Shunsuke Akamatsu

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EDUCATION

Columbia University New York, NY
MS in Computer Science, GPA 3.9/4.0 Sep 2024 - Expected Dec 2025
Coursework: Databases, Artificial Intelligence, User Interface Design, Deep Learning for Computer Vision.

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

EXPERIENCE

Waseda University Tokyo, Japan
Undergraduate and Graduate Research Assistant at Advanced Multimedia Systems Lab Apr 2023 - Jul 2024

- Created a two layered edge-cloud cooperative neural network for real-time object detection by combining lightweight and high-performance models with feature compression, leveraging machine learning techniques.
- Improved a trade-off between accuracy and transmitted data amount by up to 45 percent.
- Published three first-authored papers at *IEEE GCCE 2023*, *IEVC 2024*, and *IEEE AIC 2024*.

Teaching Assistant Apr 2024 - Jul 2024

- Advised and managed 400 freshmen's study for mandatory experiments - "Simulation of physical phenomenon".
- Mentored 20 undergraduate students for basic programming courses and introductory machine learning concepts.

Research Assistant at Network Security Lab Sep 2022 - Mar 2023

- Produced a system 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.

Software Developer at Togawa Lab Apr 2022 - Aug 2022

- Constructed a map application using Android Studio with JavaScript, HTML, CSS and led four team members.
- Created an app suggests shortest route among multiple selected locations by utilizing Greedy and 2-opt algorithm.
- Implemented a search function for restaurants near suggested route and enhanced user interface by introducing two Leaflet plugins, making it easier for users to find current and selected locations.

Ecole Polytechnique Federale de Lausanne (EPFL) Lausanne, Switzerland
Research Internship at Multimedia Signal Processing Group Sep 2023 - Jul 2024

- Investigated impact of five deep learning-based image compression methods including future JPEG AI standard on image classification, object detection, and instance segmentation tasks.
- Presented superiority of JPEG AI for computer vision tasks; showed up to 65 percent better performance in BD-rate compared to other compression methods.
- Released a first-authored paper at *SPIE Applications of Digital Image Processing XLVII* in collaboration with professor Touradj Ebrahimi and two Ph.D. research team members.

NTT Corporation Tokyo, Japan
Joint Research Assistant Apr 2023 - Mar 2024

- Proposed auxiliary losses in training of Image Coding for Machines (ICM) models to assist encoder in acquiring high recognition performance for two computer vison tasks: object detection and semantic segmentation.
- Improved the BD-Rate by an average of 27 percent for detection and 20 percent for segmentation.
- Published a project paper at *IEEE ICIP 2024* as a joint research team of three researchers from NTT Software Innovation Center and three members from Waseda University.

PUBLICATIONS

Conference Papers

- Neural Video Representation for Redundancy Reduction and Consistency Preservation
  Taiga Hayami, Takahiro Shindo, **Shunsuke Akamatsu**, Hiroshi Watanabe
  IEEE ICCE 2025
- Improving Image Coding for Machines through Optimizing Encoder via Auxiliary Loss
  Kei Iino, **Shunsuke Akamatsu**, Hiroshi Watanabe, Shohei Enomoto, Akira Sakamoto, Takeharu Eda
  IEEE ICIP 2024
- Classification in Japanese Sign Language Based on Dynamic Facial Expressions
  Yui Tatsumi, Shoko Tanaka, **Shunsuke Akamatsu**, Takahiro Shindo, Hiroshi Watanabe
  IEEE GCCE 2024
- On The Impact of Learning-based Image Compression on Computer Vision Tasks
  Shunsuke Akamatsu, Michela Testolina, Evgeniy Upenik, Touradj Ebrahimi
  SPIE Applications of Digital Image Processing XLVII
- Bounding Box Aware Edge-Cloud Collaborative Method for Multiple Object Detection
  Shunsuke Akamatsu, Hiroshi Watanabe
  IEEE AIC 2024
- Edge-Cloud Collaborative Object Detection Model with Feature Compression
  Shunsuke Akamatsu, Kei Iino, Hiroshi Watanabe, Shohei Enomoto, Akira Sakamoto, Takeharu Eda
  IIEEJ IEVC 2024
- Image Coding for Machines with Objectness-based Feature Distillation
  Kei Iino, **Shunsuke Akamatsu**, Hiroshi Watanabe, Shohei Enomoto, Akira Sakamoto, Takeharu Eda
  IIEEJ IEVC 2024
- Introduction of Auxiliary Loss in Deep Image Compression for Image Recognition
  Kei Iino, **Shunsuke Akamatsu**, Hiroshi Watanabe, Shohei Enomoto, Akira Sakamoto, Takeharu Eda
  IEICE 2024 (in Japanese)
- A Video Object Detection Method of ECNet Based on Frame Difference and Grid Cell Confidence
  Shunsuke Akamatsu, Kei Iino, Hiroshi Watanabe, Shohei Enomoto, Xu Shi, Akira Sakamoto, Takeharu Eda
  IEEE GCCE 2023

AWARDS

Heiwa Nakajima Scholarship: Awarded for my master's study at Columbia ($55,000). 2024 - 2025
Waseda University Dean's Award: Received for achievement in coursework, ranked 3rd out of 180 students. 2024
Waseda University Department Award: Honored for research activities, top 3 out of 90 students. 2024

SKILLS

Languages: Python (with NumPy/Scipy/Pandas/Sklearn), JavaScript (with HTML/CSS/REACT), SQL, C, Java.
Frameworks and Application Tools: PyTorch, TensorFlow, OpenCV; Android Studio, Blender, Microsoft Office.

ACADEMIC SERVICE

Educational Tutor 2022-2023

- Learning support for junior high school students at Junior High School at Otsuka, University of Tsukuba.

Student Volunteer 2022

- Assistance in conference management at International Conference on Emerging Technologies for Communications (ICETC).

Tutoring School Teacher 2021-2022

- Part-time work providing supplementary teaching to elementary, junior high, and high school students on the content of their school classes at TOMAS, Riso Kyoiku Group.