Dillon Loh Guan Hui

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SUMMARY

I am an AI/software engineer with 3 years of experience building scalable backend applications, robotics simulations, and AI services for companies in both Singapore and Japan. I am also frequently involved in machine learning projects, including works in reinforcement learning for autonomous robotics, computer vision, and predictive modelling. My interests lie in the field of Embodied AI, with a particular focus on advancing human-like perception and interaction capabilities in robots.

EDUCATION

University of Cambridge (Incoming) — Cambridge, United Kingdom
Master of Philosophy in Machine Learning and Machine Intelligence — Oct 2025 - Aug 2026
Computer Vision and Robotics Specialisation

Nagoya University — Nagoya, Japan
Bachelor of Science in Fundamental and Applied Physics (GPA: 3.96/4.3) — Oct 2018 – Sep 2022
Thesis title: *Applications of Deep Unsupervised Learning to Galactic i-band images.*
Link: https://github.com/dillonloh/galaxy-dim
Attended 'Summer School in Statistics for Astronomers XVII' programme by the Pennsylvania State University.

Awards
JUGAS - NU Full-Ride Scholarship (Japanese University Graduates Association of Singapore, Nagoya University) — 2018 – 2022
JASSO Monbukagakusho Honors Scholarship (Japanese Student Services Organization) — 2018 – 2019

Teaching
Teaching Assistant (Nagoya University NU-EMI Mirai Project) — Jun 2021 – Apr 2022

Extracurricular Activities
Member > President (Nagoya University International Students Group) — Oct 2020 – Sep 2022
Member > Captain (Nagoya University Boxing Club) — Apr 2019 – Sep 2022
Editor-in-Chief (Nagoya University Newsletter (NUdge) Team) — Jun 2021 – Jul 2022
Head of Logistics (Nagoya University Model United Nations 2022) — Jan 2022 – Apr 2022

INDUSTRY EXPERIENCE

Hiverlab (Digital Twin and Spatial Intelligence Tech Company) — Singapore
Intern (Data Engineering/AI) — Nov 2022 – Feb 2023
Software Developer (AI/Backend) — Mar 2023 – Jun 2024
Lead Software Developer (AI/Robotics/Fullstack Web) — Jul 2024 – Current

- Lead development of scalable backend services in Python/JS/Golang for products/projects, including the planning of architecture/infrastructure, communication with clients, and management of team responsibilities.
- Implement, train, and deploy DL models in PyTorch/TensorFlow for CV and predictive modelling use cases.
- Implement and manage MLOps and data ETL pipelines with Prefect, pandas, etc.
- Lead development of robotic simulation projects with ROS/IsaacSim/Unity, including the development of a system of distributed lightweight simulation engines, A*-based path-planners, and task queue managers for very large-scale robot fleet simulations, used in the world's largest architecture projects today.
- Manage and mentor all AI/Backend developer interns in the department and organise frequent upskilling workshops.

OnClouds 株式会社 / OnClouds Co. Ltd (RaaS Tech Company) — Nagoya, Japan
Part-time ML/Robotics Software Developer — Apr 2021 – Current

- Implement, train, and deploy ML models in sklearn/PyTorch, for autonomous driving, CV, and predictive modelling use cases.
- Lead development of ROS-based mobile robotic simulations in IsaacSim for simulating LiDAR/SLAM-based autonomous robotic navigation in dense human-activity environments.
- Led development of unique 2D blueprint navmesh generator and VRP solver for warehouse pickup planning based on Voronoi Graphs.
- Conducted frequent literature reviews on the latest autonomous driving research.

RESEARCH EXPERIENCE

Hiverlab in collaboration with Associate Professor Frank Guan (Singapore Institute of Technology) — Singapore
Part-time Research Student under A/Prof Frank Guan — Aug 2024 – Current

- Proposed and researched on the problem of Adaptive Visual Language Navigation (AdaVLN) and built a prototype IsaacSim extension and dataset that integrates dynamic human obstacles into Matterport3D environments.
- Key team member alongside professors from SIT and Shanghai University on NVIDIA's Academic Grant Programme.

Laboratory of Galaxy Formation and Evolution (Astrophysics Research Lab at Nagoya University) Nagoya, Japan
Undergraduate Researcher under A/Prof Takeuchi Tsutomu Apr 2021 – Oct 2022

- Researched on the use of deep unsupervised learning for performing dimensionality reduction on galactic RGB (*i-band*) images and analysed relationship between latent features with actual galactic physical properties.
- Built image preprocessing pipelines that fetch galaxy image data and cleans them for use in unsupervised learning.
- Implemented DL autoencoders (VAEs, CAEs) with PyTorch for extracting features from images/image embedding.
- Contributed to chapter 13 in "Applications of big data and machine learning in galaxy formation and evolution" authored by Takeuchi.

GRANTS

NVIDIA Academic Grant Program for Researchers (5000 A100 GPU Hours) Dec 2024 – Jun 2025
Project Title: *Adaptive VLN Models for Embodied Agents in Dynamic Environments*

PUBLICATIONS/TALKS/BOOK CONTRIBUTIONS

Publications/Preprints

Loh, D., Bednarz, T., Xia, X., & Guan, F. (2024). *AdaVLN: Towards visual language navigation in continuous indoor environments with moving humans* [Preprint]. *arXiv*. https://arxiv.org/abs/2411.18539

Talks

Loh, D., Takeuchi, T., Cooray, S., & Iwasaki, D. (2022, October). *Latent space representations of galaxies and their relationship with galactic properties*. Talk presented at the 4th Data Science in Astronomy Workshop, Tokyo, Japan.
Slides Link: https://github.com/dillonloh/galaxy-dim/blob/main/Data%20Science%20Conference.pptx.pdf

Loh, D., Takeuchi, T., Cooray, S., & Iwasaki, D. (2022, September). *Application of unsupervised neural networks for predicting galactic properties via image features*. Poster presented at the 9th East Asian Numerical Astrophysics Conference, Okinawa, Japan.
Poster Link: https://github.com/dillonloh/galaxy-dim/blob/main/9th%20EANAM%20Poster%20-%20Dillon.pdf

Book Contributions:

Contribution to Chapter 13: [Galaxy Face]. In T. T. Takeuchi, *Applications of big data and machine learning in galaxy formation and evolution (pp. 259–284)*. CRC Press. ISBN: 0367611392, 9780367611392.

SELECTED OPEN SOURCE CONTRIBUTIONS [OSS] / PERSONAL PROJECTS [PP] (all repositories available on GitHub)

[OSS] IsaacSim AdaSimulator extension (AdaVLN Simulator)
Github Link: https://github.com/dillonloh/ada-vln

- Simulator for visual language navigation experiments in IsaacSim environments.

[OSS] IsaacSim omni.anim.people extension (Fork of IsaacSim extension for simulating human traffic with dynamic navigation)
Github Link: https://github.com/dillonloh/isaac-sim-people-cycle-sim

- Extended to enable cycling of character prims and multi-waypoint walking paths for optimising long-running simulations.

[OSS] energyplus-parser (Parser for EnergyPlus sim input/output files and geometry visualiser)
Github Link: https://github.com/dillonloh/energyplus-parser

- Implemented feature for visualising geometry of buildings in input .idf files and generating 2D/3D point clouds.

[PP] Vocal Pitching Tool (Cross-platform singing tools for pitch checking, shifting, range analysis on direct sysout audio)
Github Link: https://github.com/dillonloh/stream_pitch_detector

- Built with Python, PyAudio, aubio, scipy, librosa.

SERVICE AND OUTREACH

Volunteer (Action for Singapore Dogs) Oct 2023 – Present
I currently walk and shower dogs at a shelter for abandoned/stray dogs (Singapore Specials) on alternate weekends.

Volunteer (Transient Workers Count Too (TWC2)) Dec 2016 – Jul 2018
I previously helped organise social activities for foreign workers currently based in Singapore.

Volunteer (TOUCH Community Services) Nov 2016 – Jun 2018
I previously delivered food on weekend mornings to the homes of the elderly/disabled and helped out with administrative tasks.

ADDITIONAL

MOOCs/Certifications:

Algorithms Specialisation (5 Courses) by Stanford University on Coursera 1/5 Courses completed as of Jan 2025
Intro to Operating Systems Specialisation (4 Courses) by Codio Certification earned Jan 2025
Deep Learning Specialisation (5 Courses) by DeepLearning.AI on Coursera Certification earned Sep 2024

Skills:

Programming Languages: *Proficient in* Python, JS/NodeJS, Golang. *Familiar with* C, C++, C#, R.
Relevant Frameworks/Tools (ML/AI/Data-related): PyTorch/TensorFlow, sklearn, scipy, numpy, pandas/polars, OpenCV.
Relevant Frameworks/Tools (Development): Unity, Linux/Debian Environments, Azure/AWS Cloud, Git/GitHub, Docker/Kubernetes.