

Sanghyun Yi

MC 228-77, Pasadena CA 91125, USA
syi@caltech.edu • <https://www.sanghyunyi.com>

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
- Supervisor: John O’Doherty
- Chen graduate fellow

BS, **Seoul National Univeristy**, 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 developing automatic 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: 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: 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: Regina Barzillay
- Research areas: Natural language processing

PUBLICATIONS

- [1] Sanghyun Yi and John P. O’Doherty, “Computational and neural mechanisms underlying the influence of action affordances on value-based choice”, in *BioRxiv* 2023.
- [2] Kiyohito Iigaya, Sanghyun Yi, Iman Wahle, Sandy Tanwisuth, Logan Cross and John P. O’Doherty, “Neural mechanisms underlying the hierarchical construction of perceived aesthetic value”, in *Nature Communications* 14 (1), 127 2023.
- [3] Kiyohito Iigaya, Sanghyun Yi, Iman Wahle, Sandy Tanwisuth and John P. O’Doherty, “Aesthetic preference for art can be predicted from a mixture of low- and high-level visual features”, in *Nature Human Behaviour* 5, 743-755 2021.
- [4] 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”, in *BioRxiv* 2020.
- [5] Kiyohito Iigaya, Sanghyun Yi, Iman Wahle, Sandy Tanwisuth, Aniek Franssen and John P. O’Doherty, “Computational principles of value construction”, in *Computational and Systems Neuroscience (COSYNE)* 2021.
- [6] 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)
- [7] 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.
- [8] 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.
- [9] 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.
- [10] 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.
- [11] 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] Rahul Goel, Chandra Prakash Khatri, Tagyoung Chung, Raefer Christopher Gabriel, Anushree Venkatesh, Behnam Hedayatnia, Sanghyun Yi, “Dialog Response Generation”, US patent (11194973)
- [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”, US patent pending (16381954)
- [3] 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**
- **Chen Graduate Innovator Grant Awards**, Chen Institute for Neuroscience, Caltech, 2022
Awarded \$10,000
 - **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, 2021, 2022, 2023
 - TA for EC/ACM/CS 112:Bayesian Statistics Winter 2020, 2021, 2022
- 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, L^AT_EX.

[CV compiled on 2023-07-31]