Shunsuke Akamatsu

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EDUCATION

Columbia University   New York, NY
MS in Computer Science, Machine Learning Track, GPA: 3.9/4.0   Sep 2024 - Dec 2025
- **Coursework**: Databases, Artificial Intelligence, User Interface Design, Computer Vision, Machine Learning and Climate, Neural Networks & Deep Learning, Networks, Crowds and the Web, Cloud Computing, Computer Graphics Research Project.

Waseda University   Tokyo, Japan
BE in Communications and Computer Engineering, GPA: 3.7/4.0; Top 3%   Apr 2020 - Mar 2024
- **Relevant Coursework**: Programming, Algorithms and Data Structures, Multimedia Systems, Software Engineering, Computer Architecture, Information Network System, Operating System, Statical Analysis & Data Science, Digital Signal Processing.

PUBLICATIONS

- Taiga Hayami, Takahiro Shindo, **Shunsuke Akamatsu**, Hiroshi Watanabe, Neural Video Representation for Redundancy Reduction and Consistency Preservation, *IEEE ICCE 2025.*

- Kei Iino, **Shunsuke Akamatsu**, Hiroshi Watanabe, Shohei Enomoto, Akira Sakamoto, Takeharu Eda, Improving Image Coding for Machines through Optimizing Encoder via Auxiliary Loss, *IEEE ICIP 2024.*

- Yui Tatsumi, Shoko Tanaka, **Shunsuke Akamatsu**, Takahiro Shindo, Hiroshi Watanabe, Classification in Japanese Sign Language Based on Dynamic Facial Expressions, *IEEE GCCE 2024.*

- **Shunsuke Akamatsu**, Michela Testolina, Evgeniy Upenik, Touradj Ebrahimi, On the Impact of Learning-based Image Compression on Computer Vision Tasks, *SPIE Applications of Digital Image Processing XLVII.*

- **Shunsuke Akamatsu**, Hiroshi Watanabe, Bounding Box Aware Edge-Cloud Collaborative Method for Multiple Object Detection, *IEEE AIC 2024.*

- **Shunsuke Akamatsu**, Kei Iino, Hiroshi Watanabe, Shohei Enomoto, Akira Sakamoto, Takeharu Eda, Edge-Cloud Collaborative Object Detection Model with Feature Compression, *IIEEJ IEVC 2024.*

- Kei Iino, **Shunsuke Akamatsu**, Hiroshi Watanabe, Shohei Enomoto, Akira Sakamoto, Takeharu Eda, Image Coding for Machines with Objectness-based Feature Distillation, *IIEEJ IEVC 2024.*

- **Shunsuke Akamatsu**, Kei Iino, Hiroshi Watanabe, Shohei Enomoto, Xu Shi, Akira Sakamoto, Takeharu Eda, A Video Object Detection Method of ECNet Based on Frame Difference and Grid Cell Confidence, *IEEE GCCE 2023.*

PROFESSIONAL EXPERIENCE

SONY   Tokyo, Japan
Software Engineer and Researcher Intern   Jun 2025 - Aug 2025
- Reduced dataset requirements in computer vision tasks by leveraging Stable Diffusion with CLIP-based prompt control.
- Generated and fine-tuned weather-specific synthetic datasets using prompt engineering for autonomous driving scene understanding, ensuring robust data quality for scalable systems.
- Achieved domain adaptation, maintaining semantic segmentation accuracy while cutting real dataset size by 25%, boosting development efficiency in distributed training scenarios for the team.

AIML Inc.   Remote, USA
Machine Learning Intern   Jun 2025 - Aug 2025
- Implemented an educational web tutorial on deforestation segmentation, demonstrating advanced AI frameworks integration.
- Designed 100 PyTorch exercises covering basic (data processing, model training, CNNs) to advanced topics (vision, NLP, and GPT-2 based LLMs), providing educational and comprehensive practice for deep learning workflows.

NTT Corporation   Tokyo, Japan
Joint Research Assistant   Apr 2023 - Mar 2024
- Optimized image compression model training with auxiliary losses, boosting encoder performance in downstream tasks.
- Attained BD-rate improvement by an average of 27% for detection and 20% for segmentation tasks, underscoring effective performance tuning in modern AI pipelines.
- Co-authored a project paper at IEEE ICIP 2024, displaying strong technical collaboration and research impact.

Waseda University   Tokyo, Japan
Software Developer at Togawa Lab   Apr 2022 - Aug 2022
- Directed a four-person team to develop a cross-platform mapping application using Android Studio and JavaScript, ensuring successful, on-time project delivery through technical guidance and project management.
- Optimized Greedy and 2-opt algorithms for TSP to implement multi-location based shortest-route search.
- Improved UI/UX bottlenecks via a 10-person usability study, increasing application engagement and adoption.

RESEARCH EXPERIENCE

Columbia University   New York, NY
Research Assistant at Geometry and the City Lab (prof. Silvia Sellan)   Sep 2025 - Current
- Lead a research initiative aimed at detecting illicit 3D-printed shapes through advanced geometric analysis, with the goal of developing a real-time classification system for 3D printers.
- Conduct comparative analysis of 3D deep learning classification methods (including Point Cloud-based, Mesh-based, and Render-based approaches) to establish baseline performance metrics for illicit shape recognition.

Waseda University   Tokyo, Japan
Research Assistant at Advanced Multimedia Systems Lab (prof. Hiroshi Watanabe)   Apr 2023 - Jul 2024
- Created a two-layer edge-cloud neural network for real-time object detection to improve the trade-offs in distributed systems.
- Integrated lightweight, high-performance models to optimize data-accuracy performance efficiency for real-world applications.
- Enhanced trade-offs between accuracy and data transfer cost by up to 45% through experiments with YOLO models and OpenCV pipelines, and published three first-author papers, advancing scalable AI architectures.

Research Assistant at Network Security Lab (prof. Tatsuya Mori)   Sep 2022 - Mar 2023
- Produced a point-clouded based method to verify spatial alignment using the Iterative Closest Point (ICP) algorithm.
- Achieved authentication of the same space with up to 17 cm positional deviation and 15 degrees angular deviation, as evaluated using RMSE values for point cloud data acquired using a LiDAR sensor.

Ecole Polytechnique Federale de Lausanne (EPFL)   Lausanne, Switzerland
Research Intern at Multimedia Signal Processing Group (prof. Touradj Ebrahimi)   Sep 2023 - Jul 2024
- Evaluated 20 models across five deep learning-based image compression methods, including JPEG AI, on object detection, segmentation, and classification tasks, establishing structured ML pipelines (MLOps) for benchmarking and analysis.
- Demonstrated the superiority of JPEG AI compression, reducing data size while maintaining downstream task performance, succeeding up to 65% improvement in classification BD-rate.
- Led the project and published a first-authored paper at SPIE ADIP, coordinating with two Ph.D. team members.

TEACHING EXPERIENCE

Waseda University
Teaching Assistant
- **Simulation of physical phenomenon**: Advised and managed 400 freshmen's study for mandatory experiments.
- **Programming Basics:** Mentored 20 undergraduate students for basic programming courses (Scratch, C, Java, Python).

TOMAS, Riso Kyoiku Group
Tutoring School Teacher
- Provided supplementary teaching to elementary, junior high, and high school students on the content of their school classes.

SKILLS

Language: Python (*with NumPy, Pandas, SciPy, scikit-learn*), JavaScript (*with HTML, CSS, React, Node.js*), SQL, MATLAB, Java.
Frameworks/Tools: PyTorch, TensorFlow, Hugging Face, Git, GCP, AWS, Android Studio, Figma, Power BI, Microsoft Office.

AWARDS AND HONORS

Heiwa Nakajima Scholarship: Awarded for my master's study at Columbia ($52,000).   2024 - 2025
Waseda University Dean's Award: Received for achievement in coursework, ranked 3rd out of 180 students.   2024
Waseda University Department's Award: Honored for research activities, ranked top 3 out of 90 students.   2024

ACADEMIC PROJECTS

Graph Analysis of Twitter Data - *Python, SQL (DuckDB), Pandas, API, Graph Analysis.*
- Built a Twitter mention network using SQL and Python, performed network metrics and PageRank analysis, and derived insights on user interactions during the election period.

AlphaCulpa – *HTML, CSS, JavaScript, React, Figma, Git, Team Development.*
- Engineered a full-stack course insight platform with a four-person team, implementing real-time user contributions to optimize course selection and provide students with accurate, up-to-date insights on course difficulty, workload, and teaching quality.

UHI Prediction – *Python, PyTorch, Time-series modelling (LSTM/GRU), Regression modeling, Feature engineering.*
- Designed an end-to-end forecasting pipeline integrating statistical and deep learning models for multimodal environmental data, improving prediction accuracy of spatiotemporal risk patterns.

LiteLeafNet – *Python (Pandas, matplotlib), PyTorch, OpenCV.*
- Developed a dual-stage model optimization framework reducing computation cost by 20% while improving accuracy-cost trade-off by 14%, demonstrating efficiency-driven quantitative design.

Building Damage Prediction Modeling - *Python, PyTorch, Multimodal Data Integration, Graph Neural Networks, Risk Analysis.*
- Developed an enhanced deep learning framework using satellite imagery and building data to predict pre-disaster building damage, incorporating advanced loss functions and GNNs; currently extending the model to predict actual economic losses.