/2021.naacl-industry.13/2021.pdf} \\ \textbf{All the proposed paper in NAACL 2021: } \textbf{https://www.aclweb.org/anthology/2021.naacl-industry.13/2021.pdf} \\ \textbf{All the proposed paper in NAACL 2021: } \textbf{https://www.aclweb.org/anthology/2021.naacl-industry.13/2021.pdf} \\ \textbf{All the proposed paper in NAACL 2021: } \textbf{All the prop$
- Verification of Ensemble Effect in Neural Machine Translation
- Publication of research paper in EMNLP 2021 Workshop on Insights from Negative Results in NLP: https://insights-workshop.github.io/2021/cfp/
- Publication of research paper in Applied Sciences (SCIE): https://www.mdpi.com/2076-3417/12/11/5545
- Skills: Pytorch, Python, REST API, Flask, Neural Machine Translation

Al for Education Research Seoul, South Korea

RESEARCHER IN KOREA UNIV April. 2019. - Present

- FreeTalky: Don't Be Afraid! Conversations Made Easier by a Humanoid Robot using Persona-based Dialogue
- Publication of research paper in AAAI 2022 Artificial Intelligence for Education (AI4EDU) workshop: https://arxiv.org/abs/2112.04126
- Publication of research paper in LREC 2022: http://www.lrec-conf.org/proceedings/lrec2022/pdf/2022.lrec-1.132.pdf
- · Automatic Essay Scoring Research
- · PEEP-Talk: Deep Learning-based English Education Platform for Personalized Foreign Language Learning
- · Al student: A Machine Reading Comprehension System for the Korean College Scholastic Ability Test
- Publication of research paper in Mathematics (SCIE): https://www.mdpi.com/2227-7390/10/9/1486
- BERTOEIC: Solving TOEIC Problems Using Simple and Efficient Data Augmentation Techniques with Pretrained Transformer Encoders
- Publication of research paper in Applied Sciences (SCIE): https://www.mdpi.com/2076-3417/12/13/6686
- Skills: Pytorch, Python, Google Cloud Platform, REST API, Nao Toolkit

#### **AI for Accessibility Research**

Seoul, South Korea
June. 2019. - Present

RESEARCHER IN KOREA UNIV

- PicTalky: Design of augmentative alternative communication (AAC) software for children with developmental disabilities
   1st Place Microsoft AI Accessibility Hackathon in Korea (Team Lead)
- Award: https://bit.ly/2vPaZ91
- PickTalky Demo: https://pictalky-311.de.r.appspot.com/
- Publication of research paper in AACL 2022 Demo Track: <a href="https://preview.aclanthology.org/aacl-22-ingestion/2022">https://preview.aclanthology.org/aacl-22-ingestion/2022</a>.
- Skills: Pytorch, Python, Google Cloud Platform, REST API, Nao Toolkit

# (Project) Research and development of human-inspired multiple intelligence

Seoul, South Korea

September. 2019. - August. 2022

September. 2019. - January. 2021.

RESEARCHER IN KOREA UNIV

- Human-inspired language understanding model
- Funded by the Korea Ministry of Science and ICT (MSIT)
- Site: http://hiai.co.kr/

### (Project) Next-generation information computing technology development business

Seoul, South Korea

RESEARCHER IN KOREA UNIV

• Development of Core Application Techniques for Korean Intelligent Systems

• Research and development of Korean natural language processing core technology

# (Project) Core technology development of the real-time simultaneous speech translation based on knowledge enhancement

Seoul, South Korea

RESEARCHER IN SYSTRAN

June. 2018. - July. 2019

- · Collaboration with the Korea Electronics and Telecommunications Research Institute (ETRI) Language Intelligence Research Group
- Director: Dr. Young-Gil Kim (ETRI)
- 3rd year: Real-time lecture interpretation solution development
- · 4th year: Busan University of Foreign Studies Field Groud Test (FGT) progress and software maintenance
- Skills: JAVA, JAVA FX, Kaldi

CHANJUN, PARK · CURRICULUM VITAE

# (Project) Neural Machine Translation service for SK Telecom's in-house education program

Seoul, South Korea

RESEARCHER IN SYSTRAN April. 2019. - April. 2019

- · Development of automation software to provide translation service to SK Telecom's in-house education program
- · Skills: Python

#### **LCloud-API Platform Service Development**

Seoul, South Korea

RESEARCHER IN SYSTRAN January. 2019. - June.2019

- Planning and development of natural language processing API Platform Service
- Gravitee IO-based platform design, planning, marketing materials production, strategy establishment
- · REST API management using Swagger
- Transcription API, Translation API, Address Correction API, Speaker Verification API
- Learned Microservices architecture(MSA),IT Infrastructure
- Skills: Gravitee IO, Microservices architecture (MSA), IT Infrastructure, Mockup, Marketing, Strategic Planning, Technology management, Amazon

#### Speech recognition transcription tool development

Seoul, South Korea

RESEARCHER IN SYSTRAN January. 2019. - July. 2019

- · Development and maintenance of speech recognition transcription tool, modification and addition of various functions
- Skills: Front End, Spring Boot, Flask, AJAX, MySQL, Kaldi,

#### (Project) CJ Logistics Speech Recognition Agent

Seoul, South Korea

RESEARCHER IN SYSTRAN

Aug. 2018. - July. 2019

- CJ Logistics artificial intelligence (AI) virtual assistant project
- Skills: Quality Assurance, Quality control, Mockup, Strategic Planning, Kaldi

#### Automatic subtitle generation platform service development and planning

Seoul, South Korea

RESEARCHER IN SYSTRAN

June. 2018. - June.2019 • Development and maintenance of automatic subtitle generation platform

- Establish platform service strategies such as B2B and B2C
- Various company contacts and SWOT analysis
- Skills: JAVA, JAVA FX, Kaldi, Mockup, Strategic Planning, Technology management, Marketing

#### Planning of English speaking evaluation platform service

Seoul, South Korea

RESEARCHER IN SYSTRAN June. 2018. - December.2018

- Establishing a service strategy using English speaking evaluation technology
- English speaking evaluation technology Q.A & Q.C
- · Skills: Quality Assurance, Quality control, Mockup, Strategic Planning, Technology management, Marketing

#### Speech Recognition Research

Seoul, South Korea Aug. 2018. - July. 2019

RESEARCHER IN SYSTRAN

- Research for Automatic Speech Recognition Technology based on Kaldi
- Acoustic Model, Language Model
- Speaker Verification
- English speaking evaluation
- · Real-time speech recognition system
- · Skills: Kaldi

#### **Neural Machine Translation Research**

Seoul, South Korea

RESEARCHER IN SYSTRAN

Aug. 2018. - July. 2019

- Research for Neural Machine Translation
- Skills: OpenNMT Tensorflow, OpenNMT Pytorch

# (Project) Development of multilingual word translation service based on Korean semantics analysis for multicultural family

Sep. 2016. - June. 2018

RESEARCHER IN BUFS

- Han-Tong-E: Multilingual Word Translation Service based on Word Semantic Analysis
- · Collaboration with Professor Ok Cheol-young's laboratory at Ulsan University
- Project homepage development
- · In-depth understanding of Utagger and seminar on WSD
- Build project-related data and conduct surveys
- Project Page: https://bufsconv.blogspot.kr/
- Funded by National Research Foundation of Korea(NRF)

CHANJUN, PARK · CURRICULUM VITAE

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Seoul South Korea

# (Project) Establishment of Gold Standard language resource bank for Korean machine learning and evaluation (Next-generation information computing technology development business)

Seoul, South Korea

RESEARCHER IN BUFS Sep. 2017. - June. 2018

- For the purpose of developing Korean Natural Language Toolkit
- Development of automatic Korean word spacing and Korean compound noun decomposer
- · Skills: Python

#### (Project) Local industry development project in connection with public institutions

Seoul, South Korea Sep. 2016. - Aug. 2017

RESEARCHER IN BUFS

• ICT VAEMS: Vertical Aquaculture Energy Management

• Funded by the Korea Institute for Advancement of Technology(KIAT)

# (Project) Basic Research on Semantic Frame Generation for Short Questions (ExoBrain)

Seoul, South Korea Oct. 2015. - Feb. 2016

RESEARCHER IN BUFS

Exobrain Project

# Professional Experience \_\_\_\_\_

**Upstage** Seoul, South Korea

AI RESEARCH ENGINEER

March. 2022 - Present

- About Upstage: https://www.upstage.ai/
- Product Search Team -> Data Team
- Responsible roles related to search system evaluation
- · Establishment of evaluation system to develop Product Search Pack and responsible for data, planning, and evaluation
- Semantic search project with AMOREPACIFIC
- Semantic search project with LG U+
- Semantic Seaerch-related DataOps
- OCR-related DataOps
- · Research for Data-centric AI

**SYSTRAN** Seoul, South Korea

RESEARCH ENGINEER

Sep. 2018 - July. 2019

- About SYSTRAN: https://www.systransoft.com/
- Automatic Speech Recognition(ASR) Team
- · Core technology development of the real-time simultaneous speech translation based on knowledge enhancement (ETRI)
- · Participated in NTT Docomo speech Recognition Solution Project
- Participated in CJ Logistics speech recognition agent development project
- Participated in Samsung SDS speech recognition project
- Speech recognition service planning and development (Real-time lecture interpretation, Automatic subtitle generation service, English speaking evaluation, Customer-specific recognizer service, Web RTC-based Real-time video interpretation)
- Deep learning based speech recognition research (Acoustic Model, Language Model Training)
- Machine Translation research
- · Iaas and Paas service planning, API Platform service operation planning, B2B B2C planning and development
- Micro Service Architecture Design and Successful API Platform Service Launching Experience (LCloud)
- · Governmental project proposal experience
- · Reason for leaving: Graduate school

**SYSTRAN** Seoul, South Korea

RESEARCH INTERN

June. 2018 - August. 2018

- Automatic Speech Recognition(ASR) Team
- · Participated a project "Core technology development of the real-time simultaneous speech translation based on knowledge enhancement
- Developed Simultaneous Speech Translation (implemented using JAVA, Python and Kaldi)

Skills

**Programming** Python, JAVA, C / C++

**Machine Learning & Deep Learning** Pytorch, Pytorch lightning, Keras, Tensorflow

Natural Language Processing Machine Translation, Speech Recognition, Information Retrieval, Huggingface, OpenNMT, Kaldi, FAISS

> Full Stack Html, CSS, Javascipt, Java FX, Oracle, MySQL, Spring Boot, VertX, AWS

**Product & Project & Data Manager** MS Office, Notion, Slack, Linear, Whimsical, Recruitee, Redmine

Strategy & Planning API Platform Service, Platform Service Planning, Gravitee IO, Paas, Iaas, Q.A, Q.C, Mockup, Swagger

**Etc** Linux, Docker, Web RTC, Latex

Language Skills Korean, English, Japanese, Thai, Myanmar

# **Patents**

2019.12	Device and method for correcting Korean spelling, Granted Patent (10-2430918)	South Korea
2020.09	APPARATUS AND METHOD FOR OUTPUTTING IMAGE CORRESPONDING TO LANGUAGE, Granted Patent	0 11 17
	(10-2476497)	South Korea
2020.09	METHOD OF TRANSLATING ANCIENT KOREAN USING MACHINE TRANSLATION, Granted Patent	
	(10-2425922)	South Korea
2022.04	Correction performance evaluation metrics of neural network machine translation and method of	
	constructing the same, Granted Patent (10-2390154)	South Korea
2020.09	METHOD OF BUILDING TRAINING DATA OF MACHINE TRANSLATION, Granted Patent (10-2409667)	South Korea
2021.02	Improving speech recognition performance using TTS in domain-specific environment, Apply for a	6 44 14
2021.03	patent	South Korea
	Method For Generating Training Data And Method For Post-Processing Of Speech Recognition Using	0 111
2021.05	The Same, Apply for a patent	South Korea
	DEVICE AND METHOD FOR GENERATING OPTIMAL TRANSLATION SUBTITLE USING QUALITY	0 111
2021.09	<b>ESTIMATION</b> , Apply for a patent	South Korea
	<b>DEVICE AND METHOD FOR GENERATING TRAINING DATA FOR AUTOMATIC POST EDITING, Apply for a</b>	
2021.09	patent	South Korea
2021.09	METHOD OF BUILDING TRAINING DATA OF MACHINE TRANSLATION, PCT International Application	South Korea
2021.09	APPRATUS FOR CORPUS PROCESSING, APPARATUS AND METHOD AND MATHINE TRANSLATION, Apply	6 44 14
	for a patent	South Korea
2021.11	DEVICE AND METHOD FOR GENERATING OF TRAINING DATA FOR QUALITY ESTIMATION IN MACHINE	0 44
	TRANSLATION, Apply for a patent	South Korea
Demo		

# Demo\_

2019.12	Deep Learning based English Grammar Error Correction, http://nlplab.iptime.org:32292/	South Korea
2019.12	Deep Learning based Korean Spelling Correction, http://nlplab.iptime.org:32288/	South Korea
2020.01	Korea University Neural Machine Translation Platform, http://nlplab.iptime.org:32296/	South Korea
2020.02	Neural Symbolic Inference, http://nlplab.iptime.org:32245/	South Korea
2020.02	English Free Talking and Grammar Error Correction Feed Back System using NAO Robot,	South Korea
	https://www.youtube.com/watch?v=R16dG_4cnFk	
2020.03	Korean Ancient Neural Machine Translation Platform, http://nlplab.iptime.org:32242/	South Korea
2020.03	PicTalky: Text to Pictogram Demo for Children with Developmental Disabilities,	South Korea
	https://pictalky-311.de.r.appspot.com/	South Noted
2020.05	COVID-19 Machine Translation Platform, http://nlplab.iptime.org:32250/	South Korea
2020.07	Ancient Korean Translation & Machine Reading Comprehension with NAO,	South Korea
2020.01	https://www.youtube.com/watch?v=nXBZe-t9a-4&t=8s	South Noted
2020.11	Bilingual Education Using NAO, https://www.youtube.com/watch?v=4kCMMa62LDY&t=9s	South Korea
2021.04	Ko-CSS (Korean Colloquial-Sentence-Splitter) for simultaneous speech translation,	South Korea
	http://nlplab.iptime.org:32285/	South Noted
2021.06	BTS (BackTranScription) for STT Post-Processor, https://backtrans-317413.de.r.appspot.com/	South Korea
2021.09	Translation platfrom with AIHUB dataset, http://nlplab.iptime.org:32247/	South Korea
2021.09	<pre>Con-Talky, http://nlplab.iptime.org:32245/</pre>	South Korea
2021.09	Korea University English Grammar Corrector KakaoTalk Channel, http://pf.kakao.com/_cqxkps	South Korea
2021.09	PEEP-Talk, http://pf.kakao.com/_FlDxgs	South Korea
2021.10	A Tool for generating High-Quality Parallel Corpus considering Human Translation Market,	South Korea
	http://nlplab.iptime.org:9090/	South Noted
2021.10	A New Tool for Efficiently Generating Quality Estimation Datasets, http://nlplab.iptime.org:9091/	South Korea
2021.11	$\textbf{A Self-Supervised Automatic Post-Editing Data Generation Tool}, \\ \texttt{http://nlplab.iptime.org:9092/}$	South Korea

# **Invited Talk & Teaching Experience**

Sunmoon University South Korea

Presenter December. 2022

- Real-World Centric AI
- Invited by Sunmoon University

**Kyungsung University** PRESENTER August. 2022 · Language and Information Studies and the Future of Artificial Intelligence · Invited by Kyungsung University **Hankuk University of Foreign Studies** South Korea PRESENTER July. 2022 • Basic practice of natural language processing for everyone · Invited by Hankuk University of Foreign Studies, Interpreting and Translation Research Institute (ITRI) **Dongguk University** South Korea PRESENTER January. 2022 Artificial intelligence and Machine Translation lectures (3 times) Invited by Dongguk University, Department of English Language and Literature **Korea University** South Korea TEACHING ASSISTANT Autumn 2021 • (BDC101) Introduction to Natural Language Processing in Big Data **Busan Social Welfare Development Institute** South Korea INVITED ADVISOR July. 2021 Attending advisory meetings and Focus Group Interview · ICT-Based Ecosystem Construction Plan to Secure Opportunities to Enjoy Together - A Study on Developmental Disabilities **Korea University** South Korea Autumn 2020 HEAD TEACHING ASSISTANT • (BDC101) Introduction to Natural Language Processing in Big Data (DFE610) Natural Language Processing for Digital Finance Engineering **Korea University** South Korea TEACHING ASSISTANT Spring 2020 (COSE461)Natural Language Processing • (DFC615)Artificial Intelligence and Natural Language Processing • Lecture materials: https://github.com/Parkchanjun/KU-NLP-2020-1 LLsoLLu South Korea PRESENTER March. 2020 Latest natural language processing trends · Language Representation, Neural Symbolic Computing • Invited by LLsoLLu Global Strategy and Planning Team **NC SOFT** South Korea **PRESENTER** February. 2020 • Technology Transfer Seminar • Korean Spelling Corrector Using Automatic Noise Generation Methodology • Invited by NC SOFT Language AI Team **Dongguk University** South Korea **PRESENTER** January. 2020 • A.I - NLP - MT for Liberal Arts Introduction to Natural Language Processing, RBMT, SMT, NMT, OpenNMT · Invited by Dongguk University, Department of English Language and Literature professor. Myung-Kwan Park Lecture materials: https://github.com/Parkchanjun/Dongguk\_AI\_NLP\_MachineTranslation SKC South Korea Oct. 2019 - Nov.2019 INSTRUCTOR • Deep Learning and Natural Language Processing Course · Introduction of Text Preprocessing and NLP for Linguistics · Introduction of Word Embedding • Introduction of Machine Translation • Lecture materials(Text Preprocessing): https://github.com/Parkchanjun/SKC\_Text\_Preprocessing • Lecture materials(Introduction of Machine Translation): https://github.com/Parkchanjun/SKC\_MachineTranslation **Naver Tech Talk** South Korea PRESENTER Aug. 2019 Machine Translation for Everyone

 Invited by Sung Kim who are the Head of Naver Clova A.I • Lecture videos: https://tv.naver.com/v/9906991

South Korea

SK T Academy South Korea

Instructor Aug. 2019

- · Machine Translation for Everyone
- Invited by SK Planet
- Introduction to Natural Language Processing, RBMT, SMT, NMT, OpenNMT
- Lecture videos: https://tacademy.skplanet.com/live/player/onlineLectureDetail.action?seq=165

Sooyoungro Church South Korea

Instructor

Aug. 2017 - Dec.2017

- Sooyoungro Church Dream Bowl School Instructor (Free Service)
- Basic English Grammar and English Conversation Education

Korea Press Foundation South Korea

INSTRUCTOR Aug. 2015 - Dec. 2015

· Reading mentoring

# **All Publications**

#### **PREPRINTS**

#### Empirical study on BlenderBot 2.0 Errors Analysis in terms of Model, Data and User-Centric Approach

Jungseob Lee, Midan Shim, Suhyune Son, Yujin Kim, Chanjun Park, Heuiseok Lim, (Equal Contribution (First Co-Author)) arXiv preprint arXiv:2201.03239 (2022). 2022

# Language Chameleon: Transformation analysis between languages using Cross-lingual Post-training based on Pre-trained language models

Suhyune Son, **Chanjun Park**, Jungseob Lee, Midan Shim, Chanhee Lee, Yoonna Jang, Jaehyung Seo, Heuiseok Lim, **(Equal Contribution (First Co-Author))** 

arXiv preprint arXiv:2209.06422 (2022). 2022

#### TOP CONFERENCE

#### FreeTalky: Don't Be Afraid! Conversations Made Easier by a Humanoid Robot using Persona-based Dialogue

Chanjun Park, Yoonna Jang, Seolhwa Lee, Sungjin Park, Heuiseok Lim

LREC 2022 (Proceedings of the Language Resources and Evaluation Conference), 2022, Marseille, France

#### **Priming Ancient Korean Neural Machine Translation**

**Chanjun Park**, Seolhwa Lee, Jaehyung Seo, Hyeonseok Moon, Sugyeong Eo, Heuiseok Lim

LREC 2022 (Proceedings of the Language Resources and Evaluation Conference), 2022, Marseille, France

#### QUAK: A Synthetic Quality Estimation Dataset for Korean-English Neural Machine Translation

Sugyeong Eo, **Chanjun Park**, Hyeonseok Moon, Jaehyung Seo, Gyeongmin Kim, Jungseob Lee, Heui-Seok Lim *COLING 2022 - Proceedings of the 29th International Conference on Computational Linguistics*, 2022

#### KU X Upstage's Submission for the WMT22 Quality Estimation: Critical Error Detection Shared Task

Sugyeong Eo, **Chanjun Park**, Hyeonseok Moon, Jaehyung Seo, Heuiseok Lim

WMT 2022 - EMNLP 2022 - Proceedings of the Seventh Conference on Machine Translation, 2022, Abu Dhabi

#### Focus on FoCus: Is FoCus focused on Context, Knowledge and Persona?

SeungYoon Lee, Jungseob Lee, **Chanjun Park**, Sugyeong Eo, Hyeonseok Moon, Jaehyung Seo, Jeongbae Park, Heui-Seok Lim *Proceedings of the 1st Workshop on Customized Chat Grounding Persona and Knowledge*, 2022

#### A Self-Supervised Automatic Post-Editing Data Generation Tool

Hyeonseok Moon, **Chanjun Park**, Sugyeong Eo, Jaehyung Seo, SeungJun Lee, Heuiseok Lim ICML 2022 - DataPerf workshop, 2022 (2022). 2022

#### Empirical Analysis of Noising Scheme based Synthetic Data Generation for Automatic Post-editing

Hyeonseok Moon, **Chanjun Park**, Seolhwa Lee, Jaehyung Seo, Jungseob Lee, Sugyeong Eo, Heuiseok Lim LREC 2022 (Proceedings of the Language Resources and Evaluation Conference), 2022, Marseille, France

#### A Dog Is Passing Over The Jet? A Text-Generation Dataset for Korean Commonsense Reasoning and Evaluation

Jaehyung Seo, Seounghoon Lee, **Chanjun Park**, Yoonna Jang, Hyeonseok Moon, Sugyeong Eo, Seonmin Koo, Heuiseok Lim Findings of the Association for Computational Linguistics: NAACL 2022, 2022, Seattle, United States

# Should we find another model?: Improving Neural Machine Translation Performance with ONE-Piece Tokenization Method without Model Modification

#### **Chanjun Park**, Sugyeong Eo, Hyeonseok Moon, Heui-Seok Lim

NAACL 2021 - Proceedings of the 2021 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies: Industry Papers, 2021

#### FreeTalky: Don't Be Afraid! Conversations Made Easier by a Humanoid Robot using Persona-based Dialogue

Chanjun Park, Yoonna Jang, Seolhwa Lee, Sungjin Park, Heuiseok Lim

AAAI 2022 - Artificial Intelligence for Education(AI4EDU) (2021). 2021

#### How should human translation coexist with NMT? Efficient tool for building high quality parallel corpus

Chanjun Park, Seolhwa Lee, Hyeonseok Moon, Sugyeong Eo, Jaehyung Seo, Heuiseok Lim

NeurIPS 2021 - Data-centric AI (DCAI) workshop (2021). 2021

#### Two Heads are Better than One? Verification of Ensemble Effect in Neural Machine Translation

Chanjun Park, Sungjin Park, Seolhwa Lee, Taesun Whang, Heuiseok Lim

EMNLP 2021 - Proceedings of the Second Workshop on Insights from Negative Results in NLP, 2021, Online and Punta Cana, Dominican Republic

#### BTS: Back TranScription for Speech-to-Text Post-Processor using Text-to-Speech-to-Text

Chanjun Park, Jaehyung Seo, Seolhwa Lee, Chanhee Lee, Hyeonseok Moon, Sugyeong Eo, Heuiseok Lim

ACL 2021 - Proceedings of the 8th Workshop on Asian Translation (WAT2021), 2021, Online

#### **Dealing with the Paradox of Quality Estimation**

Sugyeong Eo, Chanjun Park, Hyeonseok Moon, Jaehyung Seo, Heuiseok Lim, (Equal Contribution (First Co-Author))

MT Summit - Proceedings of the 4th Workshop on Technologies for MT of Low Resource Languages (LoResMT2021), 2021, Virtual

#### A New Tool for Efficiently Generating Quality Estimation Datasets

Sugyeong Eo, Chanjun Park, Jaehyung Seo, Hyeonseok Moon, Heuiseok Lim

NeurIPS 2021 - Data-centric AI (DCAI) workshop, 2021

### Syntax-enhanced Dialogue Summarization using Syntax-aware information

Seolhwa Lee, Kisu Yang, Chanjun Park, João Sedoc, Heui-Seok Lim

NerIPS 2021 16th Women in Machine Learning Workshop, 2021

#### Towards Syntax-Aware Dialogue Summarization using Multi-task Learning

Seolhwa Lee, Kisu Yang, **Chanjun Park**, João Sedoc, Heui-Seok Lim

EMNLP 2021 - Widening NLP (WiNLP2021) workshop, 2021

#### **Automatic Knowledge Augmentation for Generative Commonsense Reasoning**

Jaehyung Seo, Chanjun Park, Sugyeong Eo, Hyeonseok Moon, Heuiseok Lim

NeurIPS 2021 - Data-centric AI (DCAI) workshop, 2021

#### INTERNATIONAL JOURNAL

#### Mimicking Infants' Bilingual Language Acquisition for Domain Specialized Neural Machine Translation

Chanjun Park, Woo-Young Go, Sugyeong Eo, Hyeonseok Moon, Seolhwa Lee, Heuiseok Lim

IEEE Access 10 (2022) pp. 38684-38693. IEEE, 2022

#### The ASR Post-Processor Performance Challenges of BackTranScription (BTS): Data-Centric and Model-Centric Approaches

Chanjun Park, Jaehyung Seo, Seolhwa Lee, Chanhee Lee, Heuiseok Lim

Mathematics 10.19 (2022). 2022

#### **Empirical Analysis of Parallel Corpora and In-Depth Analysis Using LIWC**

Chanjun Park, Midan Shim, Sugyeong Eo, Seolhwa Lee, Jaehyung Seo, Hyeonseok Moon, Heuiseok Lim

Applied Sciences 12.11 (2022) p. 5545. Multidisciplinary Digital Publishing Institute, 2022

#### Word-level Quality Estimation for Korean-English Neural Machine Translation

Sugyeong Eo, Chanjun Park, Hyeonseok Moon, Jaehyung Seo, Heuiseok Lim, (Equal Contribution (First Co-Author))

IEEE Access 10 (2022) pp. 44964-44973. IEEE, 2022

# Research on Utilization Strategy of User Engagements in Korean Fake News Detection

Myunghoon Kang, Jaehyung Seo, Chanjun Park, Heuiseok Lim

IEEE Access (2022) pp. 1-1. 2022

### AI Student: A Machine Reading Comprehension System for the Korean College Scholastic Ability Test

Gyeongmin Kim, Soomin Lee, Chanjun Park, Jaechoon Jo

Mathematics 10.9 (2022) p. 1486. Multidisciplinary Digital Publishing Institute, 2022

### K-NCT: Korean Neural Grammatical Error Correction Gold-Standard Test Set Using Novel Error Type Classification Criteria

Seonmin Koo, Chanjun Park, Jaehyung Seo, Seungjun Lee, Hyeonseok Moon, Jungseob Lee, Heuiseok Lim, (Equal Contribution (First Co-Author))

IEEE Access (2022). IEEE, 2022

#### BERTOEIC: Solving TOEIC Problems Using Simple and Efficient Data Augmentation Techniques with Pretrained Transformer Encoders

Jeongwoo Lee, Hyeonseok Moon, Chanjun Park, Jaehyung Seo, Sugyeong Eo, Heuiseok Lim

Applied Sciences 12.13 (2022) p. 6686. Multidisciplinary Digital Publishing Institute, 2022

#### An Automatic Post Editing with Efficient and Simple Data Generation Method

Hyeonseok Moon, Chanjun Park, Jaehyung Seo, Sugyeong Eo, Heuiseok Lim, (Equal Contribution (First Co-Author))

IEEE Access (2022). IEEE, 2022

#### Return on Advertising Spend Prediction with Task Decomposition-Based LSTM Model

Hyeonseok Moon, Taemin Lee, Jaehyung Seo, **Chanjun Park**, Sugyeong Eo, Imatitikua D Aiyanyo, Jeongbae Park, Aram So, Kyoungwha Ok, Kinam Park

Mathematics 10.10 (2022) p. 1637. MDPI, 2022

#### Dense-to-Question and Sparse-to-Answer: Hybrid Retriever System for Industrial Frequently Asked Questions

Jaehyung Seo, Taemin Lee, Hyeonseok Moon, **Chanjun Park**, Sugyeong Eo, Imatitikua D Aiyanyo, Kinam Park, Aram So, Sungmin Ahn, Jeongbae Park

Mathematics 10.8 (2022) p. 1335. MDPI, 2022

#### Plain Template Insertion: Korean-Prompt-Based Engineering for Few-Shot Learners

Jaehyung Seo, Hyeonseok Moon, Chanhee Lee, Sugyeong Eo, **Chanjun Park**, Jihoon Kim, Changwoo Chun, Heuiseok Lim *IEEE Access* 10 (2022) pp. 107587–107597. 2022

#### PU-GEN: Enhancing generative commonsense reasoning for language models with human-centered knowledge

Jaehyung Seo, Dongsuk Oh, Sugyeong Eo, Chanjun Park, Kisu Yang, Hyeonseok Moon, Kinam Park, Heuiseok Lim

#### Al for Patents: A Novel yet Effective and Efficient Framework for Patent Analysis

Junyoung Son, Hyeonseok Moon, Jeongwoo Lee, Seolhwa Lee, **Chanjun Park**, Wonkyung Jung, Heuiseok Lim *IEEE Access* 10 (2022) pp. 59205–59218. IEEE, 2022

#### PicTalky: Augmentative and Alternative Communication Software for Language Developmental Disabilities

**Chanjun Park**, Yoonna Jang, Seolhwa Lee, Jaehyung Seo, Kisu Yang, Heuiseok Lim

AACL 2022 - Demo Track (2021). 2021

#### Comparative Analysis of Current Approaches to Quality Estimation for Neural Machine Translation

Sugyeong Eo, Chanjun Park, Hyeonseok Moon, Jaehyung Seo, Heuiseok Lim, (Equal Contribution (First Co-Author)) *Applied Sciences* 11.14 (2021) p. 6584. Multidisciplinary Digital Publishing Institute, 2021

#### Grounded Vocabulary for Image Retrieval Using a Modified Multi-Generator Generative Adversarial Network

Kuekyeng Kim, **Chanjun Park**, Jaehyung Seo, Heuiseok Lim

IEEE Access (2021). IEEE, 2021

#### Exploring the Data Efficiency of Cross-Lingual Post-Training in Pretrained Language Models

Chanhee Lee, Kisu Yang, Taesun Whang, **Chanjun Park**, Andrew Matteson, Heuiseok Lim

Applied Sciences 11.5 (2021) p. 1974. Multidisciplinary Digital Publishing Institute, 2021

#### Who speaks like a style of Vitamin: Towards Syntax-Aware Dialogue Summarization using Multi-task Learning

Seolhwa Lee, Kisu Yang, **Chanjun Park**, João Sedoc, Heuiseok Lim

IEEE Access (2021). IEEE, 2021

#### An Empirical Study on Automatic Post Editing for Neural Machine Translation

Hyeonseok Moon, Chanjun Park, Sugyeong Eo, Jaehyung Seo, Heuiseok Lim, (Equal Contribution (First Co-Author)) *IEEE Access* 9 (2021) pp. 123754–123763. IEEE, 2021

#### Variational Reward Estimator Bottleneck: Towards Robust Reward Estimator for Multidomain Task-Oriented Dialogue

Jeiyoon Park, Chanhee Lee, Chanjun Park, Kuekyeng Kim, Heuiseok Lim

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#### Neural Spelling Correction: Translating Incorrect sentences to Correct sentences for Multimedia

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#### **Ancient Korean Neural Machine Translation**

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#### **Prompt-based Learning for English-German Critical Translation Error Detection**

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International Conference on Interdisciplinary Research on Computer Science, Psychology, and Education (ICICPE 2022), 2022

#### A Dataset for Korean Graph-to-Text Generation

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#### **Efficient Way for Constructing Hate Speech-Counter Narrative Dataset**

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### A Study on Jeju Dialect ASR processor using BackTranScription

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#### **Cross-lingual Zero-shot Transfer for Quality Estimation**

Sugyeong Eo, Chanjun Park, Jaehyung Seo, Heonseok Moon, HeuiSeok Lim

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#### Proposal of Automatic Essay Scoring Method Using 4-level Natural Language Analysis

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#### A High-level Machine Reading Comprehension Model

Jeongwoo Lee, Hyeonseok Moon, Chanjun Park, HeuiSeok Lim

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#### Comparative study of Korean speech recognition based on SpecAugment and Kaldi

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#### Context Detector: Persona Based Natural Conversation using Conversational Agent

Seungjun Lee, Yoonna Jang, Chanjun Park, HeuiSeok Lim

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#### **Domain Specialized Automatic Post Editing System**

Heonseok Moon, Chanjun Park, Jaehyung Seo, Sugyeong Eo, HeuiSeok Lim

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#### **Korean Generative Commonsense Reasoning**

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# Al for Construction: Development of communication platform for construction field using Natural Language Processing

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#### Categorization of Common Error Types in the Off-the-shelf ASR systems for Korean

Junyoung Son, Chanjun Park, Jaehyung Seo, HeuiSeok Lim

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#### A Comparative Study on Korean Relation Extraction with entity position information

Suhyune Son, Yuna Hur, Jungwoo Lim, Midan Shim, Chanjun Park, HeuiSeok Lim

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#### PicTalky: Deep learning-based speech therapy platform for developmental disabilities

Chanjun Park, Yanghee Kim, Yoonna Jang, Umadevi G.R, HeuiSeok Lim

The International Conference on Big data, IoT, and Cloud Computing, 2020

#### **Domain-specialize Neural Machine Translation Methodology**

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#### **Toward High Quality Parallel Corpus Using Monolingual Corpus**

Chanjun Park, Youngdae Oh, Jongkeun Choi, Dongpil Kim, HeuiSeok Lim

The 10th International Conference on Convergence Technology, 2020

### **Data Augmentation Method for Korean Neural Machine Translation**

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#### Self- Supervised Korean Spelling Correction via Denoising Transformer

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### Can artificial intelligence translate the Annals of the Joseon Dynasty?

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# Design Neural Machine Translation Model Combining External Symbolic Knowledge in translation task

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#### Free Talking NAO Robot for Children

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### Improved Machine Translation Performance Using Two Stage Subword Tokenization

Chanjun Park, Sora Choi, HeuiSeok Lim

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# Quality before Quantity: Improved Machine Translation performance using parallel corpus filtering Chanjun Park, Seunggyu Han, HeuiSeok Lim

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#### Deep Learning based Korean Dialect Machine Translation Research Considering Linguistics Features and Service

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#### Korean and Multilingual Language Models Study for Cross-Lingual Post-Training (XPT)

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# Research on Subword Tokenization of Korean Neural Machine Translation and Proposal for Tokenization Method to Separate Jongsung from Syllables

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#### **Research on Recent Quality Estimation**

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#### Cross-Validated Ensemble Methods in Natural Language Inference

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#### Neural Machine translation specialized for Coronavirus Disease-19 (COVID-19)

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#### An AI Service to support communication and language learning for people with developmental disability

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#### A Study on the Performance Improvement of Machine Translation Using Public Korean-English Parallel Corpus

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#### **DOMESTIC CONFERENCE**

#### BackTranScription (BTS)-based Jeju Automatic Speech Recognition Post-processor Research

**Chanjun Park**, Jaehyung Seo, Seolhwa Lee, Heonseok Moon, Sugyeong Eo, Yoonna Jang, HeuiSeok Lim

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#### **Word-level Korean-English Quality Estimation**

Sugyeong Eo, Chanjun Park, Jaehyung Seo, Heonseok Moon, HeuiSeok Lim

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#### **Persona-based Korean Conversational Model**

Yoonna Jang, Jungwoo Lim, Yuna Hur, Kisu Yang, Chanjun Park, Jaehyung Seo, Seungjun Lee, HeuiSeok Lim

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#### Proposal of Automated Essay Scoring Method based on Deep-Learning

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#### Model Training and Data Augmentation Schemes For the High-level Machine Reading Comprehension

Jeongwoo Lee, Hyeonseok Moon, Chanjun Park, HeuiSeok Lim

The 33rd Annual Conference on Human Cognitive Language Technology, 2021

#### Comparative study of Korean speech recognition based on SpecAugment and Kaldi

Seounghoon Lee, Chanjun Park, Jaehyung Seo, Gyeongmin Kim, HeuiSeok Lim

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#### PEEP-Talk: Deep Learning-based English Education Platform for Personalized Foreign Language Learning (Best Paper Award)

Seungjun Lee, Yoonna Jang, Chanjun Park, Minwoo Kim, Bernardo N Yahya, HeuiSeok Lim

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#### **Deep Learning based Korean Dialect Machine Translation Research**

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Heonseok Moon, Chanjun Park, Jaehyung Seo, Sugyeong Eo, HeuiSeok Lim

The 33rd Annual Conference on Human Cognitive Language Technology, 2021

#### KommonGen: A Dataset for Korean Generative Commonsense Reasoning Evaluation (Best Paper Award)

Jaehyung Seo, **Chanjun Park**, Heonseok Moon, Sugyeong Eo, Myunghoon Kang, Seounghoon Lee, HeuiSeok Lim

The 33rd Annual Conference on Human Cognitive Language Technology, 2021

#### Con-Talky: Information Extraction and Visualization Platform for Communication of Construction Industry

Midan Shim, Chanjun Park, Yuna Hur, HeuiSeok Lim

The 33rd Annual Conference on Human Cognitive Language Technology, 2021

#### Categorization and Analysis of Error Types in the Korean Speech Recognition System (Best Paper Award)

Junyoung Son, Chanjun Park, Jaehyung Seo, HeuiSeok Lim

The 33rd Annual Conference on Human Cognitive Language Technology, 2021

### A Comparative Study on Korean Relation Extraction with entity position information

Suhyune Son, Yuna Hur, Jungwoo Lim, Midan Shim, Chanjun Park, HeuiSeok Lim

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# **Attention Patterns and Semantics of Korean Language Models**

Kisu Yang, Yoonna Jang, Jingwoo Lim, Chanjun Park, Hwanseok Jang, HeuiSeok Lim

The 33rd Annual Conference on Human Cognitive Language Technology, 2021

# Quality, not Quantity?: Effect of parallel corpus quantity and quality on Neural Machine Translation

Chanjun Park, Yeonsu Lee, Chanhee Lee, HeuiSeok Lim

The 32st Annual Conference on Human Cognitive Language Technology, 2020

# Alleviation of Overcorrection Problem in Neural Korean Spelling Correction

Chanjun Park, Yeonsu Lee, Kisu Yang, HeuiSeok Lim

The 32st Annual Conference on Human Cognitive Language Technology, 2020

#### Design Neural Machine Translation Model Combining External Symbolic Knowledge

Sugyeong Eo, Chanjun Park, HeuiSeok Lim

The 32st Annual Conference on Human Cognitive Language Technology, 2020

#### Cross-Lingual Transfer of Pretrained Transformers to Resource-Scarce Languages (Best Paper Award)

Chanhee Lee, Chanjun Park, Gyeongmin Kim, Dongsuk Oh, HeuiSeok Lim

The 32st Annual Conference on Human Cognitive Language Technology, 2020

#### MMA: Multi-modal Message Aggregation for Korean VQA

Sungjin Park, Chanjun Park, Jaehyung Seo, HeuiSeok Lim

The 32st Annual Conference on Human Cognitive Language Technology, 2020

#### **Korean Spell Correction based on Denoising Transformer**

Chanjun Park, Sol Jeong, kisu Yang, Sumi Lee, Jaechoon Joe, HeuiSeok Lim

The 31st Annual Conference on Human Cognitive Language Technology, 2019

#### Parallel Corpus Filtering and Korean-Optimized Subword Tokenization for Machine Translation

#### Chanjun Park, Gyeongmin Kim, HeuiSeok Lim

The 31st Annual Conference on Human Cognitive Language Technology, 2019

#### **Optimization of Data Augmentation Techniques in Neural Machine Translation**

Chanjun Park, Kuekyeng Kim, HeuiSeok Lim

The 31st Annual Conference on Human Cognitive Language Technology, 2019

#### Comparative Study of Sentiment Analysis Model based on Korean Linguistic Chracteristics

Gyeongmin Kim, Chanjun Park, HeuiSeok Lim

The 31st Annual Conference on Human Cognitive Language Technology, 2019

#### Cross-Validated Ensemble Methods in Natural Language Inference (Best Paper Award)

Kisu Yang, Taesun Whang, Dongsuk Oh, Chanjun Park, HeuiSeok Lim

The 31st Annual Conference on Human Cognitive Language Technology, 2019

#### Korean Spacing Module using Eojeol dictionary and Morpheme dictionary

Chanjun Park, Jin-hyuk Choi, Pummo Ryu

Korea Software Congress 2018, 2018

#### Knowledge-enhancing Real-time Lecture interpreter service Development

**Chanjun Park**, Minho Kang, Byunggun Park, Suntae Kim, Myeongjin Hwang, Dongpil Kim, Young-kil Kim Korea Software Congress 2018, 2018

#### Voice recognition performance improvement using TTS system in address recognition system

**Chanjun Park**, Suntae Kim, Minho Kang, Myeongjin Hwang, Byunggun Park, Yeonsu Kim

Korea Software Congress 2018, 2018

#### Improved speech recognition performance in business meeting environments using domain-specific method

Chanjun Park, Suntae Kim, Minho Kang, Byunggun Park, Myeongjin Hwang, Yeonsu Kim

Korea Software Congress 2018, 2018

#### Spam/Ham Classification using Ensemble Technique of Machine Learning Algorithms

Chanjun Park, Pummo Ryu

Korea Computer Congress 2018, 2018

#### **Two-Stage Korea Compound Noun Decomposer**

Chanjun Park, Pummo Ryu

The 30st Annual Conference on Human Cognitive Language Technology, 2018

### **Dictionary based Compound Noun Decomposer using Resource extension**

Chanjun Park, Hyejin Won, Pummo Ryu

Korea Computer Congress 2018, 2018

#### **BOOK CHAPTERS**

#### **Natural Langugae Processing Bible**

Heuiseok Lim, Korea University NLPAI Lab

 $Human\ Science, https://www.aladin.co.kr/shop/wproduct.aspx?partner=rss\&ISBN=K412637214, 2020$ 

# **Extracurricular Activity**

#### Operate Naver's natural language processing blog

South Korea 2016.Dec-Present

BLOGGER

- URL: https://blog.naver.com/bcj1210
- Linguistics for natural language processing
- Natural Language Processing (NLP)
- Machine Translation for Everyone
- · Business, strategy, and planning for everyone
- Natural language processing with NLTK
- Software engineering
- Today's CCM

MEMBERS

STUDENT

STUDENT

**OpenNMT Forum Members** 

South Korea

2019.July-2019.July

• Active as OpenNMT Forum Members

• Develop and share OpenNMT Pytorch, Tensorflow, Library Tutorial

South Korea

ETRI's machine translation quality evaluator

· Quality evaluation of machine translation hosted by ETRI

2019.October-2019.December

Completion of basic curriculum for natural language processing and language intelligence

South Korea

Korea University Human-Inspired AI & Computing Research Center

2019.July-2019.July

Completed the natural language processing tutorial (2016-2019)

South Korea

2016 - 2019

Special Interest Group of Human and Cognitive Language Technology

Reporter, Korea Electronics and Telecommunications Research Institute (ETRI)

South Korea 2016.Feb-2018.Feb

REPORTER · Served as 3rd and 4th reporters at the Korea Electronics and Telecommunications Research Institute

South Korea

· The first plito supporters

2017.Dec-2017.Dec

Journalist of the Ministry of Science and ICT

South Korea

2016.Feb-2017.Feb

• 8 articles published

**Flitto Supporters** 

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REPORTER

- · Visit Exobrain Quiz Show
- URL: https://blog.naver.com/bcj1210/221147196551

Planning a video lecture for Natural Language Processing Basic at BUFS

South Korea

2016.July-2016.July

South Korea

• URL: https://bit.ly/2NmFJV1

STUDENT

PLANNER

2016. January - 2016. August

- Bet Advanced Course Completion and Bet President Award • Bit project level 2 license
- · Development of intelligent English learning APP

**BIT Computer Advanced Course Completion** 

**BIT Computer Short Course Completion** South Korea

2015.June-2015.August STUDENT

• Short-term course completion (C, JAVA, Data Structure)