Haoming Cai

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Education

- **The University of Maryland - College Park** — Maryland, USA
  Ph.D. Student *in Computer Science Department* — *Sept.2022 - May.2027 (Expected)*
- **The Chinese University of Hong Kong (Shenzhen)** — Guangdong, CHN
  B.Sc. *in Computer Science and Engineering* — *Sept.2017 - Sept.2022*

Research Interest

- **Computer Vision, Image Processing, Image Quality Assessment, Network Interpretation.**

Publications

- Google Scholar Citation : **149** (up to Aug.2022)

[1] **Haoming Cai**, Jingwen He, Yu Qiao, Chao Dong, "Toward Interactive Modulation for Photo-Realistic Image Restoration", accepted by **CVPRW 2021, NTIRE**. [PDF, Code]

[2] Jinjin Gu, **Haoming Cai**, Chenyu Dong, Ruofan Zhang, Yulun Zhang, Wenming Yang, Chun Yuan, "Super-Resolution by Predicting Offsets: An Ultra-Efficient Super-Resolution Network for Rasterized Images". **ECCV, 2022**. [Code]

[3] Jinjin Gu, **Haoming Cai**, Haoyu Chen, Xiaoxing Ye, Jimmy S. Ren, Chao Dong, "PIPAL : a Large-Scale Image Quality Assessment Dataset for Perceptual Image Restoration.", **ECCV, 2020**. [PDF, Project, Talk]

[4] Lin Zhou, **Haoming Cai***, Jinjin Gu, Zheyuan Li, Yingqi Liu, Xiangyu Chen, Yu Qiao, Chao Dong, "Efficient Image Super-Resolution using Vast-Receptive-Field Attention.", **ECCVW 2022, AIM**.

[5] Zheyuan Li, Yingqi Liu, Xiangyu Chen, **Haoming Cai**, Jinjin Gu, Yu Qiao, Chao Dong, "Blueprint Separable Residual Network for Efficient Image Super-Resolution", **1st of NTIRE22 Efficient SR Subtrack**. [PDF, Code]

Manuscripts

[6] **Haoming Cai**, Jinjin Gu, Zhengwen Zhang, Yu Qiao, Chao Dong, "Understanding the Unreasonable Effectiveness of Deep Features as a Perceptual Metric", **prepare for CVPR 2023**.

[7] Jinjin Gu, **Haoming Cai**, Haoyu Chen, Xiaoxing Ye, Jimmy S. Ren, Chao Dong, "Image Quality Assessment for Perceptual Image Restoration: A New Dataset, Benchmark and Metric", **review by TPAMI**. [PDF, Code]

Challenge Reports

[8] Jinjin Gu, **Haoming Cai**, Chao Dong, Jimmy S. Ren, Yu Qiao, Shuhang Gu, Radu Timofte, et al., "NTIRE 2021 Challenge on Perceptual Image Quality Assessment", **CVPRW 2021, NTIRE**. [PDF, Challenge, Talk]

[9] Jinjin Gu, **Haoming Cai**, Chao Dong, Jimmy S. Ren, Yu Qiao, Shuhang Gu, Radu Timofte, et al., "NTIRE 2022 Challenge on Perceptual Image Quality Assessment", **CVPRW 2022, NTIRE**. [Challenge]

Research Service & Award

- **Ph.D. Dean Fellowship*** - University of Maryland-College Park 2022 - 2024
- **Workshop Co-organizer*** - The Perceptual IQA Challenge in the 6th/7th NTIRE workshop at CVPR
- **Championship of Challenge** - Winner of one track in Efficient Super-Resolution Challenge at NTIRE 22 [PDF]
- **Reviewer/Assistant Reviewer** - AAAI 23, ICCV 21, WACV 22, CVPR-W 21&22 NTIRE, ECCV-W 22 AIM

Research Experience

XPixel Lab, Multi-Media Center, Shenzhen Institutes of Advanced Technology — Shenzhen, China
Research Intern — *May 2020 - Present*

- **Supervised by Prof.DONG Chao and work with Ph.D.candidate Jinjin GU**
- **Image Quality Assessment Dataset, Benchmark, Metrics, and Challenge** *(September 2019 - Present)*

  ▶ Contribute a novel perceptual image similarity dataset called PIPAL with Elo rating system to study the new distortion brought by Generative Adversarial Network (GAN). With PIPAL, I co-hosted a reputable workshop and I am studying the behavior of deep representation models used in perceptual metrics. **[3][6][7][8][9]**

- **Practical and Efficient Interactive Modulation for Image Restoration.** *(July 2020 - Present)*

  ▶ Propose Controllable Unet Generative Adversarial Network (CUGAN) which introduces continuous modulation enabling users to adjust the texture reconstruction and restoration strength freely. With fewer parameters, CUGAN achieves better performance on selected datasets and real-world images. **[1]**

  ▶ Reduce parameter, FLOPs, Activation, Convs Layers to design more efficient Image Super-Resolution models. One of them be applied in mobile platform and the other one won the cutting-edge competition **[2][4][5]**.

Software Development

- **AI-Based Anime Image Toolbox iOS Application (Swift-based)**: An AI-based image toolbox named ReyeR, providing reverse image search, image tag recognition, photo cartoonization, and a human face to anime face. Web.

Teaching Assistant

- **Introduction to Data Science.** 2022 Fall @ University of Maryland, College Park. Course Link.