Jiachen Lu

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Education

Technical University of Munich, Munich, Germany 2022.10—2025.06
Master of Science (M.Sc.) in **Robotics, Cognition, Intelligence (RCI)** GPA: 1.7/1.0 (Lower is better)
Core Curriculum: Artificial Intelligence, Robotics, Machine Learning, Machine Learning (graph and sequence data), Deep Learning, Computer Vision (multi-view geometry/detection, segmentation and tracking), Advanced Driver Assistance System (ADAS), Autonomous Driving (AD) Software Development

Coburg University of Applied Sciences, Coburg, Germany 2020.10—2022.04
Bachelor of Engineering (B.Eng.) in **Automobile Engineering (AE)** GPA: 2.0/1.0 (Lower is better)
Core Curriculum: Vehicle dynamics, Mechatronics

Tongji University, Shanghai, China 2017.10—2022.04
Bachelor of Engineering (B.Eng.) in **Vehicle Engineering & After-Sales Services** GPA: 2.6/1.0 (Lower is better)
Core Curriculum: Advanced Mathematics, Physics, Mechanics, Electricity, Control Theory, Sensors and Actuators

Working Experience

Porsche Engineering Services GmbH, Moensheim, Germany 2024.04—2024.09
ADAS Test and Development Engineer Internship
Tech Stack: Python

- Responsible for functional/unit/integration testing of Mobileye SuperVision's L2++ level assisted driving system. Constructed test reference routes based on Google Map and actual driving experience, and designed test cases based on multi-dimensional test evaluation matrix and actual weather and road conditions
- Responsible for the maintenance and development of the test system for the Cayenne with Mobileye Driver Assist, providing on-site support and accompanying tests for highway and urban road tests, as well as real-time documentation of test conditions
- Provided test system maintenance and development for Macan 4 with IAV and Bosch Parking Assist, on-site support and accompaniment for functional tests such as ePark/TPA/RA, and real-time documentation of test status and test case passes
- Analyze recorded autonomous driving test videos and update & optimize test routes as well as test cases
- Support the ADAS Driving and Parking team in their day-to-day development and testing activities, and be responsible for the onboarding of new ADAS team members

Daimler Trucks AG, Stuttgart, Germany 2021.10—2022.03
Charging System Test and Development Engineer Bachelor's Degree Thesis
Thesis title: Development of a restbussimulation for charging system control units and software modules as well as test concepts
Tech Stack: CAPL/Vector CANoe/Hardware-in-the-loop simulation (HiLs)/Restbussimulation

- Design and development of V-models, **Hardware-in-the-Loop simulation (HiLs)** and **Restbussimulation**, for the testing of the charging system components of the eActros electric trucks
- Write, Extend and Optimize existing test cases based on existing test frameworks and ECU development standards
- Introduce the concept of **Key Performance Indicators (KPIs)**, develop evaluation criteria and tools for test case automation, and evaluate existing test cases
- Write implementation scripts for automation test cases based on **CAPL** and **CANoe**, design and build corresponding script configuration and visual user interface

Daimler Trucks AG, Esslingen am Neckar, Germany 2021.05—2021.10
High Voltage (HV) Component Test and Development Engineer Internship
Tech Stack: CAPL/Vector CANape/Vector CANalyzer

- Supporting teams in the daily development and testing of HV resistor assemblies in the powertrain of eActros electric trucks
- Design of test concepts and coordination of test plans for the eActros summer road function tests. Provide **on-site support** and accompany the tests during the testing
- Design and build a visual **GUI** based on **CANape** for real-time monitoring of the operational status of specific components of the test vehicle
- Write component test scripts based on **CAPL** and **CANape** to monitor, collect and analyze test data online by monitoring the CAN bus
- Develop and write automated data mining scripts for offline evaluation of specific components of test vehicles based on CAPL and CANape's **data mining** capabilities

Project Experience

TOD2D: Road object target detection and classification for 2D images 2024.03—2024.05

Tech Stack: Python/Pytorch/OpenCV/YOLOv5-v9/DETR/SwinT/ResNet/EfficientNet *Project Link: TOD2D*

- Data cleansing, data augmentation and creation of dataset in **YOLO/COCO** format based on **nuImages** 2D image dataset
- Target detection of images in nuImages dataset using **YOLOv5-v9** belonging to One-Stage and Transformer-based **DETR/SwinT**
- Using **OpenCV** and pre-trained **YOLOv9** to extract and preclassify the target objects for the traffic light dataset **DTLD/BSTLD** and the traffic sign dataset **GTSRB/TT100K**, resize the images of the target objects and create the YOLO-format dataset
- Using the manually created traffic light and traffic sign datasets, pre-training the classification headers for classifying the type and color of traffic lights as well as the content of traffic signs based on **ResNet50** and **EfficientNet b3** were used as Second-Stage classifiers for **YOLOv9**
- Compared to direct training **YOLOv9**, **TOD** has improved training speed by **65%**, reduced hardware requirements by **25%** and improved ACC by about **12%**

End-to-end learning for self-driving cars 2023.10—2024.03

Tech Stack: Python/Pytorch/Pytorch Lightening/OpenCV/ResNet/ViT/GRU *Project Link: SelfDrivingCars*

- Based on Unity's car driving simulator, manually sampling the training data and utilizing **OpenCV** to clean, filter, process and augment the raw image data
- Using **ResNet50** as an image feature learning backbone module to realize direct steering angle prediction using vehicle front images, i.e., end-to-end learning
- In the ablation experiments, the performance of different network architectures in realizing end-to-end learning are tested, including **ResNet50**, **ResNet50+GRU** and **ViT**
- Compared to other models, the training and inference speed of ResNet50 is improved by **35%**, and the autonomous driving model trained based on ResNet50 realizes the high speed of a small car in the driving simulator with **0** collision

SoftCap: Generating Dense Descriptions for 3D Point Cloud using Sparse Convolution 2023.04—2023.09

Tech Stack: Python/Pytorch/Pytorch Lightening/C++/SoftGroup/GNN/GRU/Attention *Project Link: SoftCap*

- Applying **SoftGroup** as the detection backbone module in 3D point cloud scenarios to implement a soft grouping mechanism on point cloud data for instance proposal generation and classification
- Constructing **GNN** based on physical relationships between instances in the 3D point cloud scene, and obtaining as well as learning spatial features from instance to instance through the message passing algorithm
- Generating descriptions of instance features and their spatial attributes in the 3D point cloud scene based on augmented object features by means of a multilayer **GRU module** and **attention mechanism**
- In the process of training the model, supervised learning based on **Teacher Forcing** and reinforcement learning based on **Self-Critical** are used
- In the ScanRefer dataset, SoftCap performs well in localizing and describing objects in the 3D point cloud scene, **mAP@0.5IoU** reaching **57.38** and **CIDEr@0.5IoU** reaching **36.27**. Compared to previous work, SoftCap's performance improves **140%**

Honors and Awards

- **Phoenix Contact Scholarship** 2020.09

IT Skills

- **Programming Languages:** Python, C++, CAPL, Matlab/Simulink
- **Commonly used tools:** Pytorch, Pytorch Lightening, NumPy, OpenCV, Pandas, Git, Docker
- **Commonly used Software:** Word/Excel/PowerPoint, Vector CANoe/CANape/CANalyzer, AutoCAD, CATIA V5

Language Skills

- **English (C1):** IELTS **Overall: 7** Listening: 8 Reading: 7 Writing: 6.5 Speaking: 6 2022.01
- **German (C1):** TestDaF **Overall: 15** Listening: 3 Reading: 4 Writing: 4 Speaking: 4 2021.12

Other Skills

- **Driving License:** German B197 license, Chinese C1 license