Keyuan Zhang

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Education

Cornell University, Ithaca, New York   *August 2017 – May 2018*
Master of Engineering in Electrical Engineering

Purdue University, West Lafayette, Indiana   *August 2013 – May 2017*
Bachelor of Science in Electrical Engineering
Honors: Dean's List Honor (Top 1% in class); Semester Honor (Top 3% in college)

Research Interest

Currently, I focus on computer vision and its intersection with other fields (**Multimodality**). My previous research has focused on designing and implementing vision algorithms to improve the video quality and user experience in real-time video communication. I worked with my team to develop features in the RTC scenario. Such as virtual background replacing, face-related implementation (e.g., **face detection, face landmarks**), and serverless inference. Additionally, I have experience in **face recognition, OCR, and face anti-spoofing**.

Work Experiences

Juphoon System Software Co., Ltd   Zhejiang, China
Computer Vision Algorithm Engineer   *September 2019 – Present*

- **Real-Time Background Matting:** Advanced U-Net framework by replacing encoding and decoding blocks with the combination of lightweight convolution layers and linear bottleneck to largely reduce the size; re-designed loss function to fine edges. The MAD of proposed model was 13% higher than DeeplabV3 while keeping the size close.

- **Facial landmark detector:** Improved the speed the of open-source face detection model around 70% with limited accuracy impairment through truncations and anchor setting tuning; optimized the accuracy of facial landmark model by 17% with advanced input preprocessing technique and replacing the loss function with Wing Loss; use heatmaps to assist in supervising training to improve scenarios involving blinking and mouth opening.

- **Video Codecs:** Deployed AV1 focused RTC video transmission pipeline on multiple platforms; improved its performance in lossy transmission by solving blurred screen and high frequency FIR problems. Designing asymmetrical video RTC solution (H.263/H.264), which aims to reduce bandwidth consumption, on IoT devices for ASR and UNISOC.

Purdue University   West Lafayette, Indiana
Teaching Assistant for Electronic Measurement Techniques   *August 2016 – December 2016*

- Enhanced students' learning by mentoring them in lab and office hours. Assisted monitoring lab operation.

Project Experiences

Lung Nodules Detector in 3D CT Scans   *March 2018 – May 2018*

- Segmentation: Applied K-Means clustering and region growing to get rough lung mask; utilized morphological filters to remove blood vessels and air noise. Localization: selected possible nodules with LoG in sliced 2D images. Detection: applied the trained classifier to find positive nodules and their location.

Moving Object Tracker based on Raspberry Pi   *March 2018 – May 2018*

- Tested and evaluated main tracking algorithms (TLD, Boosting and Template matching) on RPi. Designed own tracking algorithms due to RPi's limited computing capability: detect specified object by its unique color, draw its contour and remove noise by morphological operations; the proposed algorithm achieved stable real-time tracking on RPi.

USB Audio Headphone Amplifier   Purdue University
Senior Design, Prof. Stanislaw H. Zak   *September 2016 – December 2016*
- Collaborated with team to develop an integrated audio system that would amplify USB digital audio to a wide variety of headphones.
- Designed, simulated and built prototype for amplifier control subsystem: the subsystem (DC Block + 3-tone control + volume control) was controlled by touch screen to adjust frequency range for random music signal.

Skills

- Programming Languages: **Advanced in C/C++, Python.** Intermediate in Matlab, Objective C, swift. Experienced in Java, JavaScript, R.
- Framework & Tools: **Advanced in Tensorflow, Pytorch, Video Codec Tools (FFMpeg, AV1/H264 related, etc).** Intermedia in CoreML, MXNet.
- Languages: Fluent in English, Chinese Mandarin.