# Alan CHENG

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HK Permanent Resident

## Summary

AI + Robotics Cross-Domain Researcher | Medical Imaging Algorithm Researcher

• Multidisciplinary Expertise: Systematic research experience across computer vision (CV), reinforcement learning, robotic positioning/path planning, and medical image analysis. Full-stack development capabilities with PyTorch/ROS
• Academic Innovation: Developed hybrid architecture combining multi-stage RL training with Hybrid A* algorithm, achieving breakthrough parking success rates (0% → 91.4-100%) in complex autonomous valet scenarios
• Research Productivity: Published 2 SCI papers, 2 patents. Competition achiever with 5 awards including 3 national-level honors

## Education

**The University of Hong Kong** Sep 2024 - Aug 2025
Master of Science in Mechanical Engineering

**Sun Yat-sen University** Sep 2019 - Jun 2023
Bachelor of Engineering in Traffic Engineering

## Work Experiences

**Researcher, Dongguan Sun Yat-sen University Research Institute** Aug 2023 - Jul 2024

- Researched independently on breast cancer ultrasound image segmentation and recognition technology, enhancing algorithm design and achieving a 2% improvement in classification accuracy through multi-model fusion methods
- Published a patent for "Breast Ultrasound Image Analysis Methods and Systems Based on Deep Convolutional Neural Networks" (Patent No. CN117392125B)

**Algorithm Intern, Guangzhou Saite Intelligent Technology Co., Ltd** Sep 2022 - Oct 2022

- Collected and annotated datasets for the "unmanned sweeper" project, demonstrating strong data management skills and contributing to the development of visual perception algorithms

## Academic Research Experiences

**Paper: Enhancing Autonomous Valet Parking with Multi-Stage Training and Field Reward** Oct 2023 - Present

- Developed a reinforcement learning algorithm that improved real-time performance in autonomous parking, increasing the success rate from 0% to 94-100% (an 94% improvement)
- Submitted to the Scientific Reports journal

**Dissertation: Research on Dynamic Positioning Method of Following Robot Based on Wireless Communication** Sep 2022 - Apr 2023

- Developed independently a positioning system using UWB and IMU with Kalman filtering, enhancing positioning accuracy by 30% compared to the original algorithm
- Awarded the first "Yixian Cup" South China University "Intelligence +" Innovation Competition Excellence Award
- Published patent "A fusion of UWB and IMU intelligent follow-up service robot and its control methods, devices and storage media" (Patent No. CN116300613A)

**Paper: SpikeGoogle: Spiking Neural Networks with GoogLeNet-Like Inception Module** Jun 2021 - Dec 2021

- Integrated Inception modules into spiking neural networks using Pytorch, achieving a 20.5% increase in image classification accuracy
- Wang, X., et al.: SpikeGoogle: Spiking Neural Networks with GoogLeNet-like inception module. CAAI Trans. Intell. Technol. 7(3), 492–502 (2022). https://doi.org/10.1049/cit2.12082

**Four-Wheel Steering Vehicle Path Planning and Control Research** Mar 2020 - Dec 2020

- Analyzed the motion model, and trajectory planning for a four-axis steering four-wheel drive unmanned vehicle. Completed ROS system implementation and Gazebo simulations, followed by real vehicle testing
- Achieved the second prize in the college students' innovation and entrepreneurship competition

## Industrial Experiences

**Personal Website** Jan 2023 - Present

- Developed a knowledge Q&A website using the WordPress framework, achieving 1,000 visits in one month. Features included a login system, intelligent question-and-answer system with 160 public prompt words, chat record queries, and a public forum, optimized for both PC and mobile devices
- The website was shut down in February 2023. Due to the loss of the website backup, it has been re-established in February 2025 as a new website: www.magicspell.net

**The 16th and 17th National College Students Intelligent Car Competition** Jan 2021 - Aug 2022

- Utilized Python and C/C++ to control vehicles, completing tasks such as ROS-based intelligent vehicle SLAM mapping, path planning, dynamic obstacle avoidance, and target recognition
- Competed against over 100 teams, securing the national second prize
- Award the 2022 Sun Yat-sen University Intelligent Engineering College Transportation Fund

**The 7th China College Students' "Internet+" Competition** Dec 2021 - Jun 2022

- Developed an Android app for skin diagnosis using deep learning models, generating professional skin disease analyses and highlighting affected areas through image segmentation. The project was deployed on HUAWEI cloud, enabling efficient diagnoses on any Android device
- Awarded the Provincial Silver Award at the 7th China College Students' "Internet+" Competition

## Main Skills and Languages

- **Pytorch:** proficient in building machine learning model, data set production, training, testing and deployment
- **Python:** proficient in Python programming methods, including data structures, multi-process communication, and deployment
- **ROS:** proficient in ROS deployment and program in ROS
- **Other:** C/C++(OOP), MatLab, Tensorflow, SQL, HTML
- **Languages**: Cantonese (Native), English (Fluent), Mandarin (Native) and Hakka (Native)