

# Hosung Park

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## ABOUT ME

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Current Ph.D student at Sogang University. My educational background is in Computer Science and Engineering. My research focuses on Automatic speech recognition (ASR) in particular. I work to develop weighted finite-state transducers (WFSTs) approaches to combine end-to-end ASR and external knowledge.

## EDUCATION

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Mar. 2018 ~ Present	<b>Sogang University</b> Department of Computer Science and Engineering <i>Ph.D Candidate</i> <i>Advisor: Prof. Ji-Hwan Kim</i>	Seoul, Korea
Mar. 2016 ~ Feb. 2018	<b>Sogang University</b> Department of Computer Science and Engineering  Thesis: Phoneme-to-text Conversion Based on Sequence-to-sequence Learning for Korean Continuous Speech Recognition System <i>Advisor: Prof. Ji-Hwan Kim</i> <i>Master of Science in Computer Science and Engineering</i>	Seoul, Korea
Mar. 2009 ~ Feb. 2016	<b>Handong Global University</b> Department of Computer Science and Engineering <i>Advisor: Prof. Hwan-Ki Yong</i> <i>Bachelor of Science in Computer Science and Engineering</i>	Pohang, Korea

## RESEARCH EXPERIENCE

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Jan. 2022 ~	<b>Integration of End-to-End Approach and External Knowledge in Speech Recognition</b> Sogang University  Key achievements: <ul style="list-style-type: none"><li>Combining end-to-end speech recognition and WFST decoding</li><li>Paper accepted in IASC journal</li></ul>	
Mar. 2020 ~	<b>Speech command recognition for unmanned aerial vehicle</b> Project name: Human Mobility Interface Research Project Management Supported by Ministry of Trade, Industry and Energy, Republic of Korea  Key achievements: <ul style="list-style-type: none"><li>CRNN-based speech command recognition system</li><li>WFST-based command recognition decoding</li></ul>	Sogang University

Jan. 2021 ~ Dec. 2021	<p><b>Integrated audio metadata tagging system for Korean YouTube V-log</b>  Project name: Development of data augmentation technology by using heterogeneous information and data fusion  Supported by the Ministry of Science and ICT, Republic of Korea</p>	Sogang University
Key achievements:		
<ul style="list-style-type: none"> <li>• Kaldi-based speech recognition (chain model)</li> <li>• MobNetV2-based audio event classification</li> <li>• MobNetV2-based audio scene classification</li> <li>• GMM-based music classification system</li> <li>• Energy-based voice activity detection</li> </ul>		
Jan. 2020 ~ Dec. 2020	<p><b>Korean end-to-end Real-time Speech Recognition System for conference</b>  Project name: Autonomous Intelligent Digital Companion Framework and Application  Supported by the Ministry of Science and ICT, Republic of Korea</p>	Sogang University
Key achievements:		
<ul style="list-style-type: none"> <li>• Conformer-based end-to-end speech recognition</li> </ul>		
Sep. 2017 ~ Mar. 2018	<p><b>Hybrid CTC-attention based end-to-end speech recognition</b></p>	Sogang University
Key achievements:		
<ul style="list-style-type: none"> <li>• CTC-attention hybrid model using Korean graphemes</li> <li>• Papers published in HCLT 2018, ISMAC 2019, and Journal of Web engineering.</li> </ul>		
Sep. 2017 ~ Mar. 2018	<p><b>Korean Speech Recognition System in Vehicle</b>  Project name: Technical development of Korean Speech Recognition System in Vehicle  Supported by Ministry of Trade, Industry and Energy, Republic of Korea</p>	Sogang University
Key achievements:		
<ul style="list-style-type: none"> <li>• TDNN-based acoustic model for speech recognition using LF-MMI</li> <li>• Papers published in The Journal of the Acoustical Society of Korea</li> </ul>		
Sep. 2017 ~ Mar. 2018	<p><b>Korean Real-time Speech Recognition System in Drama, news and conversation</b>  Project name: Development of QA systems for Video Story Understanding to pass the Video Turing Test  Supported by Ministry of Science and ICT, Republic of Korea</p>	Sogang University
Key achievements:		
<ul style="list-style-type: none"> <li>• TDNN-based acoustic model for speech recognition using LF-MMI</li> <li>• Real-time streaming speech recognition for embedded robot</li> </ul>		

Sep. 2016 ~ **Korean automatic grapheme-to-phoneme(G2P) tool** Sogang University  
April 2017 Project name: Development of NCSOFT Korean grapheme-to-phoneme(G2P) module  
Supported by NCSOFT

Key achievements:

- C++ based Korean automatic G2P tool for speech recognition
- Korean standard pronunciation from computer engineering perspective

May 2016 ~ **Distant speech recognition for AI speaker** Sogang University  
April 2020 Project name: Development of Distant Speech Recognition and Multi-Task Dialog Processing Technologies  
for In-Door Conversational Robots  
Supported by Ministry of Trade, Industry and Energy, Republic of Korea

Key achievements:

- Korean automatic speech recognition system for multi-channel AI speaker
- LSTM-based acoustic model for speech recognition
- TDNN-based acoustic model for speech recognition
- CTC+WFST-based Korean speech recognition system.
- Automatic Korean grapheme-to-phoneme converter for speech recognition

## INDUSTRY EXPERIENCE

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Jan. 2015 ~ **Speech recognition research engineer - Internship** Seongnam, Korea  
Feb. 2015 Naver Labs  
*Award: Excellence award*

Key achievements:

- API server for streaming automatic speech recognizer.

Aug. 2013 ~ **Microsoft Student Partners - Student ambassador** Seoul, Korea  
Aug. 2014 Microsoft Korea  
*Award: 1<sup>st</sup> place and D2 award at Imagine Cup Korea 2014*

Key achievements:

- InFace – extracting identities from parents and their children’s face.

## TEACHING EXPERIENCE

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June 2022 **Teaching assistant - AI Expert Course** Seoul, Korea  
LG electronics

Key achievements:

- Teaching about Transformer-based models and CNN-based model for end-to-end Speech recognition
- Teaching about multilingual fine-tuning for transformer-based speech recognition models.

June 2022	<b>Teaching assistant - AI Academy</b> Samsung electronics	Seoul, Korea
	Key achievements: <ul style="list-style-type: none"> <li>• Teaching about Nemo toolkit-based conformer models.</li> <li>• Teaching about integration of nemo toolkit and WFST-based decoder.</li> </ul>	
Sep. 2018 ~ Dec. 2018, Sep.2019~ Dec.2019	<b>Consultant - AI Speech Technology Expert Course</b> Samsung electronics	Yongin, Korea
	Key achievements: <ul style="list-style-type: none"> <li>• Consulting and teaching about automatic speech recognizer based on Kaldi toolkit</li> <li>• Consulting and teaching about automatic speech recognizer based on end-to-end manner.</li> </ul>	
Feb. 2019, April.2019, Aug.2020	<b>Teaching assistant - AI Speech Technology Expert Course</b> LG electronics	Seoul, Korea
	Key achievements: <ul style="list-style-type: none"> <li>• Teaching about automatic speech recognizer based on Kaldi toolkit</li> <li>• Teaching about LF-MMI-based acoustic modeling for speech recognition.</li> </ul>	

## PUBLICATIONS (SCI ONLY)

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1. **Hosung Park**, Eunsoo Cho, Juneseok Oh, and Ji-Hwan Kim, "WFST-based Integration of End-to-End Approach and External Knowledge in Speech Recognition Decoding Network," *Intelligent Automation & Soft Computing*, 2023.
2. **Hosung Park**, Yoonseo Chung, Ji-Hwan Kim, "Deep Neural Networks-based Classification Methodologies of Speech, Audio and Music, and its Integration for Audio Metadata Tagging," *Journal of Web Engineering*, Vol. 22, No. 1, pp 1-26, 2023
3. Soonshin Seo, Juneseok Oh, Eunsoo Cho, **Hosung Park**, Gyujin Kim and Ji-Hwan Kim, "TP-MobNet: A Two-pass Mobile Network for Low-complexity Classification of Acoustic Scene," *Computers, Materials & Continua*, Vol.73, No. 2, 3291-3303, 2022.
4. Donghyun Lee, **Hosung Park**, Soonshin Seo, Hyunsoo Son, Gyujin Kim, and Ji-Hwan Kim, "Robustness of Differentiable Neural Computer Using Retention Vector-based Memory Deallocation in Language Model," *KSII Transactions on Internet and Information Systems*, Vol. 15, No. 3, pp.837-852, 2020.
5. Donghyun Lee, **Hosung Park**, Soonshin Seo, Changmin Kim, Hyunsoo Son, Gyujin Kim, and Ji-Hwan Kim, "Language Model Using Differentiable Neural Computer Based on Forget Gate-based Memory Deallocation," *Computers, Materials & Continua*, Vol. 68, No. 1, pp.537-551, 2020.
6. **Hosung Park**, Soonshin Seo, Changmin Kim, Hyunsoo Son, Ji-Hwan Kim, "Hybrid CTC-attention network-based end-to-end speech recognition system for Korean language," *Journal of Web Engineering*, 2020.
7. Minkyu Lim, Donghyun Lee, **Hosung Park**, Yoseb Kang, Juneseok Oh, Jeong-Sik Park, Gil-Jin Jang, Ji-Hwan Kim, "Convolutional Neural Network based Audio Event Classification," *KSII Transactions on Internet and Information Systems*, Vol. 12, No. 6, 2018.
8. Donghyun Lee, Minkyu Lim, **Hosung Park**, Yoseb Kang, Jeong-Sik Park, Gil-Jin Jang, Ji-Hwan Kim, "Long Short-Term Memory Recurrent Neural Network-Based Acoustic Model Using Connectionist Temporal Classification On a Large-Scale Training Corpus," *China Communications*, Vol. 14, No. 9, pp. 23-31, 2017.

## PUBLICATIONS (NON-SCI, 1<sup>ST</sup> AUTHOR ONLY)

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1. **Hosung Park**, and Ji-Hwan Kim, “Acoustic Model Training Using Self-Attention For Low-Resource Speech Recognition,” *The journal of the Acoustical Society of Korea*, Vol. 39, No. 5, pp. 483-489, 2020. (SCOPUS)
2. **Hosung Park**, Yoseb Kang, Minkyu Lim, Donghyun Lee, Junseok Oh, and Ji-Hwan Kim, “LFMMI-Based Acoustic Modeling by Using External Knowledge,” *The journal of the Acoustical Society of Korea*, Vol. 38, No. 5, pp. 607-613, 2019. (SCOPUS)

## INTERNATIONAL CONFERENCES (1<sup>ST</sup> AUTHOR ONLY)

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1. **Hosung Park**, Soonshin Seo, Daniel Jun Rim, Changmin Kim, Hyunsoo Son, Jeong-Sik Park, and Ji-Hwan Kim, . “Korean Grapheme Unit-based Speech Recognition Using Attention-CTC Ensemble Network,” *Proceeding of International Symposium on Multimedia and Communication Technology (ISMATC)*, 2019.
2. **Hosung Park**, Donghyun Lee, Minkyu Lim, Yoseb Kang and Ji-hwan Kim, "The Scalable Load Balancing System for Speech Mining by Using Multiple Speech Recognizer," *Proceeding of the Oriental COCODA*, 2017.
3. **Hosung Park**, Eun Som Jeon, Minkyu Lim, Donghyun Lee, Yoseb Kang, Ji-Hwan Kim, “Multimodal Classification of Moving Vehicle based on convolutional neural network”, *The 4th International Conference on Electronics, Electrical Engineering, Computer Science*, 2017
4. **Hosung Park**, Eun Som Jeon, Minkyu Lim, Donghyun Lee, Unsang Park and Ji-hwan Kim, “Classification of Moving Vehicles Based On Convolutional Neural Network”, *The 3rd International Conference on Electronics, Electrical Engineering, Computer Science*, 2017
5. **Hosung Park**, Donghyun Lee, Minkyu Lim and Ji-hwan Kim, “Endpoint Detection Of Speech Signals For Android Applications,” *The 3rd International Conference on Electronics, Electrical Engineering, Computer Science*, 2017
6. **Hosung Park**, Minkyu Lim, Donghyun Lee, Jeong-Sik Park, and Ji-Hwan Kim, “Word Clustering Using Word Embedding Generated by Neural Net-based Skip Gram,” *The 2nd International Conference on Electronics, Electrical Engineering, Computer Science*, 2016

## DOMESTIC CONFERENCES (1<sup>ST</sup> AUTHOR ONLY)

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1. **Hosung Park**, Soonshin Seo, Hyunsoo Son, Changmin Kim, and Ji-Hwan Kim, “Self-attentive Layer for Discriminant Vector Training in Low-resource Speech Recognition,” *Proceeding of Korea Computer Congress*, 2020. - oral
2. **Hosung Park**, Donghyun Lee, Minkyu Lim, Yoseb Kang, Juneseok Oh, Soonshin Seo, Daniel Jun Rim, and Ji-Hwan Kim, “Hybrid CTC-Attention Based End-to-End Speech Recognition Using Korean Grapheme Unit,” *Annual Conference on Human and Language Technology*, 2018. – oral
3. **Hosung Park**, Donghyun Lee, Minkyu Lim, Yoseb Kang, Ji-Hwan Kim, “Implementation of Multi-Robot Speech Recognition Using Scalable Load Balancer”, *Brain Engineering Society of Korea Symposium*, 2017 - poster

## PATENTS

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1. **Hosung Park**, Juneseok Oh, and Ji-Hwan Kim, “Server for Providing Corpus Building Service and Method Therefore”  
Korea - Application No. 10-2020-0052570
2. **Hosung Park**, Hyunwook Kim, Jaeseong Lee, Chanhee Lee, “System and Method for Providing Image Monitoring Service Using Waste Smart Device”  
Korea - Registration No. 10-16-81730  
Korea – Application No. 10-2015-0086507

3. **Hosung Park**, Eunsom Jeon, Euijong Hwang, Sumin Lee, “System and Method for Searching Missing Family Using Facial Information and Storage Medium of Executing the Program”  
Korea – Registration No. 10-17-431690000  
Korea – Application No. 10-2014-0139857

#### **AWARDS AND HONORS**

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2022	1 <sup>st</sup> place, 2022 Korean AI Competition
2021	1 <sup>st</sup> place, 2021 AI data hackathon
2020	Google Cloud Award (3rd place), 2nd KB AI challenge
2020	Best Paper Award, Korea Computer Congress
2018 ~ 2019	Samil scholarship, The Samil Foundation
2017	Certificates of Distinction in Teaching, Sogang University
2015	3rd place, Handong Global University Capstone Competition
2015	Excellence Award, Naver Labs Internship
2014	1st place, Microsoft Imagine Cup Korea Final
2014	Naver D2 Award, Microsoft Imagine Cup Korea Final