Hiroki Kobayashi

小林 大起

Computer Vision Researcher · AI Engineer · PhD in Engineering

Araya Inc.
Chukyo University
PhD Engineering

GitHub	github.com/koba-jon
Hugging Face	huggingface.co/koba-jon
LinkedIn	linkedin.com/in/hiroki-kobayashi-phd
Google Scholar	scholar.google.co.jp/citations?user=HzjxmYoAAAAJ
Qiita	qiita.com/koba-jon

About

Computer vision researcher and AI engineer specializing in industrial anomaly detection, representation learning, and generative modeling. Research focuses on building practical, robust machine learning methods for visual inspection — particularly in manufacturing environments where real defective data are scarce. Actively develops deep learning implementations in Python and C++ (PyTorch, LibTorch), including large-scale open-source projects.

Affiliation

Position	AI Engineer
Company	Araya Inc. (araya.org)

Education

Apr 2023 – Mar 2026	**Doctor of Philosophy in Engineering** *Chukyo University*
Apr 2021 – Mar 2023	**Master of Science in Engineering** *Chukyo University*
Apr 2017 – Mar 2021	**Bachelor of Science in Engineering** *Chukyo University*

Research Areas

Anomaly Detection	Visual Inspection	Computer Vision	Deep Learning

Featured Open-Source Project

pytorch_cpp (github.com/koba-jon/pytorch_cpp)

Large-scale open-source project for deep learning in C++ using LibTorch. Covers image classification, object detection, generative models, and modern deep learning architectures. Reflects a strong commitment to practical implementation and research-oriented development in computer vision.

Publications — Journal Papers (8 total, 2 as first author)

- Hiroki Kobayashi, Manabu Hashimoto, 工業製品のわずかな表面変化を区別するための擬似欠陥を構成するパラメータの推定に基づく事前学習と異常検知, *精密工学会誌, Vol.91, No.10, pp.1017-1024, 2025 [精密工学会研究奨励賞]*
- Naoki Murakami, Naoto Hiramatsu, Hiroki Kobayashi, et al., 特徴量の正常表現空間からの逆射影誤差指標に基づく対象物の回転に頑健な異常検知の提案, *精密工学会誌, Vol.91, No.5, pp.597-604, 2025*

- Naoto Hiramatsu, Hiroki Kobayashi, et al., 理想ペア画像を用いた画像変換に基づく異なるカメラ間ギャップ低減による異常検知の高精度化, *精密工学会誌, Vol.91, No.2, pp.185-191, 2025*
- Rina Tagami, Hiroki Kobayashi, Shuichi Akizuki, Manabu Hashimoto, **Reliable image matching using optimal combination of color and intensity information based on relationship with surrounding objects,** *IEICE Transactions, Vol.E107-D, No.10, pp.1312-1321, 2024*
- Naoki Murakami, Naoto Hiramatsu, Hiroki Kobayashi, et al., 固有空間における情報合成に基づく高リアリティ不良品画像生成, *精密工学会誌, Vol.90, No.8, pp.662-668, 2024*
- Rina Tagami, Sakura Eba, Hiroki Kobayashi, et al., 画素ペア色相値の発生確率分析に基づく高速カラー画像マッチング, *精密工学会誌, Vol.89, No.2, pp.182-189, 2023*
- Naoya Nakabayashi, Sakura Eba, Hiroki Kobayashi, Manabu Hashimoto, 任意の回転変動許容力を有する画素選択型テンプレートマッチング, *精密工学会誌, Vol.88, No.6, pp.514-520, 2022*
- Hiroki Kobayashi, Naoya Nakabayashi, Ryo Miyoshi, Manabu Hashimoto, 異状発生直前・直後のペア画像を用いた画像復元と高精度キズ検出, *精密工学会誌, Vol.87, No.12, pp.1020-1027, 2021*

Publications — International Conferences (14 total, 5 as first author)

- Hiroki Kobayashi, Naoki Murakami, Naoto Hiramatsu, Takahiro Suzuki, Manabu Hashimoto, **Anomaly Detection Based on Semi-Formula Driven Pre-training Dataset to Represent Subtle Difference and Anomaly Score,** *BMVC 2024, pp.1-12, Glasgow, UK, Nov 2024*
- Hiroki Kobayashi, Manabu Hashimoto, **DRepT: Anomaly Detection Based on Transfer of Defect Representation with Transmittance Mask,** *IJCNN 2023, pp.1-8, Queensland, Australia, Jun 2023*
- Hiroki Kobayashi, Manabu Hashimoto, **High Precision Anomaly Detection based on Pre-trained Features Enhanced by Only Large Amount of Normal Samples,** *IWAIT 2024, Langkawi, Malaysia, Jan 2024*
- Hiroki Kobayashi, Ryo Miyoshi, Manabu Hashimoto, **Normal Image Generation-Based Defect Detection by Generative Adversarial Network with Chaotic Random Images,** *ISVC 2021, LNCS Vol.13017, pp.353-365, Oct 2021*
- Hiroki Kobayashi, Ryo Miyoshi, Manabu Hashimoto, **Scratch Detection based on Image Reconstruction using Ideal-Image-Pair Dataset of Just Before/After Defect Occurrence,** *IWAIT 2021, Jan 2021*

(+ 9 additional international conference papers as co-author)

Publications — Domestic Conferences

56 domestic conference papers (13 as first author) in venues including MIRU, SSII, ViEW, DIA, PRMU, and iMec. Selected highlights below:

- 小林大起，橋本学, わずかな表面変化を区別するための変形パラメータ推定に基づく異常検知のための事前学習手法の提案, *画像工学研究会（IE），pp.83-88, 2026/02*
- 小林大起，橋本学, 正常特徴量の正規性制約を用いた事前学習に基づく **PaDiM** による高精度異常検知, *画像工学研究会（IE），pp.408-413, 2024/03 [IE 賞]*
- 小林大起，橋本学, 透過マスクを用いた実欠陥特徴の転移に基づく異常検知, *MIRU2023, 2023/07*
- 小林大起，橋本学, 特徴抽出型ネットワークを用いた異常検知のための事前学習用データセットの実験的性能分析, *SSII2023, 2023/06*
- 小林大起，橋本学, 異種テクスチャにおける実欠陥特徴の転移に基づく異常検知, *ViEW2022, 2022/12 [画像応用技術専門委員会 優秀論文賞]*

Awards & Honors

Research Presentation Awards (11)

2026/03	精密工学会研究奨励賞	*公益社団法人 精密工学会*
2024/05	学長賞	*中京大学*
2024/04	IEEE Nagoya Section Conference Presentation Award	*IEEE Nagoya Section*
2024/03	IE 賞	*一般社団法人 電子情報通信学会*
2023/03	研究奨励賞	*DIA2023*
2023/01	学長賞	*中京大学*
2022/12	画像応用技術専門委員会 優秀論文賞	*ViEW2022*

2021/04	IEEE Nagoya Section Excellent Student Award	*IEEE Nagoya Section*
2021/02	学長賞	*中京大学*
2020/09	ベストプレゼンテーション賞	*精密工学会秋季大会*
2020/03	研究奨励賞	*DIA2020*

Review Award (1)

2022/07	MIRU 論文評価貢献賞	*第 25 回 画像の認識・理解シンポジウム*

Scholarship (1)

2023/06	第一種奨学金 特に優れた業績による返還免除（全額）	*独立行政法人 日本学生支援機構*

Certifications

- Fundamental Information Technology Engineer Examination
- Image Processing Engineer Examination (Basic)
- JDLA Deep Learning for GENERAL 2020 #1