

ADVAY PAKHALE

+65 9145 8425 advay.pakhale@u.nus.edu [in Advay Pakhale](#) [advaypakhale](#)

EDUCATION

National University of Singapore

Expected Graduation – May 2027

Bachelor of Science (Hons) in Mathematics (**GPA: 5.0 / 5.0**)

- **Special Programme in Mathematics:** Selective academic programme (15 students per year) for students demonstrating strong aptitude and passion for mathematics

Bachelor of Computing (Hons) in Computer Science (**Double Degree Programme**) (**GPA: 5.0 / 5.0**)

- **Relevant Coursework:** Linear Algebra, Probability, Quantitative Finance, Programming Methodology, Mathematical Analysis

Raffles Institution, Singapore

Jan 2015 – Dec 2020

Singapore-Cambridge General Certificate of Education Advanced Level (**Rank Points: 90/90**)

- **Honours and Awards:** 'A' Level Examination Academic Excellence Award, SINDA Excellence Award 2021 for GCE 'A' Level, Raffles Diploma with Distinction

TECHNICAL SKILLS

Languages: Python, C++, Java

Web: HTML, CSS, JS, Django, Flask, Flutter

Machine Learning/AI: PyTorch, spaCy, Pandas, NumPy, SciPy, scikit-learn, OpenCV, matplotlib, Plotly

Miscellaneous: SQL, Git, Unix, \LaTeX , Docker, ROS, Mathematical simulations and modelling

WORK EXPERIENCE

Machine Learning Research Assistant

May 2018 – June 2018

Singapore University of Technology and Design

Singapore

- Investigated the application of Homotopy Type Theory to higher-order machine reasoning, conducting experiments using the Facebook bAbI dataset
- Wrote formal proofs using proof assistants Coq and Agda, cultivating a robust foundation in mathematical thinking and precision in proof-writing

Logistics Officer, Singapore Armed Forces

Nov 2021 – Nov 2022

5th Battalion, Singapore Infantry Regiment & Supply Base Central

Singapore

- Awarded Sword of Merit (top 10%, rank 2/52) for Logistics Officer Cadet Course and 2 Commanding Officer Coins for exemplary leadership and performance
- Spearheaded innovative digitisation strategies to enhance the accountability and serviceability of controlled armaments and sensitive equipment, resulting in a reduction of 115 monthly man-hours
- Cultivated and led a diverse team of 30 soldiers, navigating them through multifaceted operational and administrative challenges, fostering competence and cohesiveness
- Planned and executed high-stakes training and civilian operations with a high degree of success, notably contributing to the execution of NDP 2022 Heartlands Static Displays

RESEARCH PUBLICATIONS

Automatic Grading of Online Formative Assessments [🔗](#)

Apr 2019 – Jul 2020

Best Paper Award, 6th IRC Conference on Science, Engineering and Technology 2020

- Developed novel automatic grading architectures using machine learning and natural language processing to expedite marking of formative assessments
- Utilised bidirectional long short-term memory networks with attention mechanism and cosine similarity-based model for quantitatively scoring answers and providing qualitative feedback, achieving up to 75% accuracy in the grading process
- Communicated research effectively to a panel of experts through academic presentation and publication, earning the recognition of the best paper amongst 70 entries

EXTRA-CURRICULAR ACTIVITIES

NUS Hornet Robotics 9.0 | Controls Software Team Leader

Sep 2023 – Current

- Building a novel Autonomous Underwater Vehicle (AUV) in preparation for Singapore AUV Challenge 2024
- Leading the control theory software team in developing a robust software stack to implement complex autonomous behaviours such as navigation, collision avoidance and actuation
- Implemented and tested sophisticated state-of-the-art localisation, perception and control algorithms such as visual SLAM, Monte Carlo localisation approaches, YOLO, A* planners and more
- Developed a high-fidelity physics simulation, employing mathematical methods to accurately model complex robotic movements and interactions, reducing physical prototype expenses and enhancing system reliability

PROJECTS AND COMPETITIONS

Semi-finalist, Citi Foundation-SMU FinHack 2023 | React, AI, NLP, Portfolio Optimisation

Aug 2023 – Sep 2023

- Catalysed innovative AI-powered solution aimed at empowering the public to easily and accurately assess the value of ESG investments
- Rapidly prototyped proof-of-concept application using React, integrating NLP techniques and advanced portfolio risk management algorithms
- Pitched our solution to a panel of experts, effectively communicating the project's vision, functionality, and potential impact

Predicting the Age of Abalones Using Physical Characteristics |

Apr 2017 – May 2017

Pandas, NumPy, SciPy, scikit-learn, matplotlib, Plotly, Python

- Implemented multivariate non-linear regression models with gradient descent optimisation routines, achieving performance comparable to state-of-the-art implementations without relying on external libraries
- Utilised Mann-Whitney U-tests to conduct hypothesis tests vis-à-vis physical characteristics and abalone ages
- Applied k-means clustering techniques to explore unsupervised learning methods in making predictions
- Designed and implemented interactive and visually-appealing data visualisations, effectively showcasing deeper insights derived from the complex dataset

Pronunciation Improvement Application, in Collaboration with GovTech | NLP, Ionic

May 2018 – Jun 2018

- Engineered a cross-platform educational game using Ionic to detect and rectify poor pronunciation among students, enhancing language learning
- Applied NLP model trained by GovTech on a localised English speech corpus to accurately identify and address common pronunciation errors
- Designed and integrated gamified features into the app to increase accessibility for financially disadvantaged students with limited access to expensive coaching, fostering an engaging and cost-effective learning environment

Hack & Roll 2018 | Python, Tensorflow, OpenCV, Kivy, HTTP Servers |

Jan 2018 – Feb 2018

- Developed a cross-platform recreation of the classic ATARI game, Pong, within a 48-hour timeframe, showcasing rapid development
- Utilized OpenCV and Tensorflow Object Detection API to implement a novel control mechanism, enabling the detection of human faces for real-time positioning of the pong paddle within the game
- Engineered a high-performing, low-latency HTTP server to support concurrent multiplayer games