

Cheng Kai (Kevin) Lai

chengkai@andrew.cmu.edu | (412)689-9440 | [linkedin.com/in/chengkailai](https://www.linkedin.com/in/chengkailai)

EDUCATION

Carnegie Mellon University (CMU)

Master of Science in Artificial Intelligence Engineering - Chemical Engineering

Pittsburgh, PA

Sept. 2024 – Dec. 2025

National Taiwan University (NTU)

Bachelor of Science in Chemical Engineering

Taipei, Taiwan

Sept. 2019 – Jun. 2023

Coursework: Deep Learning, Machine Learning, Systems and Tool Chains for AI Engineering, Data Analysis, Data Science, AI in Chemical Engineering, Statistics and Probability, Numerical Methods, Mathematical Modeling

SKILLS

Programming: Python (NumPy, SciPy, PyTorch, TensorFlow, Scikit-Learn, Matplotlib, OpenCV), C++, R

AI/ML: Natural Language Processing, Computer Vision, Object Detection, Reinforcement Learning, Feature Engineering

Data Analytics/Engineering: PySpark, PostgreSQL, Apache-Kafka, Docker, Google Cloud Platform (GCP)

EXPERIENCE

Micron Technology, Inc

Taichung, Taiwan

Data Scientist Intern, Advanced Packaging Technology Development

Jul. 2023 – Aug. 2023

- Developed an object detection model using PyTorch, OpenCV, and YOLOv8 to measure High-Bandwidth Memory (HBM) die alignment shifts with **3 μm** spatial and **0.1°** angular precision, enabling real-time failure detection in advanced packaging
- Improved model training with data labeling, PyTorch data augmentation (flipping, rotation, random resizing) on 1,000+ 3DCT images, decreasing spatial precision error from **16 μm to 3 μm (81.25% improvement)**
- Replaced original physical scanning electron microscope (SEM) method with virtual YOLO method, which matched SEM precision while eliminating real-time defect analysis costs from **\$200/hr to \$0/hr**
- Documented comprehensive usage guidelines, model fine-tuning procedures, and bounding box parameter extraction methods which allowed non-technical stakeholders to adjust detection sensitivity based on manufacturing requirements
- Consolidated feedback via Jira from a cross-functional team, including 1 VP, 2 senior managers, and 2 engineers

PROJECTS

Course Project, Systems and Tool Chains for AI Engineering (14-763), CMU

Pittsburgh, PA

FIFA Player Value and Potential Prediction

Sept. 2024 – Nov. 2024

- Established PySpark ML regression pipeline to predict players values and potential from FIFA dataset containing over 220k data points, visualized with Matplotlib (boxplot), identifying undervalued players with **0.92 R^2** model performance
- Conducted data pre-processing (outlier handling) and feature engineering (normalization, principal component analysis, one-hot encoding, data scaling) to decrease Mean Squared Error by **10%**
- Deployed model on GCP leveraging T4 GPUs for CUDA-accelerated and distributed training across multiple nodes, implementing model parallelism to reduce training time by **15%** while maintaining prediction accuracy
- Integrated PostgreSQL database for data management, customized tables and indexes to improve query performance, wrote SQL queries to joining player statistics, lowered data preparation time by **10%** (compared to pandas)

Course Project, Machine Learning and Data Analysis, NTU

Taipei, Taiwan

Real-Time Gesture Recognition and Control

Feb. 2023 – Jun. 2023

- Constructed CNN model via OpenCV and PyTorch, empowering users to control computer interfaces (scroll, zoom) without physical contact, creating accessibility solution for users with mobility limitation
- Applied 5-fold Cross-Validation for model evaluation, Grid Search for Hyperparameter tuning, and visualized results through Scikit-Learn and Matplotlib, increasing CNN model accuracy by **15%**

RESEARCH

Mechanical and AI LAB (MAIL), CMU (Advisor: Prof. Amir Barati Farimani)

Pittsburgh, PA

AI agent for Chemical Process Optimization

Jan. 2025 – Present

- Trained AI agent for chemical plants unit operation control using AutoGen and LangChain in process simulation
- Utilized Pyomo and IDAES to construct process flowsheet in Python, providing baseline for AI agent decision-making

Process System Engineering Laboratory, NTU (Advisor: Prof. Bor-Yih Yu)

Taipei, Taiwan

Maleic Anhydride (MA) Production Process Simulation

Sept. 2022 – Dec. 2023

First author, "[Unraveling the Alternative Process Configurations for More Environmentally Friendly Maleic Anhydride Production](#)"

- Created NumPy/SciPy numerical model with Korea University, achieving **97.52%** energy efficiency and **99.9%** purity