

SHEN ZHENG

88 Daxue Rd, Wenzhou, Zhejiang, China

☎ (+86)137-8012-7158 ✉ zhengsh@kean.edu  [Linkedin](#)  [Personal Website](#)  [Github](#)  [Leetcode](#)  [Google Scholar](#)

EDUCATION

Wenzhou-Kean University

Sep 2017 – Jun 2021

B.A. in Mathematical Sciences, Minor in Economics, Magna Cum Laude

Wenzhou, China

- Major GPA: 3.944/4.000 (Rank: 1/29) | Cumulative GPA: 3.800/4.000 (Rank: 2/29)
- Relevant Coursework: Applied Machine Learning, Computer Organization & Programming, Big Data Computing, Statistical Data Mining, Foundation of Data Analysis, Data Visualization, Numerical Analysis, Differential Equations, Probability & Statistics, Econometrics.
- Honors: Dean's List (Top 1%); Zhejiang Provincial Government Scholarship (Top 3%); Outstanding Graduate (Top 10%).

PUBLICATIONS

1. Changjie Lu, **Shen Zheng**, and Gaurav Gupta (2022), "Unsupervised Domain Adaptation for Cardiac Segmentation: Towards Structure Mutual Information Maximization". Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**). IEEE.
2. **Shen Zheng** and Gaurav Gupta (2022), "Semantic-Guided Zero-Shot Learning for Low-Light Image/Video Enhancement". Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**). IEEE.
3. **Shen Zheng**, Changjie Lu, Yuxiong Wu, and Gaurav Gupta (2022), "SAPNet: Segmentation-Aware Progressive Network for Perceptual Contrastive Deraining". Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**). IEEE.
4. **Shen Zheng**, Yuxiong Wu, Shiyu Jiang, Changjie Lu, and Gaurav Gupta (2021), "Deblur-YOLO: Real-Time Object Detection with Efficient Blind Motion Deblurring", International Joint Conference on Neural Networks (**IJCNN**). IEEE.
5. **Shen Zheng**, Liwei Wang, and Gaurav Gupta (2020), "Efficient Ensemble Sparse Convolutional Neural Networks with Dynamic Batch Size", International Conference on Computer Vision and Image Processing (**CVIP**). Springer.

RESEARCH EXPERIENCE

Unsupervised Domain Adaptation for Cardiac Segmentation: Towards Structure Mutual Information Maximization

Feb 2022 – Apr 2022

Team Member | Advisor: Dr. Gaurav Gupta, Wenzhou-Kean University

Wenzhou, China

- Introduced UDA-VAE++, an unsupervised domain adaptation framework with a compact loss function lower bound for cardiac segmentation.
- Developed a Structure Mutual Information Estimation block to maximize the mutual information between the reconstruction and segmentation tasks.
- Designed a sequential reparameterization scheme that enables information flow and variance correction from low-resolution to high-resolution.
- Achieved the best Dice/ASSD score on cardiac segmentation datasets, including MM-WHS (68.5%/4.64mm) and MS-CMRSeg (78.4%/2.64mm).

Implicit Neural Representation for Isosurface Rendering

Jul 2021 – Sep 2021

Team Member | Advisor: Dr. Chaoli Wang, University of Notre Dame

Online

- Constructed a fully convolutional neural network with Siren activation function to render isosurfaces with image resolution, viewpoints and isovalue.
- Utilized Greene's bisection method and Jacobian matrix's eigenvalue for critical point detection and classification in 3D isosurface simulation.
- Obtained a top score in PSNR/SSIM/MSE (27.87/0.963/0.002) and a training loss of 0.0001 with 162 training images (others use >1,000 images).

Semantic-Guided Zero-Shot Learning for Low-Light Image/Video Enhancement

Apr 2021 – Jun 2021

Team Leader | Advisor: Dr. Gaurav Gupta, Wenzhou-Kean University

Wenzhou, China

- Proposed a semantic-guided, zero-shot, low-light image enhancement network that consolidates high-level semantics into low-level enhancement.
- Constructed a recurrent image enhancement network that only demands an enhancement factor map with five non-reference loss functions.
- Attained the best average UNIQUE/BRISQUE (0.805/27.01) and mIOU/mPA (65.87%/74.50%) for six datasets with the best inf. time (<0.001s)

SAPNet: Segmentation-Aware Progressive Network for Perceptual Contrastive Deraining

Feb 2021 – Aug 2021

Team Leader | Advisor: Dr. Gaurav Gupta, Wenzhou-Kean University

Wenzhou, China

- Built a real-time deraining network that integrates supervised rain removal, unsupervised semantic segmentation, and perceptual contrastive loss.
- Designed a progressive dilated unit with channel residual attention and Learned Perceptual Image Similarity to characterize multi-scale rains.
- Obtained the best average PSNR/SSIM (33.19/0.945) at Rain12, Rain100L, and Rain100H and the best mAP/mPA/mIOU (81.0%/76.6%/60.1%).

Deblur-YOLO: Real-Time Object Detection with Efficient Blind Motion Deblurring

Oct 2020 – Jan 2021

Team Leader | Advisor: Dr. Gaurav Gupta, Wenzhou-Kean University

Wenzhou, China

- Invented Deblur-YOLO, a Generative Adversarial Network (GAN) with a dilated feature pyramid generator, a pair of multi-scale discriminators, and a YOLO discriminator performing real-time object detection with fast blind motion blur removal.
- Achieved a state-of-the-art inference time of 0.0772s, and a mAP of 47.5%, PSNR of 23.94, and SSIM of 0.817 at the blurred COCO 2014 dataset.

Efficient Ensemble Sparse Convolutional Neural Networks with Dynamic Batch Size

Mar 2020 – Jun 2020

Team Leader | Advisor: Dr. Gaurav Gupta, Wenzhou-Kean University

Wenzhou, China

- Integrated weighted average stacking, network pruning, Winograd-ReLU convolution for AlexNet, VGG-16, and ResNet-32.
- Developed an Electromagnetism-inspired dynamic batch size algorithm for accumulating the learning rate, momentum coefficient, and batch size.
- Accelerated CNNs on FASHION-MNIST, CIFAR-10, and CIFAR-100 to 1.55x, 2.86x, and 4.15x with 2.66%, 1.37%, and 4.48% acc. improvement.

PROFESSIONAL EXPERIENCE

Momenta (An Autonomous Driving Company)

Sep 2021 – Present

Computer Vision Engineer | Mentors: Mr. Yongjun Yu & Dr. Wangjiang Zhu

Suzhou, China

- Responsible for long-tailed data augmentation, training data auto-labeling and cleaning, and model evaluation for traffic light detection algorithms.
- Implemented CycleGAN to conduct unsupervised data augmentation, converting traffic light bulbs from left arrow to round & leftUturn arrow.
- Constructed a traffic light auto-label model using quantized VoVNet-57, filtering 14,618 incorrect annotations from 1,160,513 labeled frames.
- Increased the classification accuracy for leftUturn traffic light from 78.41% to 87.27%, and the mean average precision from 93.01% to 94.80%.