Shuai Chen

shuaic@robots.ox.ac.uk • +44-7529965309 • LinkedIn • Google Scholar

EDUCATION

D.Phil in Engineering Science (3D Computer Vision) Sep 2020-2024
University of Oxford, Oxford
M.S in Electrical Engineering May 2016
University of Southern California, Los Angeles, CA GPA3.89/4.0
B.S in Electrical Engineering May 2015
University of Southern California Los Angeles, CA Major GPA 3.80/4.0, Cumulative GPA 3.64/4.0

RESEARCH INTERESTS

Computer Vison/Machine Learning. 4 years of industry experience in developing AI algorithms for real time mobile platforms and embedded systems, including image super resolution, semantic segmentation, object classification, video stabilization, video denoising, GANs. My recent interest is in camera localization and neural rendering.

PAPER PUBLICATION

[1] Direct-PoseNet: Absolute Pose Regression with Photometric Consistency
S Chen, Z Wang, V Prisacariu, *3DV*, 2021
[2] Deep Online Video Stabilization using IMU Sensors
C Li, L Song, S Chen, R Xie, W Zhang, *IEEE Trans. Multimedia*, 2022

PATENTS (3 Granted, 2Filed, 3 Pending)

- US2020034789A1: IMAGE PROCESSING METHOD AND DEVICE
- WO2021036853: IMAGE PROCESSING METHOD AND ELECTRONIC APPARATUS
- WO2021013139: IMAGE PROCESSING METHOD AND DEVICE
- Filed Patent 202010359399.8: Video Processing Method and Video Processing Device
- Filed Patent 202010397889.7: A Video Stabilization Method Based on Multi-camera

PROFESSIONAL EXPERIENCE

- ***Senior AI Algorithm Engineer (Team Leader),*** *Huawei Technologies, China* **Jan 2017-Jul 2020**

Two-stage Video Stabilization **Feb 2020- Jul 2020**

- Developed an industry-first 2-stage EIS method co-designed with novel ISP. Reduced up to 30%+ memory and power consumption while **surpassing previous SOTA performance** in dynamic environments.
- Implemented trajectory prediction & scene classification multitasking neural nets with AutoML enhancement. Proposed theoretical improvements on dynamic crop boundary constraints.

5D Video Stabilization **Feb 2020- Jul 2020**

- Developed a real-time visual-inertial based video stabilization method. The solution uses sparse feature detection and projection, 5D rolling shutter correction, and joint optimization on 3D rotiation and 2D translation.

AI Video Stabilization **Feb 2018- Jul 2020**

- Developed a real-time AI-based video stabilization algorithm including adaptive rolling shutter correction, focus breathing reduction, trajectory smoothing, etc. as a major developer and team leader
- Implemented neural networks in TensorFlow and video stabilization pipeline code in C++. Proved that the **AI motion filtering yielded superior performance** comparing to traditional methods.
- Designed a **new hyper-parameter optimization method** using AutoML and Pareto front for video stabilization. Proposed a noval cost function for achieving commercial level hyper-parameter search.
- Delivered a face-centric video stabilization algorithm using face landmarks and IMU for front camera videography.
- **Achieved No.1 on the DXOMark in 2019 and 2020**. **Top-selling features** for numerous Huawei products.

5D Video Temporal Noise Reduction **Feb 2018-May 2020**

- Developed a real-time video noise reduction algorithm by leveraging multi-frame and IMU. **Achieved No.1 on the DXOMark** Benchmark for front camera 4K video de-noising.
- Delivered as a **top-selling feature for low-light videography** on Huawei flagship P40 series.

Face Attribute & Facial Landmark Detection **Feb 2018-Apr 2019**

- Supervised 40+ face attribute classification algorithm development as a team leader. Proved some classes of our algorithm, such as gender & age, had **surpassed 2018 state-of-art papers' result by a large margin**. Reduced the model to run in real-time on Huawei products. Engineered strategies to improve model accuracy while reducing face detection algorithm's failure rate. Developed TensorFlow framework code for the team.
- Supervised facial landmark detection algorithm development as a team leader. Proved the algorithm **achieved superior performance and lower inference time** than competing products while innovatively added the function of face occlusion detection with high accuracy

Multi-frame Super-resolution/Camera Zoom **Sep 2017-Feb 2018**

- Implemented enhanced real-time super-resolution algorithm based on multi-frame convolutional neural networks & knowledge distillation as a major developer
- Proved our SR algorithm could combine super-resolution, de-nosing, and sharpening while achieving commercial level performance
- Delivered as contributed to a **top selling feature** on Huawei flagship phones P20 series
- SR algorithm **achieving No.1 score on DXOMark** mobile camera zoom evaluation
- Implemented Face SR algorithm using GAN and proposed a new discrimination loss for different face components

Single-frame Super-resolution/Camera Zoom **Jan 2017-Sep 2017**

- Developed **industry-first deep learning-based SR algorithm for Mobile Camera Zoom** as a major developer leading on algorithm design, model training, and camera zoom pipeline integration. This technology became one of **the top-selling features** on Huawei flagship phones Mate10 series & Honor V10.
- Implemented baseline SR algorithm **achieved 0.7dB PSNR higher than 2016 state-of-art solution VDSR**.
- Reduced SR network to meet real-time on device. The model **achieved 0.7dB PSNR higher than FSRCNN** while significantly faster in inference time.

Image Semantic Segmentation/Selfie Portrait Segmentation **Jan 2017-May 2017**

- Implemented part of CNN-based portrait segmentation network inference in C++ and network quantization code in Python.
- Delivered as a **top-selling feature** on Huawei flagship phones/tablets, and **surpassed iPhone X's portrait segmentation** result in Selfie Mode.

- ***Software Verification Engineer,*** *Huawei Technologies, China* **Aug 2016-Dec 2016**

- Developed Android Boot automation testing environment in Python, which was in use across all product lines of Huawei mobile phones.

- ***Engineer Intern at*** *CITIC Pacific Mining in Perth, Australia* **Jul 2012-Aug 2012**
- ***Engineer Intern at*** *Motorola Mobility in Tianjin TEDA, China* **May 2012-Jul 2012**

INVITED TALKS

- Invited Talk at Huawei Future AI ISP Workshop. May 2020
- Invited Host at Huawei Global AI Workshop - Day 1. January 2019
- Invited Talk at Huawei Executive Management Team. May 9, 2018. *Open Yourself and Embracing New Ideas.*
- Invited Talk at Huawei Beijing Research Center Annual Conference. January 27, 2018. *How to Make Huawei's AI Algorithm Contribute to the Best User Experiences.*

PHD SCHOLARSHIP

- Huawei UK PhD Fellowship, 2021-2023

HONORS

- Ex-member of Montgomery Plan--- Fast-track Promotion for Outstanding Employees, Huawei Technologies
- CBG Hero Medal Award, Huawei Technologies, 2019
- Handset Product Line President Award of 2018, Huawei Technologies, 2019
- 2nd Prize Winner 2018 Huawei Beijing Research Center AI Hackathon, Huawei Technologies, 2018
- Top-10 Distinguished Engineer of the Year of Huawei Beijing Research Center, Huawei Technologies, 2017
- Distinguished New Employee Award, Huawei Technologies, 2017
- Grand Final 2016 Huawei Beijing Research Center Hackathon, Huawei Technologies, 2016
- Alpha Lambda Delta National Honor Society, University of Southern California