Jiankun Zhao

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Education

Nankai University **Sep 2020 – Jun 2024 (Expected)**
Bachelor of Engineering in Computer Science *Tianjin, P.R.China*

- GPA: 93.28/100 3.94/4.0 (Rank 1/143)
- Relevant Coursework
  - Introduction to Artificial Intelligence (98)
  - Linear Algebra (94)
  - Discrete Mathematics (99)
  - Probability and Mathematical Statistics (94)
  - High Level Language Program Design 2-2 (99)
  - Introduction to Algorithms (93)

Awards and Scholarships

National Scholarship | *top 0.2%, the highest honor in China* **2021–2022**

National Scholarship **2020–2021**

Honorable Mention in Mathematical Contest in Modeling **Feb 2022**

First Prize in Chinese Chemistry Olympiad **Sep 2019**

Research Experience

Point Cloud Instance Segmentation **Jun 2022 – Present**
Undergraduate Research Assistant | Nankai University *Advisor: Prof. Jin Xie*

As a bottleneck in deep automotive perception, robotics and virtual reality, point cloud instance segmentation is a challenging task in 3D computer vision. I proposed and am still conducting experiments on a novel deep neuron network which integrates superpoint and mask strategy.

- Analized drawbacks of historical SOTA models (mask3D, SoftGroup, HAIS, etc.) on Scannet benchmark, aiming at overcoming Long-tail Effect and improving performance on minor classes.
- Proposed a novel network architecture which generates hierarchical superpoint features from sparse U-Net backbone and use transformer decoder structure to refine instance proposals.
- Add an offset branch and a central loss to prevent under-segmentation and over-segmentation. (ongoing)

SoH Prediction of Li-ion Batteries **Oct 2022 – Jan 2023**
Undergraduate Research Assistant | Nankai University *Advisor: Prof. Qicheng Li*

Predicting State of Health (SoH) of Li-ion batteries is a fundamental task of battery management systems on electric vehicles. I designed, implemented and trained a deep learning model which needs only a few aging statistics to accurately predict long-term SoH.

- Proposed CyFormer, a generalized cyclic time sequence model with row-wise and column-wise self-attention blocks.
- Adopted a two-stage transfer learning strategy to narrow the domain gap between different working conditions.
- Designed a light weight version of CyFormer for embedding systems by pruning.

Low-resolution License Plate Recognition **July 2022**
Computer Vision Research Intern | Chinasoft International Inc. *Advisor: Wei Li*

- Designed, implemented and trained a license plate detection and recognition model based on YOLO, ResNet/MobileNet and WPOD-NET.

Publications

Zhiqiang Nie*, Jiankun Zhao*, Qicheng Li and Yong Qin (2023). "CyFormer: Accurate State of Health Prediction of Li-ion Batteries via Cyclic Attention". In: *2023 International Joint Conference on Neural Networks (IJCNN)*. In revision.

Projects

Parallization of MFCC-KNN Audio Classification Model **Mar 2022 – Jul 2022**

- Divided MFCC algorithm into ten steps. Used different parallization methods (MPI, Pthreads, openMP, SIMD, etc.) to accelerate these steps respectively.
- Parallized KNN algorithm on ARM CPU , x86 CPU and Nvidia GPU respectively.
- Reached 6.92× acceleration of MFCC on ARM CPU, 17.05× acceleration of KNN on x86 CPU, and 23.5× acceleration of KNN on Tesla T4 GPU.

SysY Compiler **Oct 2022 – Jan 2023**

- Designed and implemented a compiler for sysY, a subset of C, on ARM.
- Constructed the lexical analyzer with Lex and the parser with Yacc. Implemented the abstract syntax tree (AST), the LLMV IR generator and the ARM assembly code generator from scratch with C++.
- Supported arrays, float numbers, break & continue statements, and self-defined functions.

Skills

Programming: Python (fluent), Java (fluent), C/C++ (fluent), CUDA, SQL, Verilog
Tools and Frameworks: PyTorch, numpy, openCV, LaTeX, bash, git, lex & Yacc
Network Architectures: transformer & ViT, ResNet, U-Net, CLIP, VAE, etc.
Languages: TOEFL 106