

I firmly believe that an individual's path to excellence is rooted in their passion for a relentless pursuit of knowledge, irrespective of the challenges offered by that pursuit. Such a pursuit secured my admission to the prestigious Nanyang Technological University (NTU). This very drive has inspired me to deeply explore the broad field of Machine Learning (ML) and Deep Learning (DL) and strive to create a significant impact in this domain.

My journey into ML and DL began in my first year of undergraduate study through the "Machine Learning Specialisation" by DeepLearning.AI. This initial exposure resonated with my passion for formal mathematics and rigorous analysis. It catalyzed my work on numerous ML and DL projects, where I tackled real-world problems using advanced methodologies. Notable among them was the development of an image classification model using CNNs and hyperparameter tuning techniques, achieving 95% accuracy while reducing overfitting by 20%. These experiences solidified my understanding of deep learning, TensorFlow, and model optimization techniques.

Expanding my interest in Natural Language Processing (NLP), I developed a machine learning model leveraging LSTM networks to generate Shakespearean-style text. This project demonstrated the creative potential of DL, as the model produced authentic poems mirroring Shakespeare's vocabulary and themes. Subsequently, I applied ML techniques to industrial challenges, such as my project on automatic depth thresholding for agricultural yield prediction. Here, I developed a computer vision system that increased prediction accuracy by 30% compared to traditional methods.

My academic journey has been complemented by coursework in Artificial Intelligence, Machine Learning, Neural Networks, and NLP, among others. These courses equipped me with expertise in neural architectures, optimization techniques, and data preprocessing. Additionally, my research interests led me to explore the potential of Scientific ML frameworks during a project under Prof. Christopher Lee. In this work, I designed a two-layer neural network compensator to mitigate torque ripples in Permanent Magnet Synchronous Motors (PMSMs), an approach that optimized computational resources while maintaining interpretability. This research involved simulating torque ripple signals using MATLAB Simulink and training the compensator to dynamically adjust based on rotor position and angular velocity, leading to improved motor efficiency. The findings were presented at the ICUR-URECA Research Conference in 2024.

As a testament to my passion for research, I have been working remotely with the University of South Carolina on catastrophic forgetting in large language models. This collaboration focuses on designing methodologies to preserve task-specific knowledge in alignment tasks while minimizing computational overhead. My undergraduate research under Prof. Alvin Chan focuses on developing a creativity benchmark for large language models and investigating how hallucination reduction strategies impact creativity and reasoning. This project involves a detailed evaluation of multi-modal AI systems in drug discovery tasks, analyzing their potential to generate novel and practical solutions.

In addition to academic pursuits, I actively participate in high-impact industry challenges. My team's decentralized AI project, SOPPU, was recognized as a semifinalist in the Alibaba Global E-commerce Challenge 2024 and accepted for publication at the Distributed Artificial Intelligence (DAI) 2024 conference. This project explored scalable personalized AI using

compressed PEFT (LoRA) adapters, achieving impressive results with a 2x compression ratio and significant memory savings. Similarly, my preprint manuscript, "Enhancing Urban Mobility through Adaptive Traffic Analysis: A Case Study in Singapore," showcases the application of ML in optimizing urban systems, using traffic simulation data to derive actionable insights for congestion mitigation.

My professional experiences have further reinforced my commitment to impactful ML and DL research. As an intern at Seatrion Limited, I transformed data-driven AI proof-of-concepts into full-scale pilots, integrating OCR into web applications. My internship with Teleskop.Tech involved analyzing open-source large language models to enhance chatbot capabilities, resulting in actionable recommendations for improving accuracy and user satisfaction. Additionally, during the NTU VeNTUre project with Bosch, I designed a hybrid recommendation system for personalized recipe suggestions for Bosch Cookit users. This project achieved 80% accuracy by leveraging NLP techniques to analyze recipe keywords and clustering algorithms like PCA and K-Means to enhance recommendation quality.

Looking ahead, I am thrilled to join Panasonic R&D Center Singapore as an AI Engineer Intern. Here, I will work on the Detection and Classification of Acoustic Scenes and Events (DCASE) challenges, contributing to advancements in acoustic scene classification and environmental sound processing.

As a member of NTU's High-Performance Computing Club, I have delved into software and hardware optimizations for server architectures, further broadening my technical expertise. This diverse background underscores my passion for solving complex problems across varied ML and DL domains, from NLP to Computer Vision.

I am confident that my academic foundation, research experience, and professional accomplishments position me to contribute positively to your institution's research endeavors. I am eager to engage with leading experts, tackle interdisciplinary challenges, and advance the frontiers of ML and DL. Thank you for considering my application.