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Curriculum Vitæ

Current Position

Associate Professor, Information & Communication Sciences, Sophia University (Japan)

Education

Ph.D. Physical Electronics, Tokyo Institute of Technology
2001-2004 *Study of Smell Reproduction using Chemical Sensing System*
Advisor: Dr. Takamichi Nakamoto

M.Eng. Electrical and Electronic Engineering, Tokyo Institute of Technology
1996-1998 *Development of Odor-Tracking System by Visualizing Instantaneous Gas Distribution*
Advisors: Dr. Takamichi Nakamoto, Dr. Toyosaka Moriizumi

B.Eng. Electrical and Electronic Engineering, Tokyo Institute of Technology
1992-1996

Work Experience

2008-present Associate Professor, Information & Communication Sciences, Sophia University

2006-2008 Assistant Professor, Electrical & Electronics Engineering, Sophia University

2004-2006 Postdoctoral Fellow, Computer Science, Texas A&M University
(Fellowship from Japan Society for the Promotion of Science)
Machine Olfaction Based on Quartz Crystal Microbalance Sensor Arrays and Neuromorphic Signal Processing
Advisor: Dr. Ricardo Gutierrez-Osuna

2002-2004 Research Fellow, Physical Electronics, Tokyo Institute of Technology
(Predoctoral Fellowship from Japan Society for the Promotion of Science)

1998-2000 Canon Inc., Tokyo, Japan
Development of analog circuits and signal processing algorithms for film scanners

Teaching Experience

2008-present *Undergraduate Courses*
Introduction to Computer Science, Sensory Information Processing, Multivariate Analysis, Information Science Laboratory, Undergraduate Seminar, Computer Literacy, Neural Networks (2018-)
Graduate Courses
Sensing Systems Engineering, Introduction to Machine Learning (2023-)

2006-2009 *Undergraduate Courses*
Electromagnetism, Scientific English
Graduate Courses
Sensing Engineering, Statistical Pattern Classification

2001 Teaching Assistant, Course of Experiments in Electrical and Electronic Engineering

1996 Teaching Assistant, Introduction to Electrical Engineering

Honors and Awards

2017 Best Student Paper Award
T. Oyama and T. Yamanaka, *Fully Convolutional DenseNet for Saliency-Map Prediction*, ACPR2017.

2007	Research Grant for Young Scientist, The Science and Technology Foundation of Japan.
2006	JSPS Postdoctoral Fellowship for Young Scientists (declined, acceptance rate: 7.39%)
2004-2006	JSPS Postdoctoral Fellowship for Research Abroad (acceptance rate: 15.57%)
2002-2004	JSPS Predoctoral Fellowship (acceptance rate: 10.10%)
2002	Presentation Award from IEEJ (Institute of Electrical Engineers of Japan)

Research Grants

2021-2024	Takao Yamanaka, “omni-directional image generation from snapshot image,” Japan Society for the Promotion of Science Grants-in-Aid for Scientific Research Grant-in-Aid for Scientific Research (C).
2008-2009	T. Yamanaka, "Odor-sensor signal processing based on olfactory neurodynamics model," Japan Society for the Promotion of Science, Grant-in-Aid for Young Scientists, #20700166, $33,000.
2007	T. Yamanaka, "Olfactory interface," The Science and Technology Foundation of Japan, $10,000.
2007-2011	M. Tanaka et al., "Human information science research project," Sophia University Open Research Center.
2006-2007	T. Yamanaka, "Hardware implementation of neural computation model in biological olfaction and its application to odor sensors," Japan Society for the Promotion of Science, Grant-in-Aid for Young Scientists, #18800048, $30,000.
2002-2003	T. Nakamoto, H. Ishida, T. Yamanaka, J. Ide, "Research on Odor Recorder," Japan Society for the Promotion of Science, Grant-in-Aid for Scientific Research B, .#14350181, $163,000.
2002-2003	T. Yamanaka, "Odor Recorder (Electronic Odor Reproduction System)," Japan Society for the Promotion of Science, Grant-in-Aid for JSPS Fellows, $20,000.

Research Interests

Sensory Information Processing, Computer Vision, Pattern Recognition

Publications

Journal Articles (refereed)

1. Takao Yamanaka, Tatsuya Suzuki, Taiki Nobutsune, and Chenjunlin Wu, Multi-Scale Estimation for Omni-Directional Saliency Maps Using Learnable Equator Bias, IEICE Transactions on Information and Systems, Vol. E106-D, No. 10, 2023.
2. T. Oyama and T. Yamanaka, "Influence of Image Classification Accuracy on Saliency Map Estimation," CAAI Transactions on Intelligence Technology, vol. 3, issue 3, 2018, pp. 140-152.
3. T. Ohba and T. Yamanaka, "Suppression of background odor effect in odor sensing system using olfactory adaptation model," IEEJ Transactions on Sensors and Micromachines, vol. 128, no. 5, 2008, pp. 240-245.
4. T. Yamanaka, N. Nimsuk, and T. Nakamoto, "Concurrent recording and regeneration of visual and olfactory information using odor sensor," Presence: Teleoperators and Virtual Environments, vol. 16, issue 3, 2007, pp. 307-317.
5. B. Raman, T. Yamanaka, and R. Gutierrez-Osuna, "Contrast enhancement of gas sensor array patterns with a neurodynamics model of the olfactory bulb," Sensors and Actuators B, vol. 119, 2006, pp. 547-555.
6. A. Perera, T. Yamanaka, A. Gutierrez-Galvez, B. Raman, and R. Gutierrez-Osuna, "A dimensionality-reduction technique inspired by receptor convergence in the olfactory system", Sensors and Actuators B, vol. 116, issue 1-2, 2006, pp. 17-22.
7. B. Wyszynski, T. Yamanaka, and T. Nakamoto, "Recording and reproducing citrus flavors using odor recorder," Sensors and Actuators B, vol. 106, 2005, pp. 388-393.
8. T. Nakamoto, H. Takigawa, and T. Yamanaka, "Fundamental study of odor recorder using inkjet devices for low-volatile scents," IEICE Transactions on Electronics, vol. E87-C, no. 12, 2004, pp. 2081-2086.

9. T. Yamanaka, K. Yoshikawa, and T. Nakamoto, "Improvement of odor-recorder capability for recording dynamical change in odor," Sensors and Actuators B, vol. 99, issue 2-3, 2004, pp. 367-372.
10. T. Yamanaka, R. Matsumoto, and T. Nakamoto, "Fundamental study of odor recorder for multi-component odor using recipe exploration method based on singular value decomposition," IEEE Sensors Journal, vol. 3, issue 4, 2003, pp. 468-474.
11. T. Yamanaka and T. Nakamoto, "Real-time reference method in odor recorder under environmental change," Sensors and Actuators B, vol. 93, 2003, pp. 51-56.
12. T. Yamanaka, R. Matsumoto, and T. Nakamoto, "Odor recorder for multi-component odor using two-level quantization method," Sensors and Actuators B, vol. 89, 2003, pp. 120-125.
13. T. Yamanaka, R. Matsumoto, and T. Nakamoto, "Study of recording apple flavor using odor recorder with five components," Sensors and Actuators B, vol. 89, 2003, pp. 112-119.
14. T. Yamanaka, R. Matsumoto, and T. Nakamoto, "Study of odor blender using solenoid valves controlled by delta-sigma modulation method for odor recorder," Sensors and Actuators B, vol. 87, 2002, pp. 457-463.
15. T. Yamanaka and T. Nakamoto, "Improvement of odor-recorder robustness against environmental change using real-time reference method," IEEJ Transactions on Sensors and Micromachines, vol.122-E, no.6, 2002, pp. 312-317. (in Japanese)
16. H. Ishida, T. Yamanaka, N. Kushida, T. Nakamoto, and T. Moriizumi, "Study of real-time visualization of gas/odor flow image using gas sensor array," Sensors and Actuators B, vol. 65, issue 1-3, 2000, pp. 14-16.
17. H. Ishida, N. Kushida, T. Yamanaka, T. Nakamoto, and T. Moriizumi, "Study of gas/odor flow visualization system using array of pulse drive semiconductor gas sensors," IEEJ Transactions on Sensors and Micromachines, vol. 119-E, no. 4, 1999, pp. 194-200. (in Japanese)
18. T. Yamanaka, H. Ishida, T. Nakamoto and T. Moriizumi, "Analysis of gas sensor transient response by visualizing instantaneous gas concentration using smoke," Sensors and Actuators A, vol. 69, issue 1, 1998, pp. 77-81.

Review Papers/Books/Book Chapters (refereed)

1. T. Yamanaka and Y. Munakata, Bio-inspired background suppression technique and its implementation into digital circuit, Book Chapter in T. Nakamoto (ed). "Human Olfactory Displays and Interfaces: Odor Sensing and Presentation, " IGI Global, 2012.
2. T. Nakamoto and T. Yamanaka, "Odor reproduction with movie and its application to teleolfaction," Book Chapter in E. Hines and M. Leeson (eds.) "Intelligent Systems for Machine Olfaction: Tools and Methodologies," IGI Global, 2010.

Review Papers/Books/Book Chapters (unrefereed)

1. T. Nakamoto and T. Yamanaka, Electrical and Electronic Measurement, Baifukan Co. Ltd., 2009. (in Japanese)
2. T. Nakamoto and T. Yamanaka, "Odor recorder using odor sensing system," Journal of the society of instrument and control engineers, vol. 42, no. 8, 2003, pp. 679-684. (in Japanese)
3. T. Nakamoto and T. Yamanaka, "Odor recorder using odor sensing system," Aroma Research, no.13, 2003, pp. 22-25. (in Japanese)

Conference Papers

1. Hinata Aoki and Takao Yamanaka, Improving NeRF with Height Data for Utilization of GIS Data, International Conference on Image Processing (ICIP), 2023, Kuala Lumpur, Malaysia.
2. Kensuke Mukai and Takao Yamanaka, Improving Translation Invariance in Convolutional Neural Networks with Peripheral Prediction Padding, International Conference on Image Processing (ICIP), 2023, Kuala Lumpur, Malaysia.
3. Keisuke Okubo and Takao Yamanaka, Omni-Directional Image Representation in GAN-based Image Generator, IEICE Technical Report, Pattern Recognition and Media Understanding (PRMU), Oct. 2021 (Online).
4. Keisuke Okubo and Takao Yamanaka, “Omni-Directional Image Generation from Single Snapshot Image,” IEEE International Conference on Systems, Man, and Cybernetics (SMC2020), 2020, Tronto, Canada (Virtual Conference).
5. Reo Ogusu and Takao Yamanaka, LPM: Learnable Pooling Module for Efficient Full-Face Gaze Estimation, The 14th IEEE International Conference on Automatic Face and Gesture Recognition (FG2019) , 2019, Lille, France.
6. T. Suzuki and T. Yamanaka, "Saliency Map Estimation for Omni-Directional Image Considering Prior Distributions," IEEE International Conference on Systems, Man, and Cybernetics (SMC2018), 2018, Miyazaki, Japan.
7. T. Oyama and T. Yamanaka, Fully Convolutional DenseNet for Saliency-Map Prediction, The 4th Asian Conference on Pattern Recognition, November 26-29, 2017, Nanjing, China. (**Best Student Paper Award**)
8. Y. Munakata and T. Yamanaka, "Implementation of olfactory-adaptation neural network in FPGA," 27th Sensor Symposium on Sensors, Micromachines and Applied Systems, Shimane, Japan, October 14-15, 2010, LN-8.
9. T. Yamanaka, Y. Munakata, and T. Ohba, "Digital-circuit implementation of olfactory-adaptation neural network for gas sensing," 13th International Meeting on Chemical Sensors, July 11-14, 2010, Perth, Australia.

10. T. Ohba and T. Yamanaka, "Odor sensing system with model of olfactory adaptation," 24th Sensor Symposium on Sensors, Micromachines and Applied Systems, Tokyo, Japan, October 16-17, 2007, C3-5.
11. T. Yamanaka and R. Gutierrez-Osuna, "Estimating the number of modules in rat olfactory bulb by prediction of odorant descriptors," 28th Annual Meeting of the Association for Chemoreception Sciences, April 26-30, 2006, Florida, USA.
12. A. Perera, T. Yamanaka, A. Gutierrez-Galvez, B. Raman, and R. Gutierrez-Osuna, "A dimensionality-reduction technique inspired by receptor convergence in the olfactory system," 11th International Symposium on Olfaction and the Electronic Nose (ISOEN 05), Barcelona, Spain, Apr. 13-15, 2005.
13. T. Nakamoto, H. Takigawa, and T. Yamanaka, "Fundamental study of odor recorder using inkjet devices for low-volatile scents," 3rd International Symposium on Organic Molecular Electronics, Kyoto, Japan, May 18-19, 2004, BS9.
14. T. Yamanaka, K. Yoshikawa, and T. Nakamoto, "Improvement of odor-recorder capability for dynamical change of odor," IEEE Sensors 2003, Toronto, Canada, Oct. 22-24, 2003, P2-17.
15. B. Wyszynski, T. Yamanaka, and T. Nakamoto, "Study of reproducing citrus flavors using odor recorder," The 20th Sensor Symposium, Tokyo, Jul. 23-24, 2003, pp. 181-184.
16. T. Yamanaka, K. Yoshikawa, and T. Nakamoto, "Improvement of odor-recorder capability for dynamical change of odor," The 20th Sensor Symposium, Tokyo, Jul. 23-24, 2003, B1-3, pp. 81-84.
17. T. Yamanaka, B. Wyszynski, and T. Nakamoto, "Study of odor recorder for recording recipe of orange flavor," Transducers '03, Boston, USA, Jun. 8-12, 2003, pp. 1140-1143.
18. T. Nakamoto, T. Yamanaka, and R. Matsumoto, "Recipe-exploration algorithms of odor recorder for multi-component odor," 9th International Symposium on Olfaction and Electronic Nose (ISOEN 02), Rome, Sep. 30 – Oct. 2, 2002, pp.60-61.
19. T. Yamanaka and T. Nakamoto, "Real-time reference method in odor recorder under environmental change," 9th International Meeting on Chemical Sensors (IMCS9), Boston, USA, Jul. 7-10, 2002, CS 240 OR.
20. T. Yamanaka, R. Matsumoto, and T. Nakamoto, "Odor recorder for multi-component odor using two-level quantization method," The 19th Sensor Symposium, Kyoto, May 2002, Po-25, pp.283-286.
21. T. Yamanaka, R. Matsumoto, T. Nakamoto, and T. Moriizumi, "Odor recorder for multi-component odor using active sensing system," 5th East Asian Conference on Chemical Sensors (EACCS'01), Nagasaki, Japan, Dec. 4-7, 2001, 2A11.
22. T. Nakamoto, T. Yamanaka, and R. Matsumoto, "Olfactory display using solenoid valves controlled by delta-sigma modulation," International Conference on Multisensor Fusion and Integration for Intelligent Systems (MFI2001), Baden-Baden, Germany, Aug. 20-22, 2001, pp.13-18.
23. T. Yamanaka, R. Matsumoto, and T. Nakamoto, "Odor recorder based on active odor sensing system using delta-sigma modulation method," The 18th Sensor Symposium, Kanagawa, May 2001, C4-4, pp.423-426.
24. H. Ishida, T. Yamanaka, N. Kushida, T. Nakamoto and T. Moriizumi, "Study of real-time visualization of gas/odor flow image using gas sensor array," 7th International Meeting on Chemical Sensors (IMCS7), China, 1998, pp. 196-198.
25. T. Yamanaka, H. Ishida, T. Nakamoto and T. Moriizumi, "Analysis of gas sensor transient response by visualizing instantaneous gas concentration," Computational Methods and Simulation in Engineering (CMSE97), Bandung, Indonesia, Oct. 1997, VII.B.4-1.
26. T. Yamanaka, H. Ishida, T. Nakamoto, and T. Moriizumi, "Analysis of gas sensor transient response by visualizing instantaneous gas concentration using smoke," The 15th Sensor Symposium, Kanagawa, Jun. 1997, B3-2, pp.213-216.
27. T. Nakamoto, T. Yamanaka, H. Ishida and T. Moriizumi, "Speed up of odor-source localization system using Kalman-filter sensor signal processing method," Meeting Abstracts of Electrochemical Society, USA, 1996, p.951.

Technical Reports

1. T. Yamanaka and R. Gutierrez-Osuna, "Extracting functional clusters of glomeruli in rat olfactory bulb by non-negative matrix factorization," Department of Computer Science, Texas A&M University, Technical Report tamu-cs-tr-2008-11-2.
2. T. Yamanaka, A. Perera, B. Raman, A Gutierrez-Galvez and R. Gutierrez-Osuna, "Learning sparse basis vectors in small-sample datasets through regularized non-negative matrix factorization," Department of Computer Science, Texas A&M University, Technical Report tamu-cs-tr-2008-9-1.

Seminar Presentations

1. Image recognition using deep learning and its applications, Sophia Technology Seminar, Tokyo, March 4, 2019.
2. Pattern recognition for olfactory analysis and odor sensing systems, Institute of Electrical Engineers of Japan, Tokyo, Dec. 20, 2010.
3. Odor sensor signal processing based on olfactory neural network, Sophia University Neuroscience Seminar, Tokyo,

May 28, 2009.

4. Extraction of modules in olfactory bulb and its correlation with olfactory perception, Physical Electronics, Tokyo Institute of Technology, Tokyo, Japan, Jul. 29, 2005.
5. Signal processing towards neuromorphic machine olfaction, Computer Science, Texas A&M University, College Station, USA, Apr. 22, 2005.
6. Signal processing towards neuromorphic machine olfaction, Chemistry, Texas A&M University, College Station, USA, Feb. 10, 2005.
7. Signal processing towards neuromorphic machine olfaction, Mechanical Systems Engineering, Tokyo University of Agriculture and Technology, Tokyo, Japan, Dec. 24, 2004.
8. Signal processing towards neuromorphic machine olfaction, Physical Electronics, Tokyo Institute of Technology, Tokyo, Japan, Dec. 21, 2004.
9. Odor recorder: odor reproduction system using odor sensing system, Computer Science, Texas A&M University, College Station, USA, Jun 13, 2003.

Professional Memberships and Activities

Memberships

IEEJ (Institute of Electrical Engineers of Japan)
IEICE (The Institute of Electronics, Information and Communication Engineerings)

Reviewer for Scientific Journals

IEEE Transactions on Image Processing
IEEE Sensors Journal
IEEE Engineering in Medicine and Biology Magazine
Analytical Chemistry
IEEJ Transactions on Electronics, Information and Systems
IEEJ Transactions on Sensors and Micromachines