

ChengAo Shen

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EDUCATION

Sichuan Agricultural University

Ya'an, CN

BSc. in Information and Computing Science

Sep 2020 - Jun 2024

- **GPA:** 3.91/5.0, ranking: 23/150
- **Awards:** Third Prize in the China Undergraduate Mathematical Contest in Modeling in 2022, Third Prize of Mathorcup in 2022, Meritorious Winner of the ShuWei Cup in 2020, Sichuan Agricultural University Outstanding Student award in 2023
- **Relevant Courses:** Data Structure, Computer Operating System, Computer Network, Computer Image Processing Techniques, Design and Analysis of Algorithms, Probability-and-Statistics, Numerical Analysis, Discrete Mathematics

PUBLICATIONS

- **ChengAo Shen**, Siyuan Mu, Ge Diao, “Emoji Kitchen with Controlled Fusion”, *ICLR 2024 TinyPapers*
- Chun Wu, Hongrong Chang, Xianjin Chen, **Chengao Shen**, etc., “Deep learning assisted rapid assessment of food freshness using an anti-interfering triple-emission ratiometric fluorescent sensor”, *ACS Sustainable Chemistry & Engineering*
- Zhiwei Lua, Yonghui Gong, **Chengao Shen**, etc., “Portable, intelligent MIECL Sensing platform for ciprofloxacin detection using a fast convolutional neural networks-assisted Tb@Lu₂O₃ nanoemitter”, *Food Chemistry*

RESEARCH EXPERIENCE

CellMamba: Instance Segmentation Method for Ultra-High-Count Cell Images

Ya'an, CN

Supervisor: Zhaoli Shen

May 2024 – Present

- Introduced the Mamba structure to biological cell instance segmentation, proposing a new model, CellMamba
- Utilized the Mamba mechanism to analyze global illumination, contrast, and color distribution in input images, enhancing segmentation accuracy while Enhanced inference speed and reduced computational costs
- Introduced the Ultra-Cell dataset with more than 1000 instances per image

Action Recognition for Animals

Ya'an, CN

Supervisor: Zhaoli Shen

Apr 2023 – Apr 2024

- Improved performance of the Video Swin-Transformer for the Animal Kingdom dataset by 30 mAP over the baseline, by adapting its layers and temporal structure
- Built a data set including different behaviors of pigs; labeled the location and timestamp of pigs in the video to provide sample information for network training
- Fine-tuned the pre-trained model on the large data set and reached the high-precision detection of pigs' movement behavior in the specific environment
- Deployed the method on the farm to monitor the behaviors of the pigs

Instance Segmentation in Bio-Medical Images with Sparse model

Ya'an, CN

Supervisor: Zhaoli Shen

Jan 2024 – May 2024

- Enabled the deployment of the traditional MaskRCNN on home computers with low GPU memory when dealing with Bio-Medical Images which have High-Resolution and large amounts of samples.
- Reduced the consumption of storage space. We stored masks in a sparse format, which minimized the storage of other blank areas and enhanced hardware utilization
- Used a data augmentation method that focuses on the cell data. The method assists the model in learning and extracting more information from the cells' photos to improve the slide windows prediction strategy and performance

Emoji Kitchen With Controlled Fusion

Ya'an, CN

Supervisor: Zhaoli Shen

Nov 2023 - Dec 2023

- Proposed a new, novel image fusion network named 'Controlled Fusion Network', which can accept any number of input images and fuse them into an output image containing semantic information
- Ensured the model is lightweight and has low coupling, making training easier and enabling quick migration to other fields
- Collected a new dataset about emoji fusion and proposed a new image fusion task that uses the model to realize the semantic information while retaining the details, to test the model

Introduction to Neural Networks Research Program

Ya'an, CN

Supervisor: Pavlos Protopapas, Harvard University

Jul 2023 - Aug 2023

- Learned about artificial neural networks, including fundamental algorithms, practical techniques, and advanced topics like CNNs, transfer learning, and auto-encoders
- Led a team in creating a model to implement convolutional neural networks to determine the age of ceramics. The model was based on techniques like depth-wise separable convolution to keep it lightweight, enabling deployment and demonstration on local computers

Intelligent Sensing based on Deep Learning

Ya'an, CN

Supervisor: Hanbing Rao

Nov 2022 - Apr 2023

- Identified chemical-specific targets based on the object detection algorithm and judged the luminescence of substances through color changes and ratios by the classification algorithm.
- Designed deep learning methods with YOLOv8 to analyze the fluorescent image, deployed the deep learning model on a cloud server, and established the WeChat application to boost the research
- Accelerated the efficiency of chemical experiments by reducing the need for manual experimental operations

WORK EXPERIENCE

Hangzhou Fudian Intelligent Information Technology Co., Ltd.

Hangzhou, CN

Position: Software Development Intern

Jul 2019 – Jun 2024

- Applied intelligent algorithms to assist in software development
- Used target detection and tracking algorithms to register products in and out of a warehouse automatically
- Made a handheld targeted object dilatometer based on Raspberry Pi, applied for the patent, and deployed deep learning in the embedded applications
- Used object detection algorithm to recognize specified objects and conducted rapid stock in and out
- Made web pages and applets and managed the procedures of multiple projects

ADDITIONAL INFORMATION

- **Computer Languages and Skills:** Python (Pytorch, Numpy, Pandas, matplotlib), Linux, Rust, Latex, C++, SPSS, Javascript (React, Nodejs), Matlab
- **Languages:** Mandarin (native), English (iBT TOEFL 96), Japanese (basic)
- **Interests:** Running, Cycling, Reading (science fiction, philosophy, biography), Skiing