

# Seohyun Back

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Ph.D. Student, KAIST, Graduate School of AI

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## RESEARCH INTEREST

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- **NLP, NLU**: Natural language processing, Natural language understanding
- **MRC**: Deep learning for reading comprehension-based question answering
- **VQA**: Deep learning for visual question answering
- **Text Summarization**: Deep learning for text summarization

## PROGRAMMING SKILLS

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- **Advanced**: Python (tensorflow, pytorch), C, C++, Java
- **Moderate**: HTML, CSS, Javascript

## EDUCATION

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- **Korea Advanced Institute of Science and Technology (KAIST)** Daejeon, South Korea  
*Ph.D. Student in Artificial Intelligence (Advisor : Prof. Jaegul Choo)* Sep 2020 - Present
- **Korea University (KU)** Seoul, South Korea  
*M.E. in Big Data Convergence (Advisor : Prof. Jaegul Choo)* Sep 2016 - Feb 2019
- **SungKyunKwan University (SKKU) [military service 2008 - 2009]** Suwon, South Korea  
*B.S. in Computer Science and Engineering (Advisor : Prof. Jeehyong Lee)* Mar 2007 - Aug 2014

## INTERNATIONAL PUBLICATIONS

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- **Learning to Generate Questions by Learning to Recover Answer-containing Sentences**  
*Seohyun Back\*, Akhil Kedia\*, Sai Chetan Chinthakindi, Haejun Lee and Jaegul Choo*  
*Proceedings of findings on Association for Computational Linguistics (ACL-IJCNLP), 2021, Virtual*
- **NeurQuRI: Neural Question Requirement Inspector for Answerability Prediction in MRC**  
*Seohyun Back, Sai Chetan Chinthakindi, Akhil Kedia, Haejun Lee and Jaegul Choo*  
*International Conference on Learning Representations (ICLR), 2020, Addis Ababa, Ethiopia*
- **MemoReader: Large-Scale Reading Comprehension through Neural Memory Controller**  
*Seohyun Back, Seunghak Yu, Sathish Indurthi, Jihie Kim and Jaegul Choo*  
*Conference on Empirical Methods in Natural Language Processing (EMNLP), 2018, Brussels, Belgium, Long paper*
- **Cut to the Chase: A Context Zoom-in Network for Reading Comprehension**  
*Sathish Indurthi, Seunghak Yu, Seohyun Back and Heriberto Cuayahuitl*  
*Conference on Empirical Methods in Natural Language Processing (EMNLP), 2018, Brussels, Belgium, Short paper*
- **A Multi-Stage Memory Augmented Neural Network for Machine Reading Comprehension**  
*Seunghak Yu, Sathish Indurthi, Seohyun Back and Haejun Lee*  
*Proceeding of the Workshop on MRQA (co-located with ACL), 2018, Melbourne, Australia, Workshop Long paper*

## DOMESTIC PUBLICATIONS

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- **Text Summarization using Self-Attention and Self-Learning**  
*Jisang Yu, Seohyun Back and Jaegul Choo*  
*Conference on Korea Software Congress (KSC2018), 2018*
- **WAS Framework Designed for Distributed Computing Environments**  
*Ungueop Choi, Eunji Kwon, Jeongsu Lee and Seohyun Back*  
*Proceedings of The Korea Contents Association (KoCon) Spring Conference, 2013*

## Document Summarization Using Mutual Recommendation with LSA and Sense Analysis

- **Seohyun Back**, Dongwook Lee, Minji Park, Jinhee Park, Hyewuk Jung and Jeehyong Lee  
*Proceedings of Korean Institute of Intelligent Systems (KIIS) Spring Conference, 2012, Best Paper Award*

## Moving Pattern based Bot Detection Model

- **Seohyun Back**, Jaekwang Kim and Jeehyong Lee  
*Proceedings of Korean Institute of Intelligent Systems (KIIS) Fall Conference, 2011*

## PATENTS

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### Multi-Agent Complex Question Answering through Context Awareness (2021)

- **Seohyun Back**, Taeho Kil, Kyungsu Kim, Daehun Kim, Sungjin Kim, Younguk Kim, Hyunhan Kim, Gyubin Son and Hojin Jung, WO (2021), KR P20210005351

### Device and Method For Providing Notification Message Related To Content (2021)

- **Seohyun Back**, Taeho Kil, Kyungsu Kim, Sungjin Kim and Hojin Jung  
KR P20210008950

### Device, Method, and Program for Enhancing Content Through Iterative Generation (2019)

- **Seohyun Back**, Jiyeon Hong, Sai Chetan, Cheolseung Jung, Haejun Lee, Yonghyun Ryu and Wonho Ryu  
US (2019), WO (2019), KR P20190160008

### Electronic Device and Method for Providing a Feedback Information for a User Input (2018)

- **Seohyun Back**, Seunghak Yu, Huiwon Yun and Hojin Jung  
US US16/718672, EP 20150327.3, KR P20190008608

### Voice Recognition Apparatus and Operation Method Thereof (2017)

- **Seohyun Back**, Doohwa Hong, Jongyoub Ryu, Jiyeon Hong, Sungja Choi and Eunkyoun Kim  
US US16/211973, WO PCT/KR2018/015428, KR P20170167775

### Electronic Device and Method for Controlling External Device Thereof (2016)

- Jiwoong Choi, **Seohyun Back**, Yongseok Jang and Hyunah Oh  
US US15/467054, CN 201780012476.9, WO PCT/KR2017/003103, KR P20160106116, EP 17786086.3

## RESEARCH EXPERIENCE

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- **Samsung Research, AI Center** Seoul, South Korea  
*Research Engineer* *Sep 2016 - Present*
  - **Multi-modal Representation Learning:** Proposed and developed a training method for Vision-Linguistic Multi-modal Representation Learning.
  - **Question Generation:** Proposed and developed a pre-training method for question generation. Achieved state-of-the-art results in KorQuAD (Korean QA dataset in SQuAD style) using generated synthetic QA data.
  - **Multi-hop MRC:** Proposed and developed a new deep neural network for Multi-hop MRC tasks. Achieved multiple state-of-the-art results in HotpotQA leaderboards. (both in distractor and fullwiki setting)
  - **Machine reading comprehension (Question Answering):** Proposed and developed a new deep neural network for QA tasks using external memory. Achieved multiple state-of-the-art results in popular QA competition leaderboards; MS MARCO (1st), TriviaQA (1st) and SQuAD (5th, single model). Also achieved state-of-the-art result on QUASAR and NarrativeQA datasets. (Supervisor : Dr. Seunghak Yu)
  - **Text summarization:** Reproduced several existing abstractive summarization models for research baselines.
  - **Voice assistant (Bixby):** Developed a rejection module to exclude non-processable commands.
- **Samsung Creative Lab (C-lab)** Seoul, South Korea  
*Research Engineer* *Sep 2015 - Aug 2016*
  - **Indoor pointing system:** Customized GMM algorithm to predict indoor pointing using mobile device based on collected RF signal. The final project was acquired by Samsung Electronics Mobile Division.
  - **Machine learning library:** Developed own machine learning library for the python; Pytrain.

- **Information and Intelligence System Lab (IIS Lab)** Suwon, South Korea  
*Research Intern in SungKyunKwan University* Jul 2011 - Jun 2012
  - **Text summarization:** Proposed and developed a new extractive model. Best paper award in KIIS 2012.
  - **Auto playing bot detection:** Proposed and developed a method to detect auto playing bot in MMORPG.

## WORK EXPERIENCE

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- **Samsung DMC Research Institute (Acoustic and Sound Technology Lab)** Suwon, South Korea  
*Software Engineer* Jul 2014 - Aug 2015
  - **Commercial chatbot:** Developed chitchat model, crawler, dialog manager and customized intent classifier.
  - **Machine translation:** Integrated ASR, MT, TTS modules to make end-to-end system and built PoC.
  - **Dialog summarization:** Integrated ASR, dialog manager modules to make phone call summarization.
- **Samsung Software Membership** Suwon, South Korea  
*Software Engineer* Jan 2011 - Jun 2014
  - **Large-scale quiz system:** Developed distributed quiz server systems with multiple connections.
  - **Web market framework:** Developed p2p market solution that consist of web server and Android application.
  - **Distributed streaming system:** Developed web browser p2p streaming system using web-rtc protocol.
- **Whoyster** Anyang, South Korea  
*Software Engineer, Co-Founder, CEO* Jul 2011 - Jun 2012
  - **Document summarization solution:** Developed a tool for document analysis and extractive summarization.
  - **Funding:** Equipments and location was funded by National IT Industry Promotion Agency (NIPA).

## TEACHING EXPERIENCE

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- **Tashkent University of Information Technologies (TUIT)** Tashkent, Uzbekistan  
*Software Engineering Tutor, Volunteer* Jul 2013 - Aug 2013
  - **Machine learning:** Teaching basics of machine learning models including KNN, D-Tree, NaiveBayes. (50 hours)
  - **Java & Android:** Teaching fundamentals of Java language and Android application. (40 hours)

## HONORS AND AWARDS

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- **Samsung Best Paper Award 2019 Bronze\* Prize:** AI division, accept rate 4.37% (Fall 2019)
- **Samsung Best Paper Award 2018 Gold\* Prize:** AI division, 1st prize (Fall 2018)
- **Samsung Best Paper Award 2018 Silver\* Prize:** AI division, accept rate 2.02% (Fall 2018)
- **Samsung Best Paper Award 2018 Bronze\* Prize:** AI division, accept rate 4.17% (Fall 2018)
- **SEC Annual Awards Bronze\* Prize:** Best achievement award in R&D, Samsung Electronics (Fall 2017)
- **Super Rookie 1st\* Prize:** Highest performer of new employee's project, Samsung Electronics (Spring 2015)
- **Elite Membership Student:** Selected one of the best members, Samsung Software Membership (Spring 2014)
- **SSM Best Project Award 1st\* Prize:** Best achievement award, Samsung Software Membership (Spring 2013)
- **KIIS Best Paper Award:** Korean Institute of Intelligent Systems 2012 (Spring 2012)
- **Smart Home Idea Award Triple 2nd\* Prize:** Korea Association of Smart Home (Fall 2010)
- **SKKU Mobile App Competition Silver\* Prize:** Sungkyunkwan University (Fall 2010)

## SCHOLARSHIPS

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- **Academic Scholarship:** Korea University (Spring 2018)
- **Digital Contest Scholarship:** Selected student, Sungkyunkwan University (Fall 2010)
- **Jang Yeong-sil Scholarship:** Freshmen for outstanding academic records, Sungkyunkwan University (Spring 2007)

EXTRACURRICULAR ACTIVITIES

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- **Study and Open-source Coding Club (SOCC)** Seoul, South Korea  
*Organizer* *Dec 2013 - Feb 2020*
  - **Conducting AI studies:** Paper reading, Tensorflow programming, NLP/NLU, Statistical analysis.
  - **Organizing conference:** Planning and conducting IT conference every year with almost a hundred participants.
  - **Funding:** Conference cost and location was funded by NAVER LABS (Jun 2014 - Dec 2015).
- **The 3rd Software Maestro (Government-led training program)** Seoul, South Korea  
*Student in software engineering* *Jul 2012 - Nov 2012*
  - **Software mentoring course:** Studied agile methods and information retrieval.

LANGUAGES

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- **English:** Business **Korean:** Native