

# Kyusong Lee

Carnegie Mellon University

## Education

- 2017.1– **Postdoctoral Associate**, *Language Technologies Institute*, Carnegie Mellon University, Pittsburgh, USA.  
Advisor: Maxine Eskenazi
- 2015.10– **Research Scholar**, *Language Technologies Institute*, Carnegie Mellon University, Pittsburgh, USA.  
Advisor: Maxine Eskenazi
- 2010.02– **Ph.D.**, *Computer Science and Engineering*, *Pohang University of Science and Technology*, Pohang.  
Advisor: Gary Geunbae Lee, Intelligent Software Lab.
- 2003.03– **B.S.**, *School of Computer Science and Engineering*, *Soongsil University*, Seoul.  
2010.02

## Experience

- 2016.5– **Research Intern and Co-op**, IBM Research, New York, USA.  
2016.12 Advisor: Suresh N Chari, Youngja Park
- 2015.12– **Technology transfer.**, *Naver Labs*, Seoul, South Korea.  
2015.02 Natural Language Processing Group
- 2014.09– **Research Intern.**, *Microsoft Research Asia*, Beijing, China.  
2015.03 Mentor: Nan Duan, Ming Zhou, Natural Language Computing Group

## Research Interest

spoken dialog system, computer assisted language learning, grammar error correction, question generation

## Research Experience

### IBM Thomas J. Watson Research Center (IBM)

- 2016–2016 **Research on constructing knowledge base and document classification.**  
- I was a research intern in IBM research, NY. I developed open extracted knowledge base in security domain. Moreover, I investigated a document classification using deep learning technique

### Carnegie Mellon University (CMU)

CMU LTI, 5000 Forbes Avenue, 15213-3891 – Pittsburgh – PA

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2015–current **Research on Question Answering and Spoken Dialog System**, *Language Technologies Institutes*.

- I am developing a conversational agent which named as Skylar. My research has been focused on handling non-task oriented dialog such as chatter and question answering. Moreover, I designed the conversational virtual user interface to attract real users. <http://skylar.speech.cs.cmu.edu>

#### Microsoft Research Asia (MSRA)

2014–2015 **Research on Question Answering**, *Natural Language Computing Group, Microsoft Research Asia*.

- I developed a question answering system using both curated knowledge base and open knowledge base.

#### Pohang University of Science and Technology (POSTECH)

2014–2015 **EXOBRAIN- Research on Question Answering**, *Institute for Information & communications Technology Promotion(IITP)*.

- I participated in developing semantic answer type detection without human label

2013–2014 **Research on Grammar Error Correction and Feedback based on Learner Model**, *National IT Industry Promotion Agency (NIPA), Microsoft Research Asia*.

- I participated in making the project proposal and I am responsible for project management and develop a grammar error correction system in the written and spoken data.

2010–2014 **Research laboratory for natural language-based immersive English tutoring system**, *National Research Foundation of Korea*.

- I participated in making the project proposal and I am responsible for project management and developed POSTECH Immersive English Study (POMY) system. I collaborated with researchers in haptics, computer vision, graphics and English education.

2010–2014 **Development of dialog-based spontaneous speech interface technology on mobile platform**, *Ministry of Science, ICT and Future Planning*.

- I participated in making a spoken dialog system and a grammar error correction system for corrective feedback

2010–2013 **Intelligent Robots for English Conversation Tutoring**, *Ministry of Knowledge and Economy Project*.

- I participated in making language learning game using Unity3D game engine.

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## Awards

2016 NTCIR Question Answering, Ranked 1st

2015 Brain Korea 21 Plus, Scholarship

2014 CoNLL 2014 Shared Task, Ranked 4th

2014 Winner of the best HCI KIDS award, HCI Korea

2011 Winner of the best DEMO award, Korea Computer Congress

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## Teaching Experience

Fall 2013 Pattern Recognition, EECE514

Fall 2011 Programming Language, CS103

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## Publications

### Spoken Dialog System

- [C26] Tiancheng Zhao, **Kyusong Lee**, Maxine Eskenazi. Unsupervised Discrete Sentence Representation Learning for Interpretable Neural Dialog Generation. Proceedings of the ACL 2018, July 2018, Melbourne
- [C25] **Kyusong Lee**, Tiancheng Zhao, Alan W Blank, Maxine Eskenazi. DialCrowd: A toolkit for easy dialog system assessment. Proceedings of the International Conference on Spoken Dialogue Systems Technology (SIGDIAL 2018), July 2018, Melbourne
- [C24] Tiancheng Zhao, Allen Lu, **Kyusong Lee**, Maxine Eskenazi. Generative Encoder-Decoder Models for Task-Oriented Spoken Dialog Systems with Chatting Capability. Proceedings of the International Conference on Discourse and Dialogue (SIGDIAL 2017), August 2017, Saarbrücken, Germany
- [C23] **Kyusong Lee**, Tiancheng Zhao, Yulun Du, Edward Cai, Allen Lu, Eli Pincus<sup>1</sup>, David Traum, Stefan Ultes, Lina M. Rojas-Barahona, Milica Gasic, Steve Young, and Maxine Eskenazi. DialPort, Gone Live: An Update After A Year of Development. Proceedings of the International Conference on Spoken Dialogue Systems Technology (SIGDIAL 2017), August 2017, Saarbrücken, Germany
- [C22] **Kyusong Lee**, Tiancheng Zhao, Stefan Ultes, Lina Rojas-Barahona, Eli Pincus, David Traum, Maxine Eskenazi. An Assessment Framework for DialPort. Proceedings of the International Workshop on Spoken Dialogue Systems Technology (IWSDS 2017), June 2017, Pittsburgh
- [C21] **Kyusong Lee**, Tiancheng Zhao and Maxine Eskenazi. DialPort: Connecting the Spoken Dialog Research Community to Real User Data. Proceedings to the IEEE spoken language technology (SLT 2016), Dec 2016, San Diego
- [C20] **Kyusong Lee**, Paul Hongsuck Seo, Junwhi Choi, Soo-Ok Kweon, Gary Geunbae Lee. Conversational Knowledge Teaching Agent that Uses a Knowledge Base. Proceedings to the 16th Annual Meeting of the Special Interest Group on Discourse and Dialogue (Sigdial 2015), Dec 2015, Prague. 2015
- [C19] Jeesoo BANG, Sangdo HAN, **Kyusong LEE**, Gary Geunbae LEE. Open domain personalized dialog system using user-interested topics in system responses. Proceedings of the 2015 IEEE Automatic Speech Recognition and Understanding workshop (ASRU 2015), Dec 2015, Arizona
- [C18] Sangdo Han, **Kyusong Lee**, Donghyeon Lee, Gary Geunbae Lee. Counselling dialog system with 5W1H extraction. Proceedings to the 14th Annual Meeting of the Special Interest Group on Discourse and Dialogue (SIGDIAL 2013), Aug 2013, Metz
- [J8] Hyungjong Noh, Seonghan Ryu, Donghyeon Lee, **Kyusong Lee**, Cheongjae Lee, and Gary Geunbae Lee (2012). An Example-Based Approach to Ranking Multiple Dialog States for Flexible Dialog Management. Selected Topics in Signal Processing, IEEE Journal of, 6(8), 943-958. SCI

### Dialog-based Computer Assisted Language Learning

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- [J7] **Kyusong Lee**, Soo-ock Kweon, Hyungjong Noh, Gary Geunbae Lee. (2014) Postech Immersive English Study (POMY): Dialog-based Language Learning Game. IEICE transactions on information and systems (2014) 97(7):1930-1841 SCIE
- [J6] Jaebong Lee, **Kyusong Lee**, Hoang Minh Phuong, Hojin Lee, Gary Geunbae Lee and Seungmoon Choi. POMY: POSTECH Immersive English Study with Haptic Feedback, Journal of Institute of Control, Robotics and Systems (2014) 20(8):815-821 (In Korea)
- [C17] Phuong Hoang Minh, Jaebong Lee, Hojin Lee, **Kyusong Lee**, Gary Geunbae Lee, Seungmoon Choi. Haptic-Enabled English Education System, Proceedings of the International Conference on Asia Haptics. November 2014, Tsukuba, Japan
- [J5] Sungjin Lee, Hyungjong Noh, Jonghoon Lee, **Kyusong Lee**, Gary Geunbae Lee, Seongdae Sagong, Moonsang Kim. (2011) On the Effectiveness of Robot-Assisted Language Learning, ReCALL Journal, Vol.23(1), SSCI.
- [J4] Sungjin Lee, Hyungjong Noh, Jonghoon Lee, **Kyusong Lee**, and Gary Geunbae Lee (2012). Foreign Language Tutoring in Oral Conversations Using Spoken Dialog Systems. IEICE TRANSACTIONS on Information and Systems, 95(5), 1216-1228. SCIE
- [C16] **Kyusong Lee**, Soo-Ok Kweon, Sungjin Lee, Hyungjong Noh, Jonghoon Lee, Jinsik Lee, Hae-Ri Kim, Gary Geunbae Lee. Effects of language learning game on Korean elementary school students. Proceedings of the SLaTE 2011 workshop on speech and language technology in education (SLaTE2011), Aug 2011. Venice.
- [C15] Hyungjong Noh, **Kyusong Lee**, Sungjin Lee, Gary Geunbae Lee. POMY: a conversational virtual environment for language learning in POSTECH. Proceedings of the 12th sigdial workshop on discourse and dialog (sigdial 2011), June 2011 Portland (demo presentation)
- [C14] Hyungjong Noh, Sungjin Lee, **Kyusong Lee**. Gary Geunbae Lee. Ranking dialog acts using discourse coherence indicator for English tutoring dialog systems. Proceedings of the 3rd international workshop on spoken dialog systems technology (IWSDS 2011), Sept 2011, Granada Spain
- [C13] Sungjin Lee, Hyungjong Noh, Jonghoon Lee, **Kyusong Lee**, Gary Geunbae Lee. POSTECH Approaches for Dialog-based English Conversation Tutoring. Proceedings of the 2010 APSIPA annual summit and conference, Singapore, Dec 2010 (nominated for student best paper)
- [C12] Sungjin Lee, Hyungjong Noh, Jonghoon Lee, **Kyusong Lee**, Gary Geunbae Lee. Cognitive Effects of Robot-Assisted Language Learning on Oral Skills. Proceedings of Interspeech Second Language Studies Workshop, Tokyo, Sep 2010
- [C11] Sungjin Lee, Changgu Kim, Jonghoon Lee, Hyungjong Noh, **Kyusong Lee**, Gary Geunbae Lee. Affective Effects of Speech-enabled Robots for Language Learning. Proceedings of the IEEE Spoken Language Technology (SLT 2010), Berkeley, Dec 2010

### [Error Correction](#)

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- [J3] Junhwi CHOI, Seonghan RYU, **Kyusong LEE**, Gary Geunbae LEE, and Gary Geunbae Lee. One-Step Error Detection and Correction Approach for Voice Word Processor, IEICE transactions on information and systems, 98(8):1517-1525, 2015 SCIE
- [C10] **Kyusong Lee**, Paul Hongsuck Seo, Seokhwan Kim, Soo-Ok Kweon, Gary Geunbae Lee. Grammatical error correction based on learner comprehension model in oral conversation. Proceedings to the IEEE spoken language technology (SLT 2014), Dec 2014, Nevada
- [C9] **Kyusong Lee**, Gary Geunbae Lee. POSTECH grammar error correction system in the CONLL-2014 shared task. Proceedings to 18th conference on computational natural language learning (CoNLL 2014), June 2014, Baltimore. **Ranked 4th**
- [C8] Jeesoo Bang, **Kyusong Lee**, Seonghan Ryu, Gary Geunbae Lee. Vowel reduction feedback system for non-native learners of English. Proceedings to the 39th IEEE international conference on acoustics, speech, and signal processing (ICASSP 2014), May 2014, Florence.
- [C7] Junhwi Choi, Donghyeon Lee, Seonghan Ryu, **Kyusong Lee**, Gary Geunbae Lee, Engine-Independent ASR Error Management for Dialog Systems, Proceedings of the 5th International Workshop on Spoken Dialog System (IWSDS 2014), Napa, California, USA, January 2014
- [C6] Hongsuck Seo, Jonghoon Lee, **Kyusong Lee**, Gary Geunbae Lee. A meta-learning approach to grammatical error correction. Proceedings o the 50th annual meeting of the association for computational linguistics (ACL 2012), Jeju Korea, July 2012.
- [C5] Hongsuck Seo, **Kyusong Lee**, Gary Geunbae Lee, Soo-Ok Kweon, Hae-Ri Kim. Grammatical error annotation for Korean learners of spoken English. Proceedings of the 8th international conference on language resources and evaluation (LREC2012), May 2012, Istanbul
- [C4] Sungjin Lee, Hyungjong Noh, **Kyusong Lee**, Gary Geunbae Lee, Grammatical Error Detection for Corrective Feedback Provision in Oral Conversations, Proceedings of the AAAI 2011: Twenty-Fifth Conference on Artificial Intelligence, San Francisco, Aug 2011
- [J2] Sungjin Lee, Jonghoon Lee, Hyungjong Noh, **Kyusong Lee**, Gary Geunbae Lee. (2011) Grammatical Error Simulation for Computer-Assisted Language Learning, Knowledge-Based Systems, SCI
- Question Generation and others**
- [C3] **Kyusong Lee**, Gary Geunbae Lee. Sentence completion task using web scale data. Proceedings of the International Conference on Big Data and Smart Computing (BigComp 2014), Jan 2014, Bangkok
- [C2] **Kyusong Lee**, Soo-Ok Kweon, Hae-Ri Kim, Gary Geunbae Lee. Filtering-based Automatic Cloze Test Generation Proceedings of the SLaTE 2013 workshop on speech and language technology in education (SLaTE2013), Aug 2013. Grenoble.
- [C1] **Kyusong Lee**, Soo-Ok Kweon, Hongsuck Seo, Gary Geunbae Lee. Using corpus data in generating grammar questions in L2 learning. Proceedings to 2012 IEEE workshop on spoken language technology (SLT2012), Dec 2012, Miami

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- [J1] Jonghoon Lee, Sungjin Lee, Hyungjong Noh, **Kyusong Lee**, and Gary Geunbae Lee. Iteratively constrained selection of word alignment links from knowledge and statistics, Knowledge-Based Systems, 24 (7): 1120-1130, Oct 2011. SCI

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## Patent

### Patent Cooperation Treaty (PCT)

METHOD OF MANAGING COMMUNICATION AND SYSTEM FOR THE SAME  
PCT/KR2011/007906

CONVERSATION MANAGEMENT SYSTEM AND METHOD THEREOF  
PCT/KR2013/000408

FOREIGN LANGUAGE LEARNING SYSTEM AND METHOD THERE OF  
PCT/KR2013/00000

APPARATUS FOR GRAMMATICAL ERROR CORRECTION AND METHOD FOR  
GRAMMATICAL ERROR CORRECTION USING THE SAME  
PCT/KR2013/004079

METHOD FOR RECOGNIZING UTTERANCE AND APPARATUS THEREOF  
PCT/KR2013/009228

APPARATUS FOR GRAMMATICAL ERROR CORRECTION AND METHOD FOR  
GRAMMATICAL ERROR CORRECTION USING THE SAME  
PCT/KR2013/004079

### US Patent

Conversation management method, and device for executing same  
<https://www.google.com/patents/US20130325468>

Language learning system and learning method  
<http://www.google.com/patents/US20150079554>

System and method for managing conversation  
<https://www.google.com/patents/US20150058014>

System for correcting grammatical errors, and method for correcting grammatical  
errors using same  
<https://www.google.com/patents/US20150309982>

Apparatus for learning vowel reduction and method for same  
<https://www.google.com/patents/WO2014200187A1>

Method for automatically generating blank filling question and recording medium  
device for recording program for executing same  
<https://www.google.com/patents/US20160180730>

Preposition error correcting method and device performing same  
<https://www.google.com/patents/US20160180742>

### Demestic Patent

APPARTUS FOR GRAMMATICAL ERROR DETECTION AND METHOD USING  
THE SAME

Application Number: 10-2011-0071070, Registration: 10-1181928

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METHOD OF MANAGING COMMUNICATION AND SYSTEM FOR THE SAME  
Application Number: 10-2011-0016755, Registration: 10-1178310

FOREIGN LANGUAGE EDUCATION SYSTEM AND METHOD, AND COLLECTING METHOD OF CORPUS USING THE SAME

Application Number: 10-2011-0069047, Registration: 10-1194794

FOREIGN LANGUAGE LEARNING SYSTEM AND METHOD THEREOF

Application Number: 10-2012-0052646

METHOD FOR RECOGNIZING UTTERANCE AND APPARATUS THEREOF

Application Number: 10-2013-0048731

METHOD FOR SUPPLYING CONSULTING COMMUNICATION AND APPARATUS USING THE METHOD

Application Number: 10-2012-0135236

APPARATUS FOR GRAMMATICAL ERROR CORRECTION AND METHOD FOR GRAMMATICAL ERROR CORRECTION USING THE SAME

Application Number: 10-2012-0145721

CONVERSATION MANAGEMENT SYSTEM AND METHOD THEREOF

Application Number: 10-2012-0052647

## Computer skills

Language C, C++, C#, python, pearl, php, javascript, Java, R, Unity3D

OS Windows, Linux, Unix, Mac OS X

## Languages

Language 1 Korean

*Native*

Language 2 English

*Fluent*

## Developed System

DialCrowd: A toolkit for easy dialog system assessment)

o <https://dialrc.org/dialcrowd.html>

Conversational Agent (Dialog system, QA and Chatbot)

o <http://dialport.org/>

POSTECH Immersive English Study (POMY)

o <http://isoft.postech.ac.kr/~kyusonglee/POMY2.0.mp4>

o <http://isoft.postech.ac.kr/~kyusonglee/demo/pomydemo.mp4>

## Extra-curricular Activities

2012, Nov ULJIN Triathlon, Swim 10km / Bike 40km / Run 10 km / Overall Time 03:35:00

2007, Jan International Volunteer Experimence, Teaching basic computer skills in the Philippines

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2008–2009 English Language Centers, Philadelphia

2007-2014 Visited Countries: Belgium, Canada, China, France, Italy, Japan, Switzerland, Thailand, Turkey, Philippines, United States of America, (Good friendship all over the world.)

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