

Minghao Zhou

RESEARCH ENGINEER | MACHINE LEARNING | COMPUTER VISION
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PROFESSIONAL SUMMARY

Research and machine learning engineer working across tactile sensing, biomedical data, computer vision, and production software. Experienced in multimodal data harmonization, reproducible ML pipelines, model deployment, sensor validation, and full-stack research tools. Works across Python, Java, deep learning frameworks, Linux, Docker, and modern web stacks.

PROFESSIONAL EXPERIENCE

VBTS Project Manager | Tuopu Group

Feb 2026 - Aug 2026

Ningbo, China

- Led end-to-end research for a fingertip vision-based tactile sensor for dexterous robot hands; benchmarked sensing principles and optical-flow/marker algorithms, authored a 13-chapter CTS specification, and aligned suppliers on elastomer and optical design.
- Recreated a vendor's PyArmor-encrypted tactile SDK as a white-box pipeline from raw imagery through optical flow to 3D deformation; implemented a custom ONNX Correlation operator for a PWC-Net-style network and achieved $r = 0.98$ against reference flow.
- Built a geometric decoder that lifted 2D flow to a 3D deformation field using a per-pixel Jacobian and flow-divergence normal; calibrated a ray-traced pixel-to-mesh mapping and achieved test R2 of 0.87-0.92 for tangential displacement.
- Developed Python and standalone tooling for LIN/CAN validation of diffusion-type O2 sensors, including rule-driven ASC decoding, filtering and plots, plus CANoe CAPL end-to-end, durability, and load tests.

Research Engineer | University of Florida, Department of HOBI

Nov 2023 - Present

Florida, US

- Curate, transform, and harmonize clinical, genomic, imaging, and research-generated datasets into UFGDC using NCI-GDC-aligned standards.
- Implement and customize preprocessing, quality-control, and downstream analysis pipelines for single-cell, spatial omics, and genomics data.
- Adapt PyTorch and TensorFlow frameworks for biomarker discovery and drug-response prediction.

Machine Learning Engineer | Konica Minolta Systems Laboratory

Jul 2023 - Dec 2023

San Jose, US

- Built a Python ML backend for automated model training on newly ingested datasets and productionized training workflows.
- Deployed Label Studio and developed auto-labeling capabilities to reduce manual annotation and QA effort.

Computer Vision Engineer | VisionX LLC | Part-time

Jun 2022 - Jul 2023

San Jose, US

- Implemented contour and defect detection with OpenCV and YOLOv7 for infusion-bag quality control and delivered a Tkinter GUI.
- Improved leaf-disease classification with Swin ViT and MobileViT to approximately 99.3% accuracy and used YOLOv7 for lesion-area detection.
- Deployed a YOLOv8 pipeline with tracking and pose estimation for automated retail shoplifting detection.

PROFESSIONAL EXPERIENCE CONTINUED

Software Engineer | Rice University, OIT and Research Computing

Jun 2022 - Aug 2022
Houston, US

- Built and published the Slave Voyages research website using React, Material UI, and Oracle infrastructure.
- Designed Sankey diagrams, route-flow maps, and trend visualizations with Leaflet, D3, and Plotly.
- Implemented Java Spring Boot microservices and REST APIs, wrote JUnit tests, and contributed to Jenkins CI/CD.

SELECTED PROJECTS

County-level COVID-19 Forecasting and Visualization | 2021

Collected daily U.S. county cases, engineered moving-average and geographic/population features, trained LSTM predictors, and published interactive Tableau maps and reports.

Vision-based Football Match Analysis | 2019-2020

Curated 3,000 player images; applied SiamMask tracking across approximately 70% of scenarios; trained a CNN with approximately 60% frame-wise action accuracy; and built a WeChat mini-app with a Django backend.

Hotel Management System and Web Pacman | 2019-2021

Built React and Heroku coursework applications with Java Spark REST backends, MVC and common design patterns, plus PHP and MySQL booking functionality.

EDUCATION

Rice University | M.S. in Computer Science | GPA 3.8 / 4.0

Aug 2021 - Jan 2023
Houston, TX

University of Nottingham | B.S. in Computer Science, Artificial Intelligence | GPA 3.9 / 4.0

Sep 2017 - Jun 2021
Nottingham, England

SELECTED PUBLICATIONS

- Liu, X., Wang, Q., Zhou, M., Wang, Y., et al. DrugFormer: Graph-Enhanced Language Model to Predict Drug Sensitivity. Advanced Science, 2024.
- Zhang, P., Chen, W., Tran, T. N., Zhou, M., et al. Thor: A Platform for Cell-Level Investigation of Spatial Transcriptomics and Histology. Nature Communications, 2025.
- Wang, Q., Pan, Y., Zhou, M., Tang, Z., et al. scDrugMap: Benchmarking Large Foundation Models for Drug Response Prediction. Nature Communications, 2025.
- Tang, Z., Zhou, M., Zhang, K., Song, Q. scPerb: Predict Single-Cell Perturbation via Style Transfer-Based Variational Autoencoder. Journal of Advanced Research, 2024.
- Wang, Y., Wang, Q., Zhou, M., Liang, J., et al. Integration of Genetic and Imaging Data for Alzheimer's Disease Diagnosis and Interpretation. Advanced Science, 2025.

TECHNICAL SKILLS

Programming: Python, Java, C/C++, SQL (MySQL, PostgreSQL, Oracle), Bash, HTML, CSS, JavaScript

Data and ML: PyTorch, TensorFlow, OpenCV, YOLO, PySpark, HDFS, Jupyter, Tableau

Platforms and Tools: Linux, Git, Docker, AWS, REST APIs, Maven, JUnit, Jenkins, IntelliJ, CANoe, ONNX

Engineering Practices: Agile development, object-oriented programming, data modeling, visualization, preprocessing, CI/CD

CERTIFICATION

AWS Certified Solutions Architect Associate: Issued June 2023