

# Ziming Luo

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## EDUCATION

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- **University of Michigan - Ann Arbor** Aug 2023 - Present
  - **Major:** *Electrical and Computer Engineering - Signal & Image Porcess and Machine Learning* **GPA: 4.0/4.0**
  - **Honor:** *The Wang Kuo Tong Memorial Fellowship 2023-2024*
  - **Completed Coursework:** Foundation of Computer Vision (A+), Probability and Random Process (A+), Matrix Methods for Signal Processing, Data Analysis and Machine Learning
  - **Current Coursework:** Large Language Model, Advanced Topics in Computer Vision, Machine Learning,
- **Shenzhen University - Guangdong, China** Sept 2019 - July 2023
  - **Major:** *B.Sc in Information and Computing Science (Honor)* *B.Sc in Computer Science and Technology*
  - **Honor:** Outstanding Graduate Award
  - **Selected Courses:** Data Structure (A+, 93/100), Computer Systems (A, 90/100), Software Engineering (A+, 93/100), Mathematical modeling (A+, 93/100), Numerical Analysis(A+, 94/100), Mathematical methods for image processing (A+, 94/100), Computer Graphics (A, 90/100)
- **Shenzhen University - Guangdong, China** Sept 2021 - June 2023
  - **Micro Program:** *Artificial Intelligence*
  - **Selected Courses:** Overview of Artificial Intelligence (A+, 93/100), Preliminary Machine Learning (A+, 93/100), Practice and Application of Deep Learning (A+, 97/100), Fundamentals and Application of Cloud Computing (A, 92/100), Computer Vision (A, 91/100)

## RESERACH EXPERIENCE

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- **Guangdong Key Laboratory of Intelligent Information Processing** Mar 2022 - Feb 2023
  - **Research Assistant** *Paper link*
  - Developed a semi-supervised learning model based on rough sets, in which a novel heuristic algorithm was developed for feature selection on partially labelled data, and an efficient data editing technique was designed to remove the classification noise.
  - **Journal Paper:** Luo Z., Gao C. & Zhou J. Rough sets-based tri-trade for partially labeled data. Applied Intelligence (IF: 5.3), 2023.
- **Big Data institute Shenzhen University** Jul 2021 - Feb 2022
  - **Research Assistant** *Paper link*
  - Developed a Label-Aware Recurrent Reading network to deal with multi-label classification problems in natural language processing, achieved a label-aware document representation based on the top-down mechanism in neuroscience, and adopted the attention mechanism to dynamically adjust the word weights.
  - **Conference Paper:** S. Ming, H. Liu, Luo Z, et al. Label-Aware Recurrent Reading for Multi-Label Classification, Asia Conference on Algorithms, Computing and Machine Learning (CACML), 2022.

## PROJECT EXPERIENCE

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- **University of Michigan** Jan 2024 - Present 2024
  - **DPO-Assisted Model Alignment Through Knowledge Distillation** *Project link*
  - Proposes Direct Preference Optimization Knowledge Distillation (DPO-KD), a novel method for aligning small language models with human preferences without costly human annotation.
  - By leveraging state-of-the-art models like GPT-4 and Gemini as teachers, DPO-KD refines smaller student models through knowledge distillation. The approach involves generating datasets of preferred and rejected outputs, applying Direct Preference Optimization for fine-tuning. DPO-KD offers both online and offline versions, with the online version dynamically updating datasets based on the student model's progress. Additionally, the integration of QLoRA reduces memory requirements, making the fine-tuning process more efficient.
- **University of Michigan** Oct 2023 - Dec 2023
  - **Fast Food Chain Store Management - Falled Food Recognition** *Project link*
  - A computer vision course project improves hygiene and the customer experience at fast food chains by recognizing burger buns that fall on the ground without being noticed. We developed an unified pipeline for real-time video surveillance to detect hamburgers dropped on the floor. This model is small and fast enough for edge computing implementation on terminal devices.
  - Food detection: Training YOLOv8 food instance detector; Ground segmentation: Apply SLIC algorithm to segment ground superpixels; Pre-trained ResNet50 is used as a feature extractor and multilayer perceptron is trained for binary classification.
- **Shenzhen Customs Intelligent Discipline Inspection Laboratory** July 2021 - Dec 2021
  - **Customs Commodity Tax Evasion Identification** *Guangdong China*
  - Designed and built a commodity knowledge graph using customs entry form data before storing it in the Neo4j graph database, involving data cleaning, data mining and distributed storage.
  - Developed multiple mathematical models to check corporate tax evasion based on the commodity knowledge graph, extracted the key clue of "illegal tax evasion" such as false reporting of the commodity type and under-reporting of the commodity price, and succeeded in recovering over **RMB 20 million** in tax evasion for Shenzhen Customs by 2022.
  - Secured funding from the *National College Student Innovation and Entrepreneurship Training Program* and the *Guangdong Provincial Science and Technology Innovation Strategy Special Fund* as the project leader.

## COMPETITIONS & PRIZES

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09/2022	<i>Third Prize</i> , Chinese College Students Computer Design Competition
05/2022	<i>Second Prize</i> , “Blue Bridge Cup” National Collegiate Programming Competition
12/2021	<i>Grand Prize (Top 3%)</i> , “Liyuan Challenge” Innovation and Entrepreneurship Competition
09/2021	<i>Third Prize</i> , Contemporary Undergraduate Mathematical Contest in Modeling
09/2021	<i>First Prize (Top 2%)</i> , “SZU Cup” Mathematical Contest in Modeling
04/2021	<i>Meritorious Winner</i> , COMAP Mathematical Contest in Modeling
12/2020	<i>First Prize (Top 3%)</i> , “Greater Bay Area Cup” Financial Mathematical Contest in Modeling

## TECHNICAL SKILLS

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- **Professional Skills:** Good command of neural networks, especially transformer architectures commonly used in large language models; Solid understanding of machine learning principles and deep learning techniques; Proficiency in Python for data preprocessing, model training, and evaluation.
- **Toolbox:** Python, C/C++, Matlab, Linux, Git, Web Development (HTML, CSS, JavaScript), Flask/Django, SQL, Tableau, Latex
- **Soft skills :** A level of conversational English; Effective communication skills with colleagues; Work effectively in a team; Being open to learning new techniques and adjusting to changes in the field.