

JIAWEI LU

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EDUCATION

Columbia University **Dec 2022 Expected**
New York, NY
Master of Science in Electrical Engineering GPA: 3.80 / 4.00

Nanjing University **Sep 2017 – Jun 2021**
Nanjing, China
Bachelor of Science in Physics and Acoustics GPA: 4.46 / 5.00
Honors and Awards: National Scholarship (8 / 600), Sep 2019

TECHNICAL SKILLS

Programming Languages: Java, Python, C++, C, SQL, MATLAB, HTML/CSS
Machine Learning Fields: Vision (Detection, Tracking), Natural Language Processing (RNNs, Transformers), RL (DQN)
Deep Learning Tools: PyTorch, TensorFlow, Nvidia SDK(CUDA, TensorRT, DeepStream), Cloud Services (GCP, AWS)

WORK EXPERIENCE

Wireless & Mobile Networking (WiMNet) Lab - Deep Learning Research Assistant (Full-time) **May 2022 - Now**
New York, NY
Group: AI Applications for COSMOS Smart City Intersections (NSF-funded)

- Collected traffic videos from the COSMOS testbed, created training datasets, and performed data augmentation.
- Fine-tuned the YOLOv4 model on our datasets and the average precision of object detection achieved 95.2%.
- Transformed several PyTorch models into Nvidia TensorRT engine by developing high-performance C++ APIs.
- Deployed state-of-the-art detectors and trackers in Nvidia DeepStream for real-time detection and tracking tasks.

Berkeley Artificial Intelligence Research (BAIR) Lab - Machine Learning Research Assistant (Part-time) **Feb 2020 - Sep 2021**
Berkeley, CA
Group: Autonomous Driving

- Created vehicle trajectory datasets for training autonomous vehicles with Prof. Alexandre Bayen.
- Realized image re-projection through QGIS to coordinate image pixels and GPS locations.
- Improved the stabilization of aerial traffic videos by applying the color detection algorithm.
- Applied Faster R-CNN for detecting vehicles in traffic and Kalman filter for object tracking.

SELECTED RESEARCH

Investigations of Vision Transformer and its Recent Improvements **Mar 2022 - May 2022**
New York, NY
Supervisor: Prof. Zoran Kostic, Columbia University

- Reproduced evaluation results of Vision Transformer (ViT) and its two variants.
- Analyzed and compared performances of fine-tuning the pre-trained models on smaller datasets.
- Trained the Data-Efficient Image Transformer on ImageNet-1k, and evaluated its transfer performance.
- Showed the robustness of ViT by fine-tuning and evaluating it on partially mislabeled datasets.

Improvements of Active Object Localization with Deep Reinforcement Learning **Oct 2021 - Dec 2021**
New York, NY
Supervisor: Prof. Chong Li, Columbia University

- Replaced feature extractor part of Q-Network with several latest CNNs.
- Proposed a 25-action model and trained it with extra trigger samples to deal with label imbalance.
- Modified the reward function to avoid undesired action selections of the agent.
- Improved Inhibition of Return mechanism by deploying the proposed prediction algorithm.

A New Backbone for Hyperspectral Image Reconstruction and Improvement based on Mask Mixture Training and Energy Normalization **Oct 2021 - Dec 2021**
New York, NY
Supervisor: Prof. Zoran Kostic, Columbia University

- Implemented a modified version of U-Net named Spatial/Spectral Invariant Residual U-Net (SSI-ResU-Net).
- Utilized Mixed Training and Energy Normalization to increase the generalization ability of SSI-ResU-Net.

Application of Reinforcement Learning in Single-Channel Speech Enhancement System **Jan 2021 - Jun 2021**
Nanjing, China
Supervisor: Prof. Jing Lu, Nanjing University

- Built a Q-Learning model for the Deep Xi system that estimates A Priori SNR for speech enhancement.
- Designed a two-stage self-optimization algorithm named Xi-Q to improve the accuracy of action selection.
- Evaluated the performance of Xi-Q Algorithm by computing the Perceptual Evaluation of Speech Quality.

PUBLICATION

Wu, F., Wang, D., Hwang, M., Hao, C., **Lu, J.**, Darrell, T., & Bayen, A. *Motion Planning in Understructured Road Environments with Stacked Reservation Grids*. Perception, Action, Learning (PAL) @ ICRA (2020). **Jun 2020**

PATENT

A Refined Path Planning Method for Intelligent Transportation based on the Grid Expansion Model (patent No.: CN109959388A) **Apr 2019**