HUAWEI LIN

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JUNIOR IN COMPUTER SCIENCE

- **ACM-ICPC Asia Bronze Medal** in the ACM-ICPC International Collegiate Programming Contest.
- Got **National Project Funding** of ￥20,000 in 2019 National Training Program of Innovation and Entrepreneurship for Undergraduates.

HONORS & AWARDS

Received **4 national awards**, 4 provincial awards, 6 college awards during the undergraduate period.

- Group Programming Ladder Tournament, Third Prize *March 2018*
- LAN QIAO Collegiate Programming Contest (Shaanxi Province), Third Prize *April 2018*
- **Shaanxi Province Gaoxin Collegiate Entrepreneurship Contest, Gold Medal** *May 2018*
- **ACM-ICPC Chinese Collegiate Programming Contest, Bronze Medal** *June 2018*
- **ACM-ICPC Asia Regional Contest Jiaozuo Site, Bronze Medal** *November 2018*
- China Collegiate Computer Design Competition (Northwest), Third Prize *May 2019*
- **ACM-ICPC National Invitational Programming Contest, Bronze Medal** *May 2019*
- etc.

EXPERIENCE

Institute of Artificial Intelligence, SUST *September 2017 - Present*

Human Tactile Brain Function Topological Analysis Platform Based on functional Magnetic Resonance Imaging (fMRI)

- The project is a collaboration between Dr. Qi Yong and Xijing Hospital in Xi'an. This project performs a universal topological analysis of the functional activation regions of the tactile stimuli of the human brain, and aims to find the **mapping relationship** between human skin tactile sensors and the brain.
- This project has been selected as 2019 National Training Program of Innovation and Entrepreneurship for Undergraduates, and received **national project funding**.
- I am the **team leader** of this project group, and is responsible for **the research and optimization of deep learning algorithms**. Based on this project, I proposed a method using **weighted heat maps** to visualize the brain activation area, and used methods such as **Gradient-weighted Class Activation Mapping (Grad-CAM)** to improve the interpretability of the algorithm.

Crystal Material Growth Quality Analysis Method Based on SEM Image

- This project is **an interdisciplinary research project** in cooperation with the Institute of Artificial Intelligence and the Institute of Advanced Energy. In the subject of materials, there are usually hundreds or even thousands of crystals in an electron microscope image. Traditional measurement methods rely on manual measurement. The project aims to find an automatic measurement algorithm to obtain the length and angle of each crystal in the image. The project is still working on algorithm research.

- In this project, I was responsible for **crystal extraction, key point detection and crystal length calculation**. Based on the problem of key point connection, I designed algorithms such as **Part Affinity Fields(PAF)** and **Bipartite Graph Matching** to solve the problem of key point connection. In addition, I proposed the **Histogram of Oriented Gradient of the Adaptive Candidate Box (HOG-ACB)** to extract crystals of different sizes.

Depth Convolution Self-Coding Network for Gender Classification of 2D Fingerprints

- The project uses self-encoding network to extract gender-related information in complex abstract features, embody abstract features, frees manual labor, and has higher accuracy than traditional feature extraction. The experimental results have **an average accuracy of 95%** and the best model in this experiment is used to test each pair of fingers to find the pair of fingers with the most obvious features. Related articles and patents are being written.
- I am responsible for the **establishment and optimization** of the deep learning network in this project. In this project, I designed a **residual block network** suitable for experimental data to improve performance.

Thin Film Quality Analysis Platform Based on SEM Image

- The project is **an interdisciplinary research project** between Dr. Qi Yong and Dr. Yu Chenglong from the Advanced Energy Research Institute. The platform is designed to perform film quality analysis on the filter pore area and size distribution of the ion filter membrane using an ion-filtered film image taken by a scanning electron microscope. The platform has been completed and delivered for use.
- In this project, I was responsible for **designing the algorithm** to locate the filter holes and calculate the area of the holes. I propose a **neighborhood-based search method** suitable for this project.

3D Reconstruction Analysis Platform for Single-slewing Image

- It is a platform for 3D modeling of a single-slewing body image independently developed by our research institute. Its core algorithm only needs to input a single-turn image to perform 3D reconstruction. This project won the national third prize in the 2019 Chinese University Computer Design Competition and has been applied in the field of ceramic cultural relics restoration.
- I am responsible for **data preprocessing** in the team. I propose a method for **extracting the foreground** of the image.

RESEARCH PLAN

- Proficient in traditional algorithms, familiar with the application of Deep Learning and Machine Learning, and would like to study in depth in the field of Computer Vision.
- **Image Processing, Computer Vision, Medical Image Processing and Deep Leanring** were field of research during my undergraduate period.
- **Biometrics, Medical Image Processing, Image Recognition and Driverless** are areas of interest for my future.
- Good **communication**, easy **cooperation** and strong **learning ability** are the qualities I think a qualified researcher should have.
- Around the deep research in the field of computer vision, and make contribution to the development of computer vision, is my pursuit of the desire of the master's and doctoral degree.