# TIMING YANG

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## EDUCATION

**Dalian University of Technology**, *Dalian, China*                                     09/2018-07/2022

**Bachelor** of Science in Electronic Information Engineering expected in 2022; GPA 86.9/100

**Core Modules:** Machine learning (98); Data Structure (94); Digital Image Processing (90); Computer Principles (90); Digital Signal Processing (88); C Language (88); Signal and System (86); Fundamentals of Electronic Circuits (86)

**Selected Honors**:

- The Intelligent Algorithm Contest Finalist Award in Underwater Object Detection (National); (05/2021)
- Outstanding Contribution on Voluntary Work by School of Information and Communication Engineering at DUT; (12/2019)
- Second Prize Scholarship (Top 20%) by DUT; (11/2019)

**Computer Proficiency**: C(2yrs), maltab(2yrs), python(2yrs), Verilog(1yrs), Asm(1yrs)

## PUBLICATION

Chen J, Tao Liu*, **Yang T**, et al, *Mask R-CNN based deep learning analysis on in-situ measured crystal images with automatic dataset labelling*, published on the 41st Chinese Control Conference and submitted to ISTP and EI                                                                             04/2022

**Yang T,** Chen J, Qi Meng, *Optimized methods for online monitoring of L-Glutamic Acid Crystallization,* published on CONF-SPML 2021 and submitted to EI and CPCI                             08/2021

**Yang T**, *Supervised Sliding Window Smoothing Loss Function Based On MS-TCN for Video Segmentation,* published on the 3rd CONF-CDS and submitted to EI and Scopus                 06/2021

## PROFESSIONAL EXPERIENCE

**Undergraduate Thesis Project few-shot learning**                                     12/2021-06/2022

*DLUT_VLG at Dalian University of Technology*

*Advisor: Prof. Peihua Li*

- Learn the basics of few-shot learning.
- Python crawler is used to crawl images to build a dataset, and ResNet-50 was used to clean the raw data.
- Based on the few-shot learning network ReNet, Snapshot Ensembles algorithm and Data Augmentation algorithm, including MixUp, CutMix, RandomErasing, TrivialAugment, etc. are adopted in the training and testing process. Finally, on the CUB-200-2011 and CIFAR-FS public datasets under 1-shot and 5-shot settings, the results reached 82.65, 93.08, 77.36, and 88.43 percentage points, increased by 4.36%, 2.17%, 3.64%, 2.02%, respectively. The final performance of the adopted algorithm exceeds the existing single-order model and reaches **SOTA** (State-of-the-art Model).
- Firstly applied various Vision Transformer models to few-shot learning, and improved on these basic models. And propose a structural model of convolutional neural network combined with Transformer called Res9ViT. On the public dataset of CUB-200-2011, the proposed model outperforms the few-shot learning ResNet-12 model under 1-shot and 5-shot settings, the results reached 81.17 and 92.23 percentage points respectively, increased by 2.4% and 1.2%.

*This project completed the undergraduate thesis. The proposed model Res9ViT is further improving the performance, and aims to publish high-quality papers*

**Underwater Object Detection**                                             03/2021-09/2021

*IIAU-Lab at Dalian University of Technology*

*Advisor: Prof. Dong Wang*

- For algorithm design, apply Cascade-RCNN in mmdetection as the baseline model, implement Mixup, Deformable Convolutional Networks, Multi-Scale Training and Test, Global Context, Rotation Data Enhancement, Motion Blur, attention mechanism etc. to achieve underwater object detection
- In order to deploy underwater object detection in NVIDIA Jetson AGX Xavier for industrial application, replace the Cascade-RCNN model in mmdetection with yolov5m6 model to improve the speed, speed improved by 7.5 times.
- Apply algorithm design's method combined with bbox confidence and the iou of between predict boxes and ground truth boxes to clean original training dataset, accuracy improved by 4.94% in yolov5m6 model
- Apply the yolov5m6 model, based on the algorithm design's method, add focal loss function, senet-attention mechanism etc. to detect the underwater target and improve the accuracy by 15.57% in total

*This project wins the intelligent algorithm contest finalist award and stands out from over 2000teams in China Underwater Robot Professional Contest, entering the final of China Underwater Robot Professional Contest and ranking 13 out of 31 teams in finals.*

**Supervised Sliding Window Smoothing Loss Function Based On MS-TCN for Video Segmentation**

*Research Assistant in Human Perception Computing (HPC) & AI Lab at DUT*   10/2020- 06/2021

*Advisor: Associate Prof. Shenglan Liu*

- Learn and run the MS-TCN network framework
- Learn the deficiencies of loss function-TMSE
- Write a Supervised Sliding Window Smoothing Loss Function (loss function-SSWS) with Pytorch to increase the percentage points of F1@10 in 50salads, breakfast and gtea dataset by 6.60%, 9.20%, 1.57% respectively
- Learn the MS-TCN++ and ASRF network framework and compared them with the improved loss function-SSWS respectively

**A Deep-Learning Based Online Image Monitoring Method for Crystallization Process**

*Research Assistant in the Institute of Advanced Control Technology, School of Control Science and Engineering, Dalian University of Technology*             11/2019-12/2021

*Advisor: Prof. Tao Liu*

- Apply both python-opencv combined with the canny algorithm to write the automatic labeling crystal code and semi-automatic labelling methods based on Mask-RNN to reduce human work when generating the dataset
- Datasets are flipped horizontally and vertically to achieve data augmentation
- Apply deep learning object detection framework Mask-RNN to realize crystal recognition and online image monitor
- Write mAP0.5 suitable for crystal recognition to test the recognition effect
- Write automatic hyperparameter optimization code to increase the percentage points of mAP0.5 by 6.42%.
- Apply density estimation with kernel function to compute crystal size distribution

**Categorize Pictures of Cloud Shapes**                                      09/2019-10/2019

- Use python with resnet-50 network to classify 10,000 cloud shapes pictures according to the requirements set by the contest

*This project was shortlisted in the 2nd of Wireless Communication AI Competition (WAIC), ranking 173 out of 1318.*

## INTERNSHIP

Intern, **Matsushita Electrical Software Development (Dalian) Co. LTD**      06/2021-07/2021

- Learn company's production process and analyzed its technological process and production actions
- Practiced face recognition with Baidu-API, making it display on GUI
- Develop the "Shentu" system, a station entry verification system used in epidemic prevention and control, to determine whether passengers can enter the station through face recognition & health code detection

Visitor, **European Fortune 500 Industry Visit**                            07/2019-08/2019

Cologne & Hamburg, Germany; Paris, France

- Visit the automatic assembly workshop of Airbus, BMW and Mercedes-Benz.
- Investigate the Deutsche Bundesbank investment financial services philosophy
- Investigate the concept of environmental protection and development of Schneider Electric

## EXTRACURRICULAR ACTIVITIES

*Vice President*, **Young Volunteers Association of Electrical Engineering Department** 04/2019-04/2020

Service hours, 144.5 in total

- Organize to provide tutorials on the use of electronic products for the elderly in the community
- Serve as volunteer for the Marathon Volunteer at Dalian
- Volunteer for the Campus recruitment at Dalian University of Technology