MASANORI SUGANUMA

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Homepage

Education

Yokohama National University	Kanagawa, Japan
Ph.D. in Engineering, Graduate School of Environment and Information Sciences	September 2017
M.E. in Engineering, Graduate School of Environment and Information Sciences	March 2015
B.E. in Engineering, Faculty of Engineering (dropout for grade-skipping)	March 2013

Employment

Sakana AI	Tokyo, Japan
Research Scientist	Aug. 2024 –
Tohoku University, Graduate School of Information Sciences	Miyagi, Japan
Assistant Professor	Oct. 2018 –Jan. 2025
RIKEN, Center for Advanced Intelligence Project	Tokyo, Japan
Visiting Researcher	Nov. 2021 – Jan. 2025
RIKEN, Center for Advanced Intelligence Project	Tokyo, Japan
Postdoctoral Fellow (Cross appointment with Tohoku University)	Oct. 2017 – Sep. 2021
Japan Society for the Promotion of Science	
Research Fellow (DC1)	Apr. 2015 – Sep. 2017

Honors and Awards

Outstanding Reviewer Award, Meeting on Image Recognition and Understanding, 2022

Outstanding Award, The institute of electrical engineers of Japan, 2018

Best Paper Award, Genetic and Evolutionary Computation Conference (GECCO), 2017

Excellent Poster Award, STARC Forum, 2015

Student Award, Yokohama National University (M.E.), 2015

Student Award, The national convention of Information Processing Society of Japan, 2013

Professional Activities

Reviewer

  Journal

    International Journal of Computer Vision

IEEE Transactions on Pattern Analysis and Machine Intelligence

IEEE Transactions on Image Processing

Computer Vision and Image Understanding

Neural Networks

Conference

IEEE International Conference on Computer Vision

IEEE Computer Vision and Pattern Recognition

European Conference on Computer Vision

International Conference on Machine Learning

Neural Information Processing Systems

International Conference on Learning Representations

Asian Conference on Computer Vision

Keynote Talks and Invited Talks

- "Vision and language models meet visual abductive reasoning for predicting driving hazards", HeKKSaGOn AI Symposium, Sep. 20, 2023
- "The fusion of evolutionary computation and deep learning", IEEE SMC Hiroshima Chapter, July 20, 2019
- "The basics and applications of deep learning", Annual meeting of the Ecological Society of Japan, March 18, 2018

Research Activities and Interests

Vision-Language Model, AutoML (Neural Architecture Search), Evolutionary Computation, Image Restoration, Model Merging

Publications

Book

1. Masanori Suganuma, "Fundamentals of Image Recognition by Deep Learning", Ohmsha, April 2024

Book Chapter

1. Masanori Suganuma, "AutoML", The Frontiers of Computer Vision Autumn 2023, Kyoritsu Shuppan, 2023
2. Masanori Suganuma, "Image captioning", The Frontiers of Computer Vision Summer 2023, Kyoritsu Shuppan, 2023
3. Masanori Suganuma, Shinichi Shirakawa, and Tomoharu Nagao, "Designing Convolutional Neural Network Architectures Using Cartesian Genetic Programming",

In H. Iba and N. Noman (eds), Deep Neural Evolution –Deep Learning with Evolutionary Computation, chapter 7, pp. 185-208, Springer, 2020

Journal

1. Korawat Charoenpitaks, Van-Quang Nguyen, Masanori Suganuma, Masahiro Takahashi, Ryoma Niihara, Takayuki Okatani, "Exploring the Potential of Multi-Modal AI for Driving Hazard Prediction", IEEE Transactions on Intelligent Vehicles, 2024

2. Shuang Liu, Masanori Suganuma, and Takayuki Okatani, "Symmetry-aware Neural Architecture for Embodied Visual Navigation", International Journal of Computer Vision (IJCV), 2023

3. Zhijie Wang, Xing Liu, Masanori Suganuma, and Takayuki Okatani, "Unsupervised domain adaptation for semantic segmentation via cross-region alignment", Computer Vision and Image Understanding (CVIU), 2023

4. Hiroki Kurita, Masanori Suganuma, Yinli Wang, and Fumio Narita, "k-Means Clustering for Prediction of Tensile Properties in Carbon Fiber-Reinforced Polymer Composites", Advanced Engineering Materials 24 (5), 2022

5. Masanori Suganuma, Masayuki Kobayashi, Shinichi Shirakawa, and Tomoharu Nagao, "Evolution of Deep Convolutional Neural Networks Using Cartesian Genetic Programming", Evolutionary Computation 28(1):141-163, MIT Press, 2020

6. Masayuki Kobayashi, Masanori Suganuma, and Tomoharu Nagao, "A Generative Model Approach for Visualizing", International Journal of Computational Intelligence Studies, 2018

7. Takahito Hata, Masanori Suganuma, and Tomoharu Nagao, "Controlling an Autonomous Agent for Exploring Unknown Environments using Switching Prelearned Modules", Electronics and Communications in Japan, 2018

8. Masayuki Kobayashi, Masanori Suganuma, Miho Sakitsu, and Tomoharu Nagao, "Visualization of Image classification in Evolutionary Decision Networks", The Japanese Society for Evolutionary Computation, Vol.7, No.3, pp.65-76, 2016

9. Masanori Suganuma, Daiki Tsuchiya, Shinichi Shirakawa, and Tomoharu Nagao, "Image Classification Based on Hierarchical Feature Construction Using Genetic Programming", Transactions of on Mathematical Modeling and its Applications, Vol.9, No.3, pp.44-53, The Information Processing Society of Japan, 2016

10. Masato Kudo, Masanori Suganuma, and Tomoharu Nagao, "Evolutionary Neural Network with Improving Fault Tolerance by Redundancy", Transactions of on Mathematical Modeling and its Applications, Vol.9, No.3, pp.54-60, The Information Processing Society of Japan, 2016

11. Masanori Suganuma and Tomoharu Nagao, "A Self-Organizing Model for Anomaly Detection and Its Application to Video Surveillance", Transactions of on Mathematical Modeling and its Applications, Vol.9, No.1, pp.23-32, The Information Processing Society of Japan, 2016

12. Miho Sakitsu, Masanori Suganuma, Daiki Tsuchiya, and Tomoharu Nagao, "Automatic Generation of Sentences Explaining Image Classification Processes Constructed by Decision Tree and Decision Network", Transactions of on Mathematical Modeling and its Applications, Vol.9, No.1, pp.43-52, The Information Processing Society of Japan, 2016

13. Masanori Suganuma, Tomoharu Nagao, Manabu Tamura, Yoshihiro Muragaki, and Hiroshi Iseki, "Automatic Detection of Electrical Stimulation Positions in Videos of Cortical Mapping in Awake Surgery", Medical Imaging Technology, Vol.32, No.4, pp.272-281, 2014

Refereed Conference

1. Lu Xiangyong, Masanori Suganuma, Takayuki Okatani: SBCFormer: Lightweight Network Capable of Full-size ImageNet Classification at 1 FPS on Single Board Computers, IEEE Winter Conference on Applications of Computer Vision (**WACV**), 2024

2. Zhang Jie, Masanori Suganuma, Takayuki Okatani: Contextual Affinity Distillation for Image Anomaly Detection, IEEE Winter Conference on Applications of Computer Vision (**WACV**), 2024

3. Qian Ye, Masanori Suganuma, and Takayuki Okatani: Accurate Single-Image Defocus Deblurring Based on Improved Integration with Defocus Map Estimation, IEEE Conference on Image Processing (**ICIP**), 2023

4. Kang-Jun Liu, Masanori Suganuma, Takayuki Okatani: Bridging the Gap from Asymmetry Tricks to Decorrelation Principles in Non-contrastive Self-supervised Learning, Neural Information Processing Systems (**NeurIPS**), 2022

5. Van-Quang Nguyen, Masanori Suganuma, Takayuki Okatani: GRIT: Faster and Better Image-captioning Transformer Using Dual Visual Features, European Conference on Computer Vision (**ECCV**), 2022

6. Wenzheng Song, Masanori Suganuma, Xing Liu, Noriyuki Shimobayashi, Daisuke Maruta, Takayuki Okatani: Matching in the Dark: A Dataset for Matching Image Pairs of Low-light Scenes, International Conference on Computer Vision (**ICCV**), 2021

7. Van-Quang Nguyen, Masanori Suganuma, Takayuki Okatani: Look Wide and Interpret Twice: Improving Performance on Interactive Instruction-following Tasks, International Joint Conference on Artificial Intelligence (**IJCAI**), 2021

8. Engkarat Techapanurak, Masanori Suganuma, Takayuki Okatani: Hyperparameter-Free Out-of-Distribution Detection Using Cosine Similarity, Asian Conference on Computer Vision (**ACCV**), 2020

9. Van-Quang Nguyen, Masanori Suganuma, Takayuki Okatani: Efficient Attention Mechanism for Visual Dialog that can Handle All the Interactions between Multiple Inputs, European Conference on Computer Vision (**ECCV**), 2020

10. Yoshihiro Hirohashi, Kenichi Narioka, Masanori Suganuma, Xing Liu, Yukimasa Tamatsu, Takayuki Okatani: Removal of Image Obstacles for Vehicle-mounted Surrounding Monitoring Cameras by Real-time Video Inpainting, IEEE Conference on Computer Vision and Pattern Recognition Workshop (**CVPRW**), 2020

11. Yusuke Hosoya, Masanori Suganuma, Takayuki Okatani: Analysis and a Solution of Momentarily Missed Detection for Anchor-based Object Detectors, IEEE Winter Conference on Applications of Computer Vision (**WACV**), 2020

12. Masanori Suganuma, Xing Liu, Takayuki Okatani: Attention-based Adaptive Selection of Operations for Image Restoration in the Presence of Unknown Combined Distortions, IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2019

13. Xing Liu, Masanori Suganuma, Zhun Sun, Takayuki Okatani: Dual Residual Networks Leveraging the Potential of Paired Operations for Image Restoration, IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2019

14. Takayuki Okatani, Xing Liu, Masanori Suganuma: Improving Generalization Ability of Deep Neural Networks for Visual Recognition Tasks, International Workshop on Computational Color Imaging (**CCIW**), 2019

15. Masanori Suganuma, Mete Ozay, Takayuki Okatani: Exploiting the Potential of Standard Convolutional Autoencoders for Image Restoration by Evolutionary Search, The 35th International Conference on Machine Learning (**ICML**), 2018

16. Masanori Suganuma, Shinichi Shirakawa, Tomoharu Nagao: A genetic programming approach to designing convolutional neural network architectures, The Sister Conference Best Paper Track at the 27th International Joint Conference on Artificial Intelligence (**IJCAI**), 2018

17. Kobayashi Masayuki, Masanori Suganuma, Tomoharu Nagao: Generative Adversarial Network for Visualizing Convolutional Network, IEEE 10th International Workshop on Computational Intelligence and Applications (**IWCIA**), 2017

18. Chiaki Hirayama, Toshiya Watanabe, Shinji Kawabata, Masanori Suganuma, Tomoharu Nagao: Acquiring grasp strategies for a multifingered robot hand using evolutionary algorithms, the 2017 IEEE International Conference on Systems, Man,

and Cybernetics (**SMC**), 2017

19. Masanori Suganuma, Shinichi Shirakawa, Tomoharu Nagao: A genetic programming approach to designing convolutional neural network architectures, The Genetic and Evolutionary Computation Conference (**GECCO**), 2017

20. Masanori Suganuma, Daiki Tsuchiya, Shinichi Shirakawa, Tomoharu Nagao: Hierarchical feature construction for image classification using genetic programming, IEEE International Conference on Systems, Man, and Cybernetics (**SMC**), pp.1423-1428, 2016.

21. Masanori Suganuma, Toshihiko Nishimura, Tomoharu Nagao, Hiroshi Iseki, Yoshihiro Muragaki, Manabu Tamura, Shinji Minami: Automatic detection of electrical stimulation timing in operation videos of cortical mapping in awake brain surgery, International Conference on Medical Image Computation and Computer Assisted Intervention (**MICCAI**) Workshop on Modeling and Monitoring of Computer Assisted Interventions, pp.37-46, 2013

22. Toshihiko Nishimura, Masanori Suganuma, Tomoharu Nagao, Hiroshi Iseki, Yoshihiro Muragaki, Manabu Tamura, Shinji Minami: Intraoperative voice classification for analysis of cortical mapping during awake surgery, International Conference on Medical Image Computation and Computer Assisted Intervention (**MICCAI**) Workshop on Modeling and Monitoring of Computer Assisted Interventions, pp.27-36, Nagoya, 2013

23. Masanori Suganuma, Tomoharu Nagao: Detection of electrical stimulation position in recorded surgery videos of cortical mapping in awake brain surgery, IEEE 6th International Workshop on Computational Intelligence and Applications (**IWCIA**), pp.131-136, 2013