

CURRENT POSITION	Assistant Professor Department of Bio and Brain Engineering KAIST Institute for Health Science and Technology Korea Advanced Institute of Science and Technology (KAIST)
EDUCATION	Korea Advanced Institute of Science and Technology (KAIST) Feb. 2009 Doctor of Philosophy in Electrical Engineering Thesis: <i>Parameter Optimization for Kernel-based Pattern Classification and Agglomerative Clustering</i> (Advisor: Zeungnam Zenn Bien) Korea Advanced Institute of Science and Technology (KAIST) Feb. 2005 Master of Science in Electrical Engineering Thesis: <i>A Study on Facial Emotional Expression Recognition System via Gabor Wavelet Neural Network: Adaptation by Novel Feature Separability Criterion</i> (Advisor: Zeungnam Zenn Bien) Yonsei University Feb. 2003 Bachelor of Science in Electrical Engineering (Cum Laude) Thesis: <i>Radar Tracking using Kalman Filter Linearized by Fuzzy Model</i>
ACADEMIC EMPLOYMENT	Korea Advanced Institute of Science and Technology (KAIST) Dec. 2015 - present Daejeon, Republic of Korea Assistant Professor California Institute of Technology (Caltech) Nov. 2011 - Nov. 2015 Pasadena CA, USA Della Martin Postdoctoral Scholar (Mentors: John O'Doherty and Shinsuke Shimojo) Massachusetts Institute of Technology (MIT) Aug. 2010 - Oct. 2011 Cambridge MA, USA Postdoctoral Associate (Mentors: Tomaso Poggio (MIT) and Christof Koch (Caltech)) Korea Advanced Institute of Science and Technology (KAIST) Feb. 2009 - July 2010 Daejeon, Republic of Korea Postdoctoral Associate (Mentors: Christopher Fiorillo) University of Bremen May - June 2008, April - July 2005 Bremen, Germany Visiting Scientist (Mentor: Axel Graeser) TELECOM & Management SüdParis (ex. INT) Jan. - Feb. 2007 Evry, France Visiting Scientist (Mentor: Mournir Mokhtari)
GRANTS	IITP research grant 2016 - 2020 PI, \$1 Million over 4 years (TBD) Funded by Ministry of Science, ICT and Future Planning, Republic of Korea. Title: <i>Multi-modal adaptive learning algorithms</i> Samsung Future Technology Foundation Research grant 2016 - 2019 PI, \$1.1 Million over 3 years Funded by Samsung future technology foundation, Republic of Korea. Title: <i>AI-human coevolution engine</i> Korean National Research Foundation(NRF) grant 2010 - 2011 Mentor: Tomaso Poggio (MIT), Collaborator: Christof Koch (Caltech), \$2.4K Funded by Ministry of Education, Science and Technology, Republic of Korea. Title: <i>Computational Theory of Integrated Intelligence</i>

HONORS AND AWARDS	KIIS Young Investigator Award Korean Institute of Intelligent Systems	2016
	Outstanding Paper Award 2016 spring conference on intelligent systems (Korean Institute of Intelligent Systems)	2016
	ICROS Young Investigator Award Institute of Control, Robotics and Systems, Korea	2016
	Della Martin Fellowship in Mental Illness Funded by Della Martin Foundation, USA. Title: <i>Neural Substrates for the Control of Behavior by Different Learning Systems in the Human Brain</i>	2014
	Annual Honor Roll Prize Awarded by KAIST, Republic of Korea. Research Performance Evaluation within top 5%.	2007
	KBS Engineer Promotion Scholarship - 6th period Awarded by the Korea Broadcasting System (KBS), Republic of Korea. Prize given to only 30 students in the whole country.	2007
	KBS Engineer Promotion Scholarship - 5th period Awarded by the Korea Broadcasting System (KBS), Republic of Korea. Prize given to only 30 students in the whole country.	2006
	Sang-Ae Scholarship Awarded by the Sang-Ae Scholarship Association, Republic of Korea.	Aug. 2006
	Sang-Ae Scholarship Awarded by the Sang-Ae Scholarship Association, Republic of Korea.	Mar. 2006
	Outstanding Paper Award Given at 6 th International Symposium on Advanced Intelligent Systems.	Oct. 2005
	Session Best Presentation Award Given at Joint 2 nd International Conference on Soft Computing and Intelligent Systems and 5 th International Symposium on Advanced Intelligent Systems.	Sept. 2004
	Best Paper Award (Session: Neural Networks I) Given at 8 th World Multi-conference on Systems, Cybernetics and Informatics.	July 2004
	State Scholarship Awarded as a state scholarship student of the KAIST.	2003 - 2008
	Honor Student Graduate Prize (<i>Cum Laude</i>) Awarded by Yonsei University, Republic of Korea.	Feb. 2003
	Diploma of Honor (IDEA Competitive Exhibition) Awarded by the Korea EDISON Idea Research Institute, Republic of Korea. Title: <i>Design of a Refractive Lens for Vehicle: An Alternate Rear-view Mirror</i>	Dec. 2002
	High Honor Student Prize Awarded by Yonsei University, Republic of Korea.	Mar. 2002

SELECTED
PUBLICATIONS

(*corresponding author)

Lee, S.W., Yi, T., Han, J.-S., Jung, J.-W., Kim, J.-O., and Bien, Z.
Design of a Gait Phase Recognition System that can cope with EMG Sensing Location Variation.
IEEE Transactions on Automation Science and Engineering (in press).

Lee, S.W.*, O'Doherty, J.P., and Shimojo, S.
Neural computations mediating one-shot learning in the human brain.
PLOS Biology 13(4) (2015).
(synopsis "How one-shot learning unfolds in the brain" by Weaver, J.)

Lee, S.W.*, Shimojo, S., and O'Doherty, J.P.
Neural computations underlying arbitration between model-based and model-free learning.
Neuron 81, 687-699 (2014).
(front cover; preview "Decisions about decisions" by Yoshida, W. and Seymour, B.)

Lee, S.W.*, Prenzel, O., and Bien, Z.
Applying Human Learning Principles to User-Centered IoT Systems.
IEEE Computer 46, 46-52 (2013).(cover feature)

Han, J.-S., **Lee, S.W.***, and Bien, Z.
Feature Subset Selection Using Separability Index Matrix.
Information Sciences 223, 102-118 (2013).

Lee, S.W., Kim, Y.S., and Bien, Z.
A Non-Supervised Learning Framework of Human Behavior Patterns Based on Sequential Actions.
IEEE Transactions on Knowledge and Data Engineering 22, 479-492 (2010).

Lee, S.W. and Bien, Z.
Representation of a Fisher Criterion Function in a Kernel Feature Space.
IEEE Transactions on Neural Networks 21, 333-339 (2010).

Lee, S.W., Kim, Y.S., Park, K.-H., and Bien, Z.
Iterative Bayesian Fuzzy Clustering toward Flexible Icon-based Assistive Software for the Disabled.
Information Sciences 180, 325-340 (2010).

INVITED TALKS

Seoul National University Invited Talk
Seoul, Republic of Korea Nov 24, 2016
"Reinforcement learning, one-shot inference, and the human brain"

International Biomedical Engineering Conference Invited Talk
Seoul, Republic of Korea Nov 12, 2016
"How does the human brain implement Markov decision processes?"

KAIST International Workshop on Neural Computation Invited Talk
Daejeon, Republic of Korea Nov 2, 2016
"Markov decision process unfolds within the human prefrontal cortex"

The 3rd Fall Conference on Chemoreception Invited Talk
Ansan, Republic of Korea Oct 28, 2016
"Reinforcement learning and inference in the human prefrontal-striatal circuit"

The 4th DJU Interdisciplinary Research Forum Invited Talk
Daejeon, Republic of Korea Oct 20, 2016
"Computational psychiatry: new tools for understanding mental illness"

The 20th International Conference on Biomagnetism Symposium Talk
Seoul, Republic of Korea Oct 6, 2016
"Prefrontal Cognitive Controllability and Mental Disorders"

International Workshop on Computational Psychiatry Invited Talk

Seoul, Republic of Korea "Neural encoding of uncertainty information during one-shot learning"	Oct 5, 2016
The 19th Korean Society for Brain and Neural Science Annual Meeting Seoul, Republic of Korea "Learning, inference, and meta-control mechanisms in the human brain"	Invited Talk Sep 29, 2016
The 17th International Symposium on Advanced Intelligent Systems Sapporo, Japan "Brain-inspired Artificial Intelligence: Model-based and Model-free Control"	Invited Talk Aug 27, 2016
Biomedical Image Processing Summer School Seoul, Republic of Korea "Deep neural networks and model-free control"	Invited Lecture Aug 24, 2016
Google DeepMind London, UK "How does the Markov decision process unfold within the human prefrontal cortex?"	Invited Seminar June 23, 2016
University of Cambridge Cambridge, UK "Metacognitive control of reinforcement learning and causal inference"	Marr Club Seminar June 21, 2016
Daejeon University Daejeon, Republic of Korea "Brain-inspired AI: deep neural networks, reinforcement learning, one-shot inference"	Invited Seminar June 1, 2016
Hyundai Motor Company Hwaseong, Republic of Korea "Current trends in brain-inspired AI"	IDEC lecture series May 20, 2016
Hanyang University Ansan, Republic of Korea "Brain-inspired AI systems"	IDEC lecture series May 11, 2016
Korea Human Brain Mapping Symposium Daejeon, Republic of Korea "Inferring Fronto-striatal Dynamic Network Structure"	Invited Seminar May 6, 2016
National Rehabilitatino Center Seoul, Republic of Korea "Future of brain-inspired AI research"	Invited Seminar April 20, 2016
Korea University (Dept. of Psychology) Seoul, Republic of Korea "Prefrontal high level cognitive control for reinforcement learning and inference"	Invited Seminar April 8, 2016
Korea University (Dept. of Brain Eng.) Seoul, Republic of Korea "Abstraction Machines: Transitioning from AI to Neuroscience"	Brain Eng Colloquim Mar.16, 2016
Korea Advanced Institute of Science and Technology (KAIST) Seoul, Republic of Korea "High level cognitive control process for reinforcement learning and inference"	Math Dept. Seminar Mar.10, 2016
ICROS spring conference Seoul, Republic of Korea "Design of intelligent systems based on hierarchical cortical cognitive control"	Invited Seminar Mar.10, 2016
Neuromorphic Brain Modelling Workshop Gwangju, Republic of Korea "Neuromorphic algorithms for recognition and attention"	Invited Lecture Feb.16, 2016

Computational Neuroscience Winter School Pohang, Republic of Korea “Hierarchical models in the human brain”	Invited Lecture Jan. 27, 2016
Seokyeong University Seoul, Republic of Korea “Abstraction Machines and Cognitive Control”	Invited Seminar Jan. 22, 2016
Korea Advanced Institute of Science and Technology (KAIST) Daejeon, Republic of Korea “Hierarchical cognitive control”	Invited Seminar Jan. 15, 2016
2015 Young Computational Neuroscientist Workshop Seoul, Republic of Korea “Brain’s meta-controller”	Invited Seminar Dec. 14, 2015
Korea Advanced Institute of Science and Technology (KAIST) Daejeon, Republic of Korea “Brain-inspired AI: machine learning and model-based fMRI”	BBE Seminar series Dec. 4, 2015
Seoul National University Seoul, Republic of Korea “Brain’s meta-controller”	Invited Seminar June 8, 2015
Dongguk University Seoul, Republic of Korea “Brain’s meta-controller”	Invited Seminar June 3, 2015
Korea Advanced Institute of Science and Technology (KAIST) Daejeon, Republic of Korea “A neurocomputational theory of cognitive control over learning”	Invited Seminar June 1, 2015
California Institute of the Arts Valencia CA, USA “Three ways of investigating functions of human brains”	Invited Lecture Feb. 12, 2014
Dongguk University Seoul, Republic of Korea “Computational principles of learning in humans - prediction errors and uncertainty”	Invited Seminar July 6, 2012
Yonsei University Seoul, Republic of Korea “Computational principles of learning in humans - prediction errors and uncertainty”	Invited Seminar July 4, 2012
Korea Advanced Institute of Science and Technology (KAIST) Daejeon, Republic of Korea “Computational principles of learning in humans - prediction errors and uncertainty”	Invited Seminar July 3, 2012
Ulsan National Institute of Science and Technology (UNIST) Ulsan, Republic of Korea “Using machine intelligence to understand the nature of human intelligence”	Invited Seminar June 28, 2012
Columbia University, Department of Psychology New York NY, USA “Computation, Perception, and Attention”	Invited Seminar August 10, 2011
Princeton University, Neuroscience Institute Princeton NJ, USA “Information Integration in Hierarchical Networks”	Invited Seminar June 24, 2011
Columbia University, Center for Theoretical Neuroscience New York NY, USA “Computational Principles of Information Encoding in the Nervous System - Single Neurons,	Invited Seminar June 20, 2011

Hierarchical Visual Cortex, and Popperian Cognitive Machines”

California Institute of Technology (Caltech) Invited Seminar
Pasadena CA, USA Jan. 28, 2010
Visited Christof Koch Lab in Caltech CNS group. (24 Jan. - 2 Feb.)
“Generalization of Continuous Paired-Associate Learning: Computational Principles and Perspectives”.

Ulsan National Institute of Science and Technology (UNIST) Invited Seminar
Ulsan, Republic of Korea Oct. 9, 2009
“Advanced Learning Methods for Human Behavior Pattern Analysis in a Smart Home Environment: Agglomerative Fuzzy Clustering, Fuzzy-State Q-Learning, and Generalized Kernel Learning”.

Electronics and Telecommunications Research Institute (ETRI) Invited Seminar
Daejeon, Republic of Korea July 14, 2009
“Matrix Algebras, Linear and Nonlinear Pattern Analysis”.

University of Cambridge, Carvendish Laboratory Invited Seminar
Cambridge, UK Dec. 9, 2008
“Optimizing Similarity Functions in Various Pattern Recognition Problems - Gabor Wavelet Function, Agglomerative Clustering, and Generalized Kernel Function”.

TEACHING
(BEFORE 2016)

California Institute of Technology (Caltech) Guest Lecture
Pasadena, USA Spring 2015
“Different modes of learning and the brain” (CNS176:Cognition)

California Institute of Technology (Caltech) Guest Lecture
Pasadena, USA Spring 2015
“Different modes of learning in the human brain” (CNS102A:Social&Decision Neuroscience)

Electronics and Telecommunications Research Institute (ETRI) Lecture Series
Daejeon, Republic of Korea July 2009
“Kernel-based Pattern Analysis”

Electronics and Telecommunications Research Institute (ETRI) Lecture Series
Daejeon, Republic of Korea July 2009
“Matrix Algebras for Engineers and Linear Pattern Analysis”

KAIST, Department of Electrical Engineering Guest Lecture
Daejeon, Republic of Korea November 2008
- Delivered a lecture (EE682 Intelligent Control Theory: Support Vector Machines).

University of Bremen, Institute of Automation Lecture
Bremen, Germany May 2008 - June 2008
- Delivered a lecture (01-038 Machine Learning Theory: Kernel Methods).

KAIST, Department of Electrical Engineering Teaching Assistance
Daejeon, Republic of Korea 2005 - 2007
- Advised students as a teaching assistance on various lectures
- Intelligent control theory, control systems, applied electronics, signal&systems.

MENTORING
(BEFORE 2016)

California Institute of Technology Undergraduate Research Advisor
Pasadena, CA 2012 - present

- CNS80 - independent research course, Spring 2015
“Dynamics of reinforcement learning control in the human brains” - Vibhor Kumar (Computer Science, Caltech)
- BE11 - written technical communication in engineering and applied science, Spring 2015
“Brain dynamics underlying face preference decisions” - Barclay Lee (Bioengineering, Caltech)
- CNS80 - independent research course, Spring-Fall 2014
“Dynamics of arbitration control in the human brains” - Paul Zhang (Computational and

Applied Mathematics, Caltech)

- BE98 - independent research course, Fall 2014
“*Inter-brain dynamics in social interaction*” - Dae-Hyun Kim (Computational and Applied Mathematics, Caltech)
- BE200 - independent research course, Fall 2014
“*Noninvasive brain stimulation to remotely activate ventral midbrain*” - Barclay Lee (Bioengineering, Caltech)
- SURF program, June-August 2014
“*Inter-brain dynamics in social interaction*” - Dae-Hyun Kim (Computational and Applied Mathematics, Caltech)
- SURF program, June-August 2014
“*Inter-brain dynamics in social interaction*” - Dae-Hyun Kim (Computational and Applied Mathematics, Caltech)
- BE200 - independent research course, Fall 2013 - Spring 2014
“*A novel real-time eigenvector-based analysis of brain dynamics and its application to face preference prediction*” - Barclay Lee (Bioengineering, Caltech)
- SS300 - independent research course, Fall 2013 - Spring 2014
“*Interaction between a pavlovian and an instrumental learning system in the human brains*” - Brad Chattergoon (Computational and Applied Mathematics, Caltech)
- Individual Research, Winter 2013
“*Interaction between a pavlovian and an instrumental learning system*” - Abhineet Agarwal (a highschool student from Singapore)
- SURF program, June-August 2013
“*A novel real-time eigenvector-based analysis of brain dynamics and its application to face preference prediction*” - Barclay Lee (Bioengineering, Caltech)
- SURF program, June-August 2013
“*Interaction between a pavlovian and an instrumental learning system*” - Brad Chattergoon (Computational and Applied Mathematics, Caltech)
- Individual Research, Fall 2012
“*Garcia effect in humans*” - Janna Wennberg (Polytechnic School)

KAIST, Department of Electrical Engineering
Daejeon, Republic of Korea

Undergraduate Research Advisor
2004 - 2009

- EE495 Individual research
“*Implementation of EMG Feature Extraction for Walking Phase Prediction*” by C.-J. Ah
- EE308 Applied electronic lab,
“*Development of Home Network Control Architecture through Sound Signal*” by T.-J. Kim and H.-M. Park
- EE409 B.S. thesis research,
“*Adaptive Vigilance Parameter of Fuzzy Neural Network*” by J. Yoon
- EE406 research project lab,
“*Implementation of Half-Mirror System*” by S.-W. Lee and J. Yoon
- EE406 research project lab,
“*Implementation of Dynamic Footprint Recognition System*” by Y.-S. Lee and M.-J. Na

RESEARCH
PROJECTS
(BEFORE 2016)

Arbitration of control in avoidance learning

2014 - present

Collaborative research

- Collaborator: Ben Seymour (University of Cambridge & NICT)

- Explores the second dimension of the reliability-based allocation of control to goal-directed and habitual actions avoidance learning.

Causal role of lateral prefrontal cortex in arbitration of control

2013 - present

Collaborative research

- Collaborator: Christian Ruff (University of Zurich)

- Uses transcranial direct current stimulation (TDCS) in conjunction with neuroimaging technique (fMRI) to study a causal role of ventrolateral prefrontal cortex in arbitrating between a goal-directed and a habitual learning system.

- Characterizing Habitual and Goal-directed Behavioral Control Systems in the Human Brain Using Computational and Multivariate fMRI** 2011 - 2015
funded by National Institutes of Health (NIH), USA.
- Principal Investigator: John O'Doherty (Caltech)
- Proposed a Bayesian arbitration process between a goal-directed and a habitual learning system.
- Conducting a behavioral and fMRI study.
- Neural Correlates of Reward-based Decision Making and Learning** 2011 - 2013
funded by Caltech/Tamagawa grand Center of Excellence Program
- Principal Investigator: Shinsuke Shimojo and John O'Doherty (Caltech)
- Testing a behavioral and neural hypothesis of one-shot learning and causal attribution.
- Conducting a behavioral and fMRI study.
- NEOVISION2: New Neuromorphic Algorithms for Static and Dynamic Recognition of Objects** 2010 - 2011
funded by Defense Advanced Research Projects Agency (DARPA), USA.
- Principal Investigator: Tomaso Poggio (MIT)
- Phase 1 of the DARPA-funded SyNAPSE program
- Carried out implementation and analysis of a top-down attention module.
- Tested macro-batch training on MNIST dataset using bagging and boosting schemes.
- Multiscale Neuroinformatics for Targeted Therapy of Dopamine-Related Brain Disorders** 2009 - 2010
funded by the National Research Foundation of Korea funded by the Ministry of Education, Science and Technology, Korea.
- Principal Investigator: Doheon Lee (KAIST), Mentor: Christopher Fiorillo (KAIST)
- Carried out simulations and analysis on Dopaminergic neurons.
- Worked as a coordinator.
- ICT-ADI: Toward a human-friendly assistive environment for Aging, Disability & Independence** 2006 - 2008
funded by the French Ministry of Research.
- Principal Investigators: Mounir Mokhtari (INT), Zeungnam Bien (KAIST), et al.
- Project partner: Handicom Lab., TELECOM & Management SudParis, France.
- Carried out collaborative work including system integration and paper writing.
- Worked as a student coordinator & active member.
- HOST Program, DAAD/ISAP** 2005 - 2008
funded by Deutscher Akademischer Austausch Dienst(DAAD), Germany.
- Principal Investigator: Axel Graeser (U Bremen)
- Carried out collaborative work on rehabilitation robotics and paper writing.
- Advised exchange students on various related affairs.
- Development of Intelligent Robot capable of S/W, H/W-based Redesign by learning and evolution** 2008
funded by the Ministry of Knowledge Economy, Korea.
- Principal Investigator: Zeungnam Bien (KAIST)
- Worked as a student coordinator.
- Development of Intelligent Multi-Modal Human-Robot Interaction Technology for Service Robot** 2006 - 2008
funded by the Ministry of Knowledge Economy, Korea.
- Principal Investigator: Zeungnam Bien (KAIST)
- Worked as a student coordinator.
- Study on Architecture Design for Learning Engineering System** 2005 - 2008
funded by the Korea Electric Power Corporation.
- Principal Investigator: Zeungnam Bien (KAIST)
- Planned and lead a study group "Machine Learning".
- Worked as an active member(2006) and a student coordinator (2007-2008).
- Project Theme I: Intelligent Sweet Home** 2005 - 2008
funded by the SRC/ERC program of MOST/KOSEF and

Human-friendly Welfare Robot System Engineering Research Center, KAIST.
- Principal Investigator: Zeungnam Bien (KAIST)
- Responsible for coordination of the students in seven research groups.
- Responsible for demonstration/public rehearsal.
- Worked as a student representative coordinator.

Development of Soft Remote Control System for the Intelligent Residential Space 2007

funded by the SRC/ERC program of MOST/KOSEF and Human-friendly Welfare Robot System Engineering Research Center, KAIST.
- Principal Investigator: Zeungnam Bien (KAIST)
- Worked as a student coordinator.

Development of a Special Chair and Telemetric Table for Work in Information Technology 2006

funded by the Employment Promotion Agency for the Disabled, Korea.
- Principal Investigator: Zeungnam Bien (KAIST)
- Advised active members on the development of an intelligent learning engine.
- Worked as a student coordinator.

Development of Intelligent Walking Assistive Device for the Elderly 2005 - 2006

funded by YUDO Co.,Ltd.
- Principal Investigator: Zeungnam Bien (KAIST)
- Conducted statistical analysis of EMG signal features of lower limbs.
- Worked as an active member.

Dynamic Footprint-based User Identification System 2003 - 2004

funded by Brain Korea 21 program of the Ministry of Education, Korea.
- Principal Investigator: Zeungnam Bien (KAIST)
- Conducted hardware/software design of footprint-based gate system.
- Worked as an active member.

Development of Vision System for Mediated Interface 2003 - 2004

funded by the Ministry of Commerce, Industry and Energy, Korea. (Intelligent Robotics Development Program, 21st Century Frontier R&D Programs)
- Principal Investigator: Zeungnam Bien (KAIST)
- Developed facial expression recognition module and PC/PDA-based interface.
- Worked as an active member.

JOURNAL
PUBLICATIONS

(*corresponding author)

Lee, S.W., Yi, T., Han, J.-S., Jung, J.-W., Kim, J.-O., and Bien, Z.
Design of a Gait Phase Recognition System that can cope with EMG Sensing Location Variation.
IEEE Transactions on Automation Science and Engineering (in press).

Lee, S.W.*, O'Doherty, J.P., and Shimojo, S.
Neural computations mediating one-shot learning in the human brain.
PLOS Biology 13(4): e1002137 (2015).
(synopsis "How one-shot learning unfolds in the brain" by Weaver, J.)

O'Doherty, J.P., **Lee, S.W.**, McNamee, D.
The structure of reinforcement-learning mechanisms in the human brain.
Current Opinion in Behavioral Sciences 1, 94-100 (2015).

Lee, S.W.*, Shimojo, S., and O'Doherty, J.P.
Neural computations underlying arbitration between model-based and model-free learning.
Neuron 81, 687-699 (2014).
(front cover; preview "Decisions about decisions" by Yoshida, W. and Seymour, B.)

Lee, S.W.*, Prenzel, O., and Bien, Z.
Applying Human Learning Principles to User-Centered IoT Systems.
IEEE Computer 46, 46-52 (2013).
(cover feature)

Han, J.-S., **Lee, S.W.***, and Bien, Z.
Feature Subset Selection Using Separability Index Matrix.
Information Sciences 223, 102-118 (2013).

Isik, L., Leibo, J.Z., Mutch, J., **Lee, S.W.**, and Poggio, T.
A hierarchical model of peripheral vision.
MIT CSAIL Technical Report, MIT-CSAIL-TR-2011-031 (2011).

Jeon, M., **Lee, S.W.**, and Bien, Z.
Hand Gesture Recognition using Multivariate Fuzzy Decision Tree and User Adaptation.
International Journal of Fuzzy System Applications 1, 15-31 (2011).

Bien, Z. and **Lee, S.W.***
Learning Structure of Human Behavior Patterns in a Smart Home System.
Advances in Intelligent and Soft Computing 82, 1-15 (2010).

Lee, S.W., Kim, Y.S., and Bien, Z.
A Non-Supervised Learning Framework of Human Behavior Patterns Based on Sequential Actions.
IEEE Transactions on Knowledge and Data Engineering 22, 479-492 (2010).

Lee, S.W. and Bien, Z.
Representation of a Fisher Criterion Function in a Kernel Feature Space.
IEEE Transactions on Neural Networks 21, 333-339 (2010).

Lee, S.W., Kim, Y.S., Park, K.-H., and Bien, Z.
Iterative Bayesian Fuzzy Clustering toward Flexible Icon-based Assistive Software for the Disabled.
Information Sciences 180, 325-340 (2010).

Grigorescu, S.M., **Lee, S.W.**, and Ristic-Durrant, D.
Robust Object Recognition in Service Robotics.
Proceedings of 30th Colloquium of Automation (2009).

Song, J.-H., Jung, J.-W., **Lee, S.W.**, and Bien, Z.
Robust EMG Pattern Recognition to Muscular Fatigue Effect for Powered Wheelchair Control.
Journal of Intelligent & Fuzzy Systems 20, 3-12 (2009).

Prenzel, O., **Lee, S.W.**, Bien, Z., and Graeser, A.
A Study on the Application of the Software Framework MASSiVE in KAIST's Intelligent Sweet Home System.
International Journal of Assistive Robotics and Mechnronics 9 (2008).

Bien, Z., Han, J.-S., and **Lee, S.W.**
Feature Subset Selection of Biosignals for Rehabilitation System.
Proceedings of 28th Colloquium of Automation (2007).

Kim, Y.S., **Lee, S.W.**, Kang, S., Baek, Y.S., Hwang, S. and Bien, Z.
Supervised IAFC Neural Network Based on the Fuzzification of Learning Vector Quantization.
Lecture Notes in Computer Science 4253, 248-254 (2006).

Lee, S.W., Kim, D.-J., Kim, Y.S., and Bien, Z.
Training of Feature Extractor via New Cluster Validity - Application to Adaptive Facial Expression Recognition.
Lecture Notes in Computer Science 3864, 542-547 (2005).

Papers written in Korean

Jeon, M., Do, J.-H., **Lee, S.W.**, Park, K.-H., and Bien, Z.
A Personalized Hand Gesture Recognition System using Soft Computing Techniques.
Journal of Korea Institute of Intelligent Systems 18, 53-59 (2008).

Kim, S., Jeon, M., **Lee, S.W.**, Park, K.-H., and Bien, Z.
Development of Assistive Software for Disabled and Aged People Based on User Characteristics - Unified User Interface for Special Work Chair.
Journal of the Institute of Electronics Engineers of Korea 44 (2007).

Lee, S.W., Kim, D.-J., Kim, Y.S., and Bien, Z.
Gabor Wavelet Neural Network-Based Facial Expression Recognition System.
Journal of Fuzzy Logic and Intelligent System 16, 1-7 (2006).

Kwon, Y.-J., Kim, D.-J., **Lee, S.W.**, and Bien, Z.
Development of Half-Mirror Interface System and Its Application for Ubiquitous Environment.
Journal of Control, Automation and System Engineering 11, 1-7 (2005).

MANUSCRIPTS UNDER REVIEW/ IN PREPARATION

Lee, S.W., Leibo, J.Z., Isik, L., and Poggio, T.
Maximizing the Degree of Metamerism in a Hierarchical Model of Peripheral Vision.
(*under review*)

Lee, S.W. and Fiorillo, C.D.
Hebbian Plasticity of Calcium Channels as a Means of Learning to Generate Patterns through Predicting and Amplifying Synaptic Inputs.
(*in preparation*)

Lee, S.W.
CovGram Map: Space-time portrait of brain dynamics.
(*in preparation*)

BOOK CHAPTERS

Lee, S.W.* and Bien, Z.
Learning systems with fuzzy. in *Studies in Fuzziness and Soft Computing: Fifty Years of Fuzzy Logic and Its Applications*, Vol. 326, E. Tamir et al. (Eds), Springer (2015).

Lee, S.W.* and Bien, Z.
Part 2. Dedicated Smart Houses: Models and Examples around the world.
in *Smart Houses: Advanced Technology for Living Independently - Series of Studies in Computational Intelligence*, Springer (2009).

Lee, S.W. and Kim, Y.S.

Insensitive Initialization of LVQ based on IAFC Neural Network. *Spring Conference on Intelligent Systems (Korean Institute of Intelligent Systems)*, Incheon, Korea, April 2016. (Outstanding paper award)

Lee, S.W.

Space-Time Portraits of Brain Dynamics. *The 4th IEEE International Winter Conference on Brain-Computer Interface*, Yongpyong, Korea, February 2016.

Lee, S.W. and O'Doherty, J.P.

The effect of state-space complexity on arbitration between model-based and model-free control. *Computational and Systems Neuroscience (COSYNE 2015)*, Salt Lake City, USA, March 2015.

Lee, S.W. and O'Doherty, J.P.

The effect of state-space complexity on arbitration between model-based and model-free control. *Computational and Systems Neuroscience (COSYNE 2015)*, Salt Lake City, USA, March 2015.

Lee, S.W., O'Doherty, J.P., and Shimojo, S.

Interplay between learning-rate control and uncertainty minimization during one-shot causal learning. *Computational and Systems Neuroscience (COSYNE 2014)*, Salt Lake City, USA, February 2014.

Lee, S.W., O'Doherty, J.P., and Shimojo, S.

Neural computations mediating one-shot learning in the human brain. *43th annual meeting of the Society for Neuroscience (SfN 2013)*, San Diego, USA, November 2013.

Lee, S.W., O'Doherty, J.P., and Shimojo, S.

Neural computations mediating one-shot learning in the human brain. *20th Joint Symposium on Neural Computation*, Pasadena, USA, June 2013.

Lee, S.W., Shimojo, S., and O'Doherty, J.P.

Neural computations underlying arbitration between model-based and model-free learning. *20th Joint Symposium on Neural Computation*, Pasadena, USA, June 2013.

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