

# KENJIRO SUGIMOTO, Ph.D.

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**Position** Assistant Professor  
**Affiliation** Waseda University, Japan  
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## Education

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2009–2015 **Ph.D. of Engineering**,  
Waseda University, Graduate School of Information, Production and Systems, Japan.  
2007–2009 **Master of Engineering**,  
Waseda University, Graduate School of Information, Production and Systems, Japan.  
2005–2007 **Bachelor of Engineering** (with honors),  
Kurume National College of Technology, Advanced Engineering School, Japan.

## Career

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Apr. 2018 **Assistant Professor** with Waseda University, Japan.  
– Current I started to run courses related to machine learning: *linear algebra, convex analysis, probability and statistics, programming basics, and technical presentation*. These courses are lectured in English mainly for international students.

Apr. 2017 **Junior Researcher** with Waseda University, Japan.  
– Mar. 2018 In addition to the research topics shown below, I committed to researching and developing medicine package recognition systems with Cube Imaging Inc, a start-up company for helping pharmacists to prevent dispensing error using imaging technology.

Oct. 2015 **Research Associate** with Waseda University, Japan.  
– Mar. 2017 I concentrated on accelerating modern image filtering algorithms for real-time computer vision applications from both viewpoints of theory and practice.

Aug. 2015 **Visiting Research Scientist** with Durham University, UK.  
– Sep. 2015 **Adjunct Researcher** with Waseda University, Japan.  
This research theme was to design efficient real-time stereo vision algorithms using image filtering techniques.

Oct. 2014 **Research Associate** with Waseda University, Japan.  
– Jul. 2015 This research theme was a stereo vision task for autonomous vehicles with multiple cameras for intelligent transportation system.

Apr. 2010 **Research Fellow** of Japan Society for the Promotion of Science, Japan.  
– Mar. 2012 This research theme was faster image retrieval based on color information, which was applied to medicine package recognition system for preventing from dispensing error.

## Research

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My research interests lie on image processing and pattern recognition. Particularly, I am currently concentrating on pursuing more generalized but still practical algorithms of image filtering from a theoretical viewpoint. Image filtering still plays a fundamental role in many modern image processing applications, e.g., convolution operations in deep learning and denoising tools in vision applications.

Sharing research outcome with society is a major research motto of mine. I have developed medicine package checking systems based on image pattern recognition for supporting prescription process by collaborating with several companies. In recent years, the systems have been widely introduced into many pharmacies/drugstores in Japan, assisting pharmacists in their daily work for safe prescription process.

## Selected Publications

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### Journal papers/letters (all refereed)

- Christina Karam, **Kenjiro Sugimoto**, and Keigo Hirakawa: "Fast convolutional distance transform", *IEEE Signal Processing Letters*, vol. 26, no. 6, pp. 853–857, (June 2019).
- **Kenjiro Sugimoto**, and Sei-ichiro Kamata: "Compressive bilateral filtering", *IEEE Transactions on Image Processing*, vol. 24, no. 11, pp. 3357–3369, (November 2015).
- **Kenjiro Sugimoto**, and Sei-ichiro Kamata: "Efficient constant-time Gaussian filtering with sliding DCT/DST-5 and dual-domain error minimization", *ITE Transactions on Media Technology and Applications*, vol. 3, no. 1, pp. 12–21, (January 2015).
- **Kenjiro Sugimoto**, Koji Inoue, Yoshimitsu Kuroki, and Sei-ichiro Kamata: "A linear manifold color descriptor for medicine package recognition", *IEICE Transaction on Information and Systems*. vol. E95–D, no. 5, pp. 1264–1271, (May 2012).
- **Kenjiro Sugimoto**, Yoshimitsu Kuroki, and Sei-ichiro Kamata: "Lossless image compression based on predictor selection using local characteristics"(in Japanese), *IEICE Transaction on Information and Systems*, vol. J92–D, no. 10, pp. 1698–1701 (October 2009).

### International conference papers (all refereed)

- Tomohiro Sasaki, Norishige Fukushima, Yoshihi Maeda, **Kenjiro Sugimoto**, and Sei-ichiro Kamata: "Constant-time Gaussian filtering for acceleration of structure similarity", *Proceedings of International Conference on Image Processing and Robotics 2020 (ICIPRoB)*, (March 2020) // Best Paper Award
- **Kenjiro Sugimoto**, Norishige Fukushima, and Sei-ichiro Kamata: "200 FPS constant-time bilateral filter using SVD and tiling strategy", *Proceedings of IEEE International Conference on Image Processing (ICIP)*, pp. 190–194, (September 2019). // Top 10% Papers: 4.55%
- **Kenjiro Sugimoto**, Seisuke Kyochi and Sei-ichiro Kamata: "Universal approach for DCT-based constant-time Gaussian filter with moment preservation", *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 1498–1502, (Apr. 2018).
- **Kenjiro Sugimoto**, Toby P. Breckon, and Sei-ichiro Kamata: "Constant-time bilateral filter using spectral decomposition ", *Proceedings of IEEE International Conference on Image Processing (ICIP)*, pp. 3319–3323, (September 2016).
- Ryo Okutani, **Kenjiro Sugimoto**, and Sei-ichiro Kamata: "Efficient keypoint detection and description using via polynomial regression of scale space", *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 1357–1361, (March 2016).
- **Kenjiro Sugimoto**, and Sei-ichiro Kamata: "Fast Gaussian filter with second-order shift property of DCT-V ", *Proceedings of IEEE International Conference on Image Processing (ICIP)*, pp. 514–518, (September 2013). // Top 10% Paper Recognition: 4.5%
- **Kenjiro Sugimoto**, and Sei-ichiro Kamata: "Fast image filtering by DCT-based kernel decomposition and sequential sum update ", *Proceedings of IEEE International Conference on Image Processing (ICIP)*, pp. 125–128, (September 2012). // IEEE Fukuoka Section - Excellent Student Award 2012
- **Kenjiro Sugimoto**, and Sei-ichiro Kamata: "Color distribution matching using a weighted subspace descriptor ", *Proceedings of IEEE International Conference on Image Processing (ICIP)*, pp. 1733–1736, (September 2011).
- **Kenjiro Sugimoto**, and Sei-ichiro Kamata: "Fast color matching using weighted subspace on medicine package recognition ", *Proceedings of IAPR Machine Vision Applications (MVA)*, pp. 287–290, (June 2011).

## Activity reports

- **Kenjiro Sugimoto**, and Akinari Tsugo: "A report of Visual Information Processing Camp 2008" (in Japanese), *Journal of IEEJ*, vol. 38, no. 2, pp. 205–211 (March 2009).

## Technical Skills

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**Languages** Japanese (Native), English (Business-level), Chinese (Beginner-level)

**Programming** C/C++, C#, Java, Python, MATLAB, OpenCV, HTML, JavaScript.  
I participated in ACM/ICPC, the most famous programming contest in the world, advancing to Asia regional rounds by passing Japan domestic rounds in 2005 and 2006.

## References

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**Supervisor** Prof. Sei-ichiro Kamata

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Curriculum Vitae generated on March 23, 2020.