Chelsea Chi

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EDUCATION

University of Illinois Urbana-Champaign (UIUC) *Champaign, Illinois, United States*
Master of Engineering in Electrical and Computer Engineering (3.86/4.0) *Aug. 2025–Expected May 2027*
Coursework: Computer Vision, Autonomous Vehicle System Engineering, Control System Theory & Design

National Yang-Ming Chiao Tung University (NYCU) *Hsinchu, Taiwan*
Bachelor of Science in Electronics and Electrical Engineering (Last 60 credits: 3.81/4.3) *Sep. 2021–June 2025*
Coursework: Machine Learning, Data Structures & Algorithms

SKILLS

Programming: Python, C++, SQL, MATLAB
Computer Vision: object detection, segmentation, 3D perception, OpenCV
Robotics & Simulation: ROS2/ROS, Gazebo, Open3D, Rerun, RViz, LiDAR, camera/IMU fusion, sensor fusion/calibration
ML Systems & Tools: PyTorch, scikit-learn, Databricks, PySpark, MLflow, Git, Linux

WORK EXPERIENCE

Texas Instruments | *Information Technology Intern - Control Systems Engineer* *Dallas, TX | June 2026–Aug. 2026*
- Developed a Databricks/PySpark ML pipeline across 338M+ records; clustered devices by routing behavior, classified new devices, and trained per-cluster gradient-boosted models that reduced cycle-time RMSE 72.5% (10.49 to 2.89 days).
- Built a ML evaluation and backtesting platform with incremental data synchronization, MLflow experiment tracking, performance monitoring, and bottleneck diagnostics; partnered with engineering stakeholders to integrate its Docker containerization and Kubernetes deployment, enabling robustness validation before production release.

Delta Electronics | *AI Image Processing and Data Analysis Intern* *Taipei, Taiwan | July 2024–June 2025*
- Designed a multi-stage YOLOv8 computer-vision system for optical-fiber defect detection aligned with IEC standards; automated MES/Oracle SQL data acquisition to isolate micro-defects under noisy industrial conditions.

RELEVANT PROJECTS

3D Perception, Multi-Sensor Fusion, Localization & Tracking *Feb. 2026-Apr. 2026*
- Built a multimodal LiDAR-camera sensor-fusion and 3D geometry pipeline using stereo unprojection, target-free calibration, ICP (Open3D), and Graph-SLAM with Gauss-Newton optimization, reducing KITTI ATE RMSE from 0.68 m to 0.33 m.
- Trained and evaluated a CenterPoint-style BEV 3D object detector on LiDAR point clouds (>0.6 mAP on KITTI); added Kalman-filter tracking and Hungarian association for online 3D multi-object tracking and 3D scene understanding.

Crazyflie: Real-Time Multi-Sensor Perception & Navigation *Oct. 2025-Dec. 2025*
- Engineered a real-time ROS2 perception pipeline fusing camera, IMU, visual odometry, and YOLOv8 object detection for for real-time adaptive pose estimation in Nerfstudio; logged rosbags and implemented PD control with mean goal error below 8 cm.
- Developed a sim-to-real Crazyflie navigation pipeline using CasADi trajectory planning in FalconGym, achieving 100% success on trajectories verified with Vicon motion capture.

GEM e4: Real-World Perception, Automated Annotation & Navigation *Feb. 2026-May 2026*
- Developed and evaluated a robotic perception stack on the physical Polaris GEM e4, training a ResNet-34 U-Net for semantic segmentation (0.79 Dice) and YOLOv8s for multi-class object detection (0.995 mAP@0.5 stop signs, 0.896 boxes).
- Built an automated annotation and dataset-generation pipeline from rosbags using GroundingDINO and classical-CV pseudo-labeling, eliminating manual annotation; fused outputs into a body-frame scene model for FSM/DWA planning.
- Validated the 10 Hz stack in Gazebo and on real GEM e4 rosbags across lane-following, obstacle, pedestrian, and stop-sign scenarios, reaching 100% success, 0% collision, and 0.15 m cross-track error.

RFNet-Edit: Multimodal Segmentation & Diffusion Image Editing *Oct. 2025-Dec. 2025*
- Designed a VLM-based framework combining LLMs, segmentation, and diffusion inpainting to turn instructions into executable multimodal plans for multi-object editing with background preservation; exceeded Stable Diffusion XL by 6.7% in CLIP score on EditBench.

UR3 Robot Arm with ROS2 Vision-Guided Manipulation System *Aug. 2025–Oct. 2025*
- Developed a vision-guided 6-DOF UR3 robotics manipulator integrating forward/inverse kinematics, object detection, and camera calibration for autonomous grasping and placement with visual/suction feedback and real-time motion control.

RESEARCH EXPERIENCE

National Yang-Ming Chiao Tung University | *Undergraduate Research Assistant* *Sep. 2023–Dec. 2024*
- Developed an autonomous healthcare robot with obstacle avoidance, uneven-floor detection, and motion guidance; built its Android application on the Temi platform with navigation and real-time IoT connectivity over TCP/HTTP.
- Achieved 93% accuracy in a voice-input department-recommendation system using speech-to-text, RAG, and an LLM; co-first author on two papers (NSSSE 2025 Best Paper Award, ICSSE 2024 Best Session Presentation Award).