

Qiu Jueqin

COMPUTATIONAL PHOTOGRAPHY · COMPUTER VISION · COLOR SCIENCE

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Education

Sep 2014 – Nov 2019 PhD., College of Optical Science and Engineering *Zhejiang University, China*
Sep 2010 – Jun 2014 B.S., School of Instrument. and Optoelect. Engineering *Beihang University, China*

Projects

Black-Box ISP Auto-Tuning for Multiple Tasks *Hisilicon, 2012 Lab, Huawei*

PRODUCT OWNER *Feb 2021 – Present*

- Optimizing multiple down-stream tasks (e.g., Object Detection, Face Recognition, Image Quality Assessment, Unsupervised Style Transfer) by automatically tuning black-box ISP hyper-parameters
- Designed an image-to-image translation neural-network as a differentiable proxy to the interested ISP pipeline, taking both RAW data and ISP hyper-parameters as inputs
- Reduced tuning cycle from 4~6 months to 1~2 weeks for one single camera module (Lens + Sensor + ISP)
- Credited as an AI media solution for Hisilicon Ascend ecosystem

NNISP for Machine Vision *Hisilicon, 2012 Lab, Huawei*

CORE MEMBER *May 2020 – Present*

- Designed an end-to-end (SensorRAW-to-RGB) neural-network ISP pipeline for autonomous driving (20GFLOPs/4K, 30FPS×16 lanes)
- Improved mAP metric up to 30% for 2D object detection, compared to Kirin's traditional pipeline
- Deployed in Hisilicon DaVinci AI core with customized in-core cache and ASIC accelerator, reaching 15+ FPS (still requires continuous optimization)

Mobile-ISP Color Reproduction Enhancement via Colorimetric Sensor *coop. with ams Semiconductor*

TECH LEAD *Feb 2017 – Dec 2018*

- Developed a CNN-based AWB framework to improve the reliability of the illuminant estimation for extreme scenarios where the low-level based AWB algorithms perform poorly, with the use of ams TCS3430 sensors
- Improved the color reproduction accuracy of images with flash on
- Dynamically controlled the brightness and chrominance of the display by monitoring the photometric and chromatic parameters in users' ambient environment

Digital Image Signal Processing Pipeline in Mobile Devices *coop. with Rockchip Semiconductor*

TECH LEAD *Oct 2015–Sep 2017*

- Devised a complete ISP solution from SensorRAW to displayable output, including camera spectral sensitivity estimation, lens color shading correction, auto white-balancing, and color correction modules, etc
- The proposed solution exceeded the average color reproduction performance in the industry (up to the test date)



Publications

Color Constancy by Reweighting Image Feature Maps	<i>IEEE Trans. Image Proc., 2020</i>
Image Quality Degradation of Object-Color Metamer Mismatching in Digital Camera Color Reproduction	<i>Applied Optics, 2018</i>
Camera Response Prediction for Various Capture Settings Using the Spectral Sensitivity and Crosstalk Model	<i>Applied Optics, 2016</i>
Simulation of a multispectral imaging system based on multichannel filter array	<i>ACA Conf., Nagoya, Japan, 2019</i>
Robust Color Correction Strategy Based on Chromatic Adaptation Model	<i>ACA Conf., Chiangmai, Thailand, 2018</i>
Comparison of Object-Color and Illumination Metamerism for Digital Image Color Correction	<i>AIC Congress, Jeju, Korea, 2017</i>
Image quality evaluation of HDR displays	<i>Proc. of SID, California, US, 2017</i>
Investigation of Impacting Factors on Camera Calibration for Spectral Sensitivity Estimation	<i>ACA Conf., Changshu, China, 2016</i>
Spectral image reconstruction of Chinese ink and wash painting based on self-training with multispectral imaging	<i>AIC Congress, Jeju, Korea, 2016</i>

Patents

一种基于 ISP 参数自动优化的机器视觉任务跨模组迁移学习方法	<i>Under Review, China & US</i>
一种面向计算机视觉感知任务的自适应图像增强装置	<i>Under Review, China & US</i>
一种对计算机视觉任务进行端到端优化的 ISP 软代理方法	<i>Under Review, China & US</i>
一种基于局部语义特征的图像质量提升方法	<i>Under Review, China & US</i>
一种基于先验噪声模型的数字图像传感器系统误差标定方法	<i>Published, China</i>
一种高动态范围光谱图像数据的存储方法	<i>Published, China</i>
一种基于感知色差最小化优化估计数码相机光谱灵敏度的方法	<i>Published, China</i>
一种高容错性的彩色数码相机颜色校正方法	<i>Granted, China, 2020</i>
一种基于色适应模型的彩色数码相机白平衡校正方法	<i>Granted, China, 2019</i>
一种光源自适应的数码相机彩色镜头阴影校正方法	<i>Granted, China, 2017</i>

