

Sanghyun Yi

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RESEARCH INTERESTS

Computational cognitive neuroscience, reinforcement learning, affordance theory, decision-making, neural decoding, biologically plausible learning, deep learning and brain-inspired AI.

EDUCATION

PhD student, **Caltech**, Pasadena, USA Sep 2018 – Present

- Social and Decision Neuroscience
- Chen graduate fellow

BS, **Seoul National University**, Seoul, Korea Mar 2011 – Feb 2018

- College of Liberal Studies
- Major: Mathematics
- Minor: Computer Science, Statistics
- Cum laude

RESEARCH & WORK EXPERIENCE

Alexa AI, Amazon Lab126 Mar 2018 – Aug 2018

- Applied Scientist Intern
- Project:
Building coherent and engaging conversational models by adding conversation evaluators.
- Research areas: natural language processing, conversational AI.

Laboratory for Brain and Machine Intelligence, KAIST Jun 2017 – Feb 2018

- Undergraduate Research Intern
- Project:
Manipulating human's prediction error for human optimization using a reinforcement learning agent.
Meta-controlling the model-based and model-free controllers to mimic the decision making strategy of human.
Optimizing explorations of a reinforcement learning agent by modeling uncertainties of environments.
- Supervisor: Professor Sangwan Lee
- Research areas: Reinforcement learning, computational neuroscience, human optimization.

Machine Intelligence Lab, Seoul National University Jan 2016 – Dec 2016

- Undergraduate Research Intern
- Project:
Building parallel English-Korean-Chinese corpora and designing a neural net based machine translation model.
- Designed a bilingual sentence alignment algorithm based on length, word representational vectors and dictionary information.
- Proposed a CNN based encoder in attention based encoder decoder model.
- Supervisor: Professor Kyomin Jung
- Research areas: Machine translation, deep learning, natural language processing.

Natural Language Processing Group, MIT Jun 2011 – Aug 2011

- Undergraduate Research Intern
- Project: Building graph on co-working relationship among MIT faculties.
- Supervisor: Professor Regina Barzilay
- Research areas: Natural language processing

PUBLICATIONS

- [1] Kiyohito Iigaya, Sanghyun Yi, Iman Wahle, Sandy Tanwisuth and John P. O’Doherty, “Aesthetic preference for art emerges from a weighted integration over hierarchically structured visual features in the brain”, 2020. (Under review)
- [2] Sanghyun Yi, Rahul Goel, Chandra Khatri, Alessandra Cervone, Tagyoung Chung, Behnam Hedayatnia, Anu Venkatesh, Raefer Gabriel and Dilek Hakkani-Tur, “Towards Coherent and Engaging Spoken Dialog Response Generation Using Automatic Conversation Evaluators”, in *International Conference on Natural Language Generation (INLG)*, Tokyo, Japan, 2019. (Oral presentation)
- [3] Kiyohito Iigaya, Sanghyun Yi, Iman Wahle, Sandy Tanwisuth and John P. O’Doherty, “Science meets art: Attribute-based computation as a general principle for building subjective value”, in *The Multi-disciplinary Conference on Reinforcement Learning and Decision Making (RLDM)*, Montréal, Québec, Canada, 2019.
- [4] Chihyung Jeon , Hanbyul Jeong , Heesun Shin , Heewon Kim , Sungeun Kim and Sanghyun Yi, “Can AI Read Your Politics?? Social and Ethical Implications of Artificial Political Intelligence”, in *When Robots Think. Interdisciplinary Views on Intelligent Automation*, Münster, Germany, 2018.
- [5] Sanghyun Yi, Jeehang Lee, Changhwa Lee, Juno Kim, Sujin An and Sang Wan Lee, “A Competitive Path to Build Artificial Football Agents for AI Worldcup”, in *IEEE/IEIE International Conference on Consumer Electronics (ICCE) Asia*, Jeju, Korea, 2018.
- [6] Sanghyun Yi, Jeehang Lee and Sang Wan Lee, “Maximally separating and correlating model-based and model-free reinforcement learning”, in *Computational and Systems Neuroscience (COSYNE)*, Denver, USA, 2018.
- [7] Sanghyun Yi and Kyomin Jung, “A Chatbot by Combining Finite State Machine, Information Retrieval, and Bot-Initiative Strategy”, in *1st Proceedings of Alexa Prize (Alexa Prize 2017)*, Las Vegas, USA, 2017.

PATENTS

- [1] Sang Wan Lee, JeeHang Lee, Sanghyun Yi, “Apparatus and method for eliciting optimal strategy of the humans in the interactive games using artificial intelligence”, US patent pending (16381954)
- [2] Sang Wan Lee, JeeHang Lee, Sanghyun Yi, “Apparatus and method for eliciting optimal strategy of the humans in the interactive games using artificial intelligence”, Korean patent (10-2018-0089185)

ACADEMIC AWARDS

- **National Science Foundation Graduate Research Fellowship**, National Science Foundation, 2020 Honorable Mention
- **Chen Graduate Fellow**, Chen Institute for Neuroscience, Caltech 2018 – 2019
- **National Scholarship for Science and Engineering**, Korea Student Aid Foundation 2011 – 2016 Full tuition & fee. For outstanding academic performance.
- **Semifinalist, The Alexa Prize** Aug 2017
10th place among 18 semifinalists which include 12 sponsored teams.
I was the de facto leader of the team, which was unsponsored and was the only semifinalist team from Asia.
- **3rd place, Nvidia Deep Learning Contest** Oct 2016
Achieved 85.1% accuracy on food image classification.
The only undergraduate awardee.
- **3rd place, AI World Cup 2017** Dec 2017
1st place at the preliminary league and 3rd place at the final tournament where the top 4 teams of the preliminary participated in. Awarded approx \$1500.
Gave a talk about the result at The 5th International Conference on Robot Intelligence Technology and Applications(RiTA).

TEACHING

- TA for Psy 13:Introduction to Cognitive Neuroscience Spring 2020
- TA for EC/ACM/CS 112:Bayesian Statistics Winter 2020

**MILITARY
SERVICE**

259 Company, Gangbuk Police, Seoul Metropolitan Police Agency

Oct 2013 – Jul 2015

- Company Commander (Sergeant)
- Mandatory military service.
- I led a company of about 100 constables.
- I was awarded commendations from the Commissioner of Seoul Metropolitan Police Agency and the Senior Superintendent of Gangbuk Police for my achievements during the service.

CITIZENSHIP

United States of America & Republic of Korea

LANGUAGES

- English: fluent.
- Korean: native language.
- Chinese, Japanese: basic.

SKILLS

Tensorflow, PyTorch, Python, R, C/C++, Fortran, Ocaml, Java, MATLAB, HTML, CSS, \LaTeX .

[CV compiled on 2020-10-10]