CHANGJIE LU

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EDUCATION

Wenzhou-Kean University Wenzhou, China

B.A. in Mathematics and Applied Mathematics (Minor in Computer Science) Sept 2019 – Jun 2023(expected)

- GPA: 3.805/4.000 (Major GPA: 3.833/4.000)
- Graduate Thesis: Domain Robust Medical Image Segmentation (Defended at 3rd year)
- Selected awards: Dean List Research Scholarship (top 1%, Sept 2021), Research Day Best Oral Presentation (top 1%, Apr 2022), Dean List Scholarship (top 20%, Sept 2021)
- Core courses: Calculus, Real Analysis, Probability, Linear Algebra, Numerical Analysis, Machine Learning, Data Structure, Advanced AI (Graduate Level), Advanced Algorithm Analysis (Graduate Level).

PUBLICATIONS

1. **Changjie Lu**, Shen Zheng, Gaurav Gupta, "Unsupervised Domain Adaptation for Cardiac Segmentation: Towards Structure Mutual Information Maximization", *IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshop (CVPRW'22)* **(Accepted)**.
2. **Changjie Lu**, Shen Zheng, Zirui Wang, Omar Dib, Gaurav Gupta, "AS-IntroVAE: Adversarial Similarity Distance Makes Robust Intro-VAE", *Asian Conference on Machine Learning (ACML'22)* **(Accepted)**.
3. Shen Zheng, **Changjie Lu**, Yuxiong Wu, Gaurav Gupta, "Segmentation-Aware Progressive Network for Perceptual Contrastive Image Deraining", *IEEE/CVF Winter Conference on Applications of Computer Vision Workshop (WACVW'22)* **(Accepted)**.
4. Shen Zheng, Yuxiong Wu, Shiyu Jiang, **Changjie Lu**, Gaurav Gupta, "Deblur-YOLO: Fast Real-Time Object Detection with Blind Motion Deblurring", *IEEE International Joint Conference on Neural Networks (IJCNN'21, Oral)* **(Accepted)**.
5. ***Changjie Lu***, "A Survey on Causal Representation Learning and Future Work for Medical Image Analysis", 2022, *Arxiv*.
6. Yining Lu*, **Changjie Lu***, Naina Bandyopadhyay, Manoj Kumar, Gaurav Gupta, "Functional Optimization Reinforcement Learning for Real-Time Bidding", 2022, Under review.
7. Shen Zheng, Jinqian Pan*, **Changjie Lu***, Gaurav Gupta, "PointNorm: Dual Normalization is All You Need for Point Cloud Analysis", *International Conference on Robotics and Automation (ICRA'23)*, Under review.

RESEARCH EXPERIENCE

3D Cryo-ET Synthesis using Diffusion Model Carnegie Mellon University, Pittsburgh

Research student of XuLab, Advisor: Min Xu Nov 2022 – Present

- Aimed to implement a text to image model for macromolecular protein synthesis

Domain Adaptation for Cardiac Segmentation via Information Theory Wenzhou-Kean University, Wenzhou

Research assistant, Advisor: Gaurav Gupta Jan 2022 – Apr 2022

- Investigated an unsupervised domain adaptation algorithm including implicit and explicit methods.
- Derived a compact loss lower bound of object function including a mutual information term and designed a plug-and-play mutual information neural estimation algorithm; Improved multi-modality cardiac image segmentation accuracy by 2-4%.
- Completed a paper as the first author, which has been accepted by 2022 CVPR pre-recognition workshop.

Adversarial Similarity Distance for Image Generation Wenzhou-Kean University, Wenzhou

Research assistant, Advisor: Gaurav Gupta Mar 2022 – Aug 2022

- Investigated GAN-related mathematical derivation including Wasserstein distance estimation, Lipschitz condition, etc; Implemented a general data pre-processing method and network architecture for fair model comparisons.
- Proposed an adversarial similarity distance to solve the problems of posterior collapse and vanishing gradient in the Intro-VAE models and provided mathematical proof.
- Improved visual effects of synthesized images by about 10% (FID score) with more stable training and composed a paper as the first author, which has been accepted by ACML'22.

Point Cloud Semantic Segmentation and Classification Wenzhou-Kean University, Wenzhou
Research assistant, Advisor: Gaurav Gupta Mar 2022 – Sept 2022

- Conducted a literature review of state-of-the-art point cloud papers and provided mathematical analysis for dual normalization in the point extraction process; Implemented the dual normalization technique on Pointnet++ model.
- Assisted the model comparison works and designed the workflow architecture.
- Composed a paper as the co-second author, which is under review by ICRA'23.

Real-Time Bidding via Deep Reinforcement Learning Wenzhou-Kean University, Wenzhou
Research assistant, Advisor: Gaurav Gupta Sept 2021 – Dec 2021

- Studied a second-price real-time bidding algorithm for online advertisement; Proposed an operations research model.
- Implemented the multi-agent reinforcement learning (DQN) algorithm to solve the operations research problem.
- Finished a paper as the co-first author, which is under review.

Light-Weight Model for Real-Time Image Deraining Wenzhou-Kean University, Wenzhou
Research assistant, Advisor: Gaurav Gupta Mar 2021 – Nov 2021

- Investigated the techniques of deraining, including progressive strategy, GAN, etc.
- Proposed a contrastive learning loss function and conducted comparison experiments.
- Composed a paper as the co-second author and published it at 2022 WACV VAQ workshop.

Real-Time Object Detection with Blind Motion Deblurring Wenzhou-Kean University, Wenzhou
Research assistant, Advisor: Gaurav Gupta Sept 2020 – Feb 2021

- Studied real-time and efficient motion de-blurring algorithms, drew a model workflow and solved the gradient explosion problem during training.
- Completed a paper as the fourth author and published it at IJCNN'22 (Oral).

INTERNSHIP EXPERIENCE

Findability Science India
Algorithm Consultant Sept 2021 – Dec 2021

- Assisted a real-time online advertising bidding business; analyzed and explained about 20 related papers to their teams and proposed operational research strategies.
- Implemented an efficient deep Q-learning learning method in Python and saved about 10% of the total budget.

Newford Research Institute of Advanced Technology Wenzhou
Data Analysis Intern Sept 2020 – Dec 2020

- Conducted industry analysis of Zhejiang province using crawler.
- Cleaned the data using Pandas, Numpy. Made visualization plots using Tableau and Python and concluded an industry pattern report.

ADDITIONAL INFORMATION

Additional Professional and Extracurricular Experiences

- Founder, AI Lab, Department of Mathematics (Feb 2022): Organized weekly workshops, taught basic knowledge of computer vision and machine learning, and maintained the GPU server; Guided team members to carry out medical image analysis research.
- Invited Talk in Fudan University (Mar 2021): discussed image processing research with doctoral students and their supervisor Dr. Xiahai Zhuang in ZMIC Lab, and learned medical imaging analysis knowledge.
- Resident Assistant, Wenzhou-Kean University (Jun 2020-Dec 2020): Assisted to solve dormitory disputes and epidemic prevention problems and maintained environmental security of dormitory.
- AAAI-21, RECOMB'23, WACV-23's Reviewer

Computer and Language Skills

- Chinese (Native); English (TOEFL 107)
- Python, Java, Matlab, R, HTML, Markdown, LaTeX, etc.

Interests

- Road Bicycle; Running; Fitness; Chinese Chess (Four times City-level Championship)