Haoming Cai

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Education

- **The University of Maryland - College Park** — MD, USA
  Ph.D. Student *in Computer Science Department* — *Sept.2022 - May.2027*
- **The Chinese University of Hong Kong (Shenzhen)** — Shenzhen, China
  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 : **92** (till May.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**, 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]

Manuscripts

[3] **Haoming Cai**, Jinjin Gu, Zhengwen Zhang, Yu Qiao, Chao Dong, "Understanding the Unreasonable Effectiveness of Deep Features as a Perceptual Metric", **prepare for ICLR 2022**.

[4] 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]

[5] 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". **review by ECCV2022**

Challenge Reports

[6] 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]

[7] 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]

[8] Zheyuan Li, Yingqi Liu, Xiangyu Chen, **Haoming Cai**, Jinjin Gu, Yu Qiao, Chao Dong, "Blueprint Separable Residual Network for Efficient Image Super-Resolution", **Winner of NTIRE22 Efficient SR Track**.

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 NTIRE2022 [PDF]
- **Reviewer/Assistant Reviewer** - ICCV 2021, TPAMI, ACM TOMM, CVPR 2021&2022 NTIRE workshop

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 Prof.Qiao Yu, 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. **[2][3][4][6][7]**

- **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 **[5][8]**.

Software Development

- **AI-Based Anime Image Toolbox iOS Application (Swift-based)**: We built an AI-based image toolbox named ReyeR, providing reverse anime image search, anime image tag recognition, photo cartoonization, and a human face to anime face. I take charge of interaction effects and the whole front-end. More in the exhibition web of ReyeR.

Skills Summary

- **Languages/Frameworks**: Python(PyTorch, Caffe), MATLAB, CUDA (Intro Course), Swift, LaTex, Markdown