YUCAI BAI

+86 18582553046 raymondbyc@gmail.com https://raymondbyc.github.io

Education

Sichuan University (SCU) 2017 – 2020
Master of Engineering, received in 8/2020
Major in Software Engineering, supervised under Prof. PU
GPA: 3.20 / 4.0

Chongqing University of Posts and Telecommunications (CQUPT) 2013 – 2017
Bachelor of Engineering, received in 6/2017
Major in Software Engineering
GPA: 3.28 / 4.0

Publications

- **Bai Y**, Zou Q, et al. **Extremely Low Resolution Action Recognition with Confident Spatial-Temporal Attention Transfer**, in the 2nd round review of **TIP** [ARXIV]
- **Bai Y**, Fan L, et al. **Monocular Outdoor Semantic Mapping with a Multi-task Network**[C] // 2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**). IEEE, 2019: 1992-1997 [PAPER] [CODE]
- **Bai Y**, Zhang S, et al. **A fractional total variational CNN approach for SAR image despeckling**[C]//International Conference on Intelligent Computing (**ICIC**). Springer, Cham, 2018: 431-442 [PAPER] [CODE]
- Chen M, Pu Y F, **Bai Y**. **Low-dose CT image denoising using residual convolutional network with fractional TV loss**[J]. **Neurocomputing**, 2021, 452: 510-520 [PAPER]

Experiences

Advanced Driver Assistance Systems (ADAS), in HUAWEI 2021.3 - Present
The ADAS is to help drivers effortless and safer. Its perception part requires **multi-class object detection** based on forward-view images, including vehicles, pedestrians, traffic signs, obstacles. Yucai is responsible for: **1) the basic 2D detection 2) speeding up training 3) with auxiliary tasks, e.g. semantic segmentation.**

Local Automated Parking Assist (LAPA), in HUAWEI 2020.9-2021.2
The LAPA is an L4-level project to help drivers park their vehicles more conveniently. To be specific, **the car with LAPA could park itself in the selected/saved parking slot.**
Yucai is responsible for **parking slot detection** on the bird-eye images and the development of related tasks, such as parking slot selection. The involved difficulties are: 1) strong light reflection on the ground. 2) the missing of key visual features 3) the inaccuracy of detection results.
He also **filed a patent**, **a more robust detection with uncompleted visual features.**

Extreme Low Resolution Action Recognition, in SCU 2019.5 - 2021.2
To better detect in the far-view monitor systems, Yucai proposed a new method, Confident Spatial-Temporal Attention Transfer (CSTAT), to recognize extremely low-resolution (eLR) activities.
CSTAT can acquire information from high-resolution data by reducing the attention differences in the training. Besides, the credibility of the supervisory signal is also taken into consideration.
Experimental results demonstrate that, the method can effectively improve the accuracy of eLR activity recognition, and achieves an accuracy of 59.23% on 12×16 videos in HMDB51, **a state-of-the-art performance.**
The corresponding paper is in **the 2nd-round review of TIP**.

Non-compliance Action Detection of Court Scene in Surveillance Videos, in SCU 2019.3 - 2020.6

As the team leader, Yucai took charge of the entire project, including the design and development of **a real-time detection algorithm of the specific actions,** and **the production of the non-compliance action datasets.**

The detection is divided into two stages. Firstly, the object detection algorithm is used to detect people and crop the corresponding area. Then, the 3DConv-based approaches are applied to classify whether to fight.

The team **won 2ND in the action recognition track of the Teda & JD Cup.**

Monocular 3D Semantic Reconstruction with a Multi-task Network, in SYSU 2018.8 - 2019.2

This work was performed when Yucai visited Sun Yat-sen University (SYSU) under the supervision of Prof. CHEN in the Institute of Unmanned Systems.

They explored the interplay between low-level features for both depth and semantic prediction. **The proposed network can produce the depth and semantic maps simultaneously**, which provides basic knowledge for further semantic map reconstruction. This work apply **image segmentation techniques to refine the depth prediction to reduce the fluctuations caused by convolution layers**. The final map is saved in a memory-friendly way to present a large-scale urban scene.

The corresponding paper is **accepted by IROS 2019**.

Image Despeckling with Fractional Total Variational Loss, in SCU 2017.11 - 2020.6

Motivated by the Applications in Fractional Calculus Course, Yucai and Miao applied fractional-calculus techniques in the image denoising task. Due to its advantages, e.g. long-term memory, non-locality, and weak singularity, **the fractional-differential result of images can preserve the low-frequency feature in the smooth area such as contours, and at the same time, keep high-frequency information such as textures**.

To keep more details in SAR Image and Medical Image, they proposed fractional total variational loss. Ablation experiments show the proposed method has a better performance in preserving textures.

The corresponding papers are **accepted by ICIC2018 (SAR images) and Neurocomputing (Medical Images)**.

Intern Front-End Engineer, in ZBJ.com Inc. 2017.11 - 2018.5

Yucai worked in Basic Technology Department for half a year as an intern front-end engineer. He was deeply involved in the following projects:

- Development of web sites, e.g. Bajie Account , Bajie City.
- Upgrade of image format, from JPG/PNG to WEBP.

HONORS

- ”A” Performance (top 15%), HUAWEI 2021H1
- Second Prize Merit-based Scholarship, SCU 7/2019
- The Second Prize, 6th TedaHuabo Cup, Action Recognition Track 6/2019
- Excellent postgraduate student, SCU 9/2018
- Excellent Graduation Thesis, CQUPT 6/2017
- Third Prize Merit-based Scholarship, CQUPT 9/2015

Technical Strengths

- Deep learning framework: Pytorch (MMDetection) > Tensorflow > Caffe
- Coding language: Python, C++, JavaScript

English Language Level

- IELTS: 6.0
- CET (Chinese College English Test) - 6