Wenyan Cong

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Research Interests

Machine Learning, Computer Vision, Low-level Vision, Image Harmonization

Education

Shanghai Jiao Tong University(SJTU) **Shanghai, China**
M.S., Dept. of Computer Science and Technology *Sep. 2019- Mar. 2022(expected)*
Advisor: Li Niu and Liqing Zhang
Overall GPA: 3.83/4.00

Shanghai Jiao Tong University(SJTU) **Shanghai, China**
B.E., Dept. of Computer Science and Technology *Sep. 2015- Jun. 2019*
Overall GPA: 3.60/4.00

Research Experience

University of Texas at Austin **Austin, TX**
Graduate Research Assistant (Supervisor: Prof. Atlas Wang) *Jun. 2021 - Present*

- **Deep Image Unfolding in the Wild:** On-going work on wide-range image blending with reference guidance; enabled novel and diverse content generation in the intermediate region. Plan to submit to CVPR2022.

Shanghai Jiao Tong University **Shanghai, China**
Graduate Research Assistant (Supervisor: Prof. Li Niu) *Sep. 2019 - Present*

- **Deep Video Harmonization [M1]:** Leveraged color mapping consistency to lift the burden of establishing spatial correspondence; achieved ~15% improvement than the strongest baseline with higher temporal consistency.
- **Video Harmonization Dataset Construction [M1]:** Constructed and released the first public video harmonization dataset *HYouTube* which contains 3194 pairs of synthetic composite videos and real videos.
- **High-Resolution Image Harmonization [M3]:** Combined complementary transformations of traditional and deep methods in an end-to-end framework; achieved ~50% improvement and saved ~65% time and computational resources.
- **Cross-Domain Image Harmonization [M2]:** Designed the first cross-domain image harmonization network using the mixture of rendered images and real images; achieved ~34% improvement on novel categories.
- **Rendered Human Harmonization Dataset Construction [M2]:** Constructed and released the first large-scale rendered harmonization dataset *RHHarmony* with 135k image pairs; mitigated the labor-intensive dataset extension.
- **Background-Guided Image Harmonization [C3][code]:** Formulated image harmonization as background guided domain translation task; enabled the prediction of inharmony level of composite images using domain code; achieved new state-of-the-art: ~21% improvements than the strongest baseline.
- **Image Harmonization via Domain Verification [C2][code]:** Designed a domain verification discriminator to pull close the foreground domain and background domain; achieved state-of-the-art performance: ~31% improvements than the strongest baseline; provided the first benchmark in image harmonization field.

Shanghai Jiao Tong University **Shanghai, China**
Undergraduate Research Assistant (Supervisor: Prof. Li Niu) *Dec. 2018 - Aug. 2019*

- **Image Harmonization Dataset Construction [C1]:** Constructed and released the first large-scale image harmonization dataset *iHarmony4* with 4 sub-datasets (HCOCO, HAdobe5k, HFlickr, and Hday2night) and 73146 pairs of high-quality images.

Work Experience

ZMO.AI(startup) **Shenzhen, China**
Research Intern *Jan. 2021 - Apr. 2021*

- Collaborated with upstream pose search, image inpainting, image matting, and image composition techniques and developed an efficient background harmonization network for real-time background replacement.
- Achieved excellent results on both indoor and outdoor backgrounds for on-model images; it has been applied to the practical application of content generation for e-commerce brands.

Hisense Co., Ltd. **Shanghai, China**

Research Intern *Dec. 2020 - May 2021*

- Turned recent research in deep image harmonization into revenue; achieved high-quality, high-resolution, and high-fps harmonization and carried it through Hisense's devices; made three relevant patents available.

Shanghai Jiao Tong University **Shanghai, China**

Teaching Assistant *Mar. 2020 - Jul. 2021*

- *CS245: Principles of Data Science* for undergraduates, Spring 2021.
- *CS7335: Statistical Learning and Inference* for postgraduates, Fall 2020.
- *CS245: Principles of Data Science* for undergraduates, Spring 2020.

Publications

Conference Papers

[C5]Xinyuan Lu, Shengyuan Huang, Li Niu, **Wenyan Cong**, and Liqing Zhang, "HYouTube: Video Harmonization Dataset," *arXiv preprint arXiv:/2109.08809*, 2021.

[C4]Li Niu, **Wenyan Cong**, Liu Liu, Yan Hong, Bo Zhang, Jing Liang, and Liqing Zhang,"Making Images Real Again: A Comprehensive Survey on Deep Image Composition," *arXiv preprint arXiv:/2106.14490*, 2021.

[C3]**Wenyan Cong**, Li Niu, Jianfu Zhang, Jing Liang, and Liqing Zhang, "BargainNet: Background-Guided Domain Translation for Image Harmonization," *IEEE International Conference on Multimedia and Expo* (*ICME*), 2021. (Oral)

[C2]**Wenyan Cong**, Jianfu Zhang, Li Niu, Liu Liu, Zhixin Ling, Weiyuan Li, and Liqing Zhang, "DoveNet: Deep Image Harmonization via Domain Verification," *IEEE Conference on Computer Vision and Pattern Recognition* (*CVPR*), 2020.

[C1]**Wenyan Cong**, Jianfu Zhang, Li Niu, Liu Liu, Zhixin Ling, Weiyuan Li, and Liqing Zhang, " Image Harmonization Datasets: HCOCO, HAdobe5k, HFlickr, and Hday2night," *arXiv preprint arXiv:1908.10526*, 2019.

Manuscripts under Anonymous Review

[M3]**Wenyan Cong**, Xinhao Tao, Li Niu, Jing Liang, Xuesong Gao, Qihao Sun, and Liqing Zhang, "High-Resolution Image Harmonization via Collaborative Dual Transformations," submitted to *AAAI Conference on Artificial Intelligence* (*AAAI*), 2022.

[M2]**Wenyan Cong**, Junyan Cao, Li Niu, Jianfu Zhang, and Liqing Zhang, "Deep Image Harmonization by Bridging the Reality Gap," submitted to *AAAI Conference on Artificial Intelligence* (*AAAI*), 2022.

[M1]Xinyuan Lu, Shengyuan Huang, Li Niu, **Wenyan Cong**, and Liqing Zhang, "Deep Video Harmonization With Color Mapping Consistency," submitted to *AAAI Conference on Artificial Intelligence* (*AAAI*), 2022.

Patents

[P3] "Real Human Harmonization in Virtual Scenes", China Patent, No. 202111051553.6., Jun. 2021.(**The first inventor**)
[P2] "High-Resolution Image Harmonization via 3D Look-Up Tables", China Patent, No. 202111051117.9., Jun. 2021.
[P1] "Progressive High-Resolution Image Harmonization", China Patent, No. 202111050230.5., Jun. 2021.

Honors and Awards

- **National Scholarship for Graduate Students** (Top 0.2% Nationwide) 2020
- **Merit Student** of Shanghai Jiao Tong University 2020
- **Excellent League Cadre** of Shanghai Jiao Tong University 2019
- **Second Prize** in "HUAWEI Cup" China Post-Graduate Mathematical Contest in Modeling 2019
- **Outstanding Graduate** of Shanghai Jiao Tong University 2019
- **Academic Excellence Scholarship** of Shanghai Jiao Tong University 2018, 2017, 2016

Professional Services

- **Reviewer:** International Joint Conference on Artificial Intelligence (IJCAI-21)

Skills

- **Programming:** Python, C++, Git, Bash, SQL, MATLAB
- **Packages:** PyTorch, TensorFlow, OpenCV
- **Languages:** Chinese (native), English (proficient)