Xiaoyan Cong

Providence, RI | xiaoyan_cong@brown.edu | Homepage: Oliver-Cong02.github.io/ | +1 (401) 500-3107

Education

Brown University, Ph.D. Student of Computer Science   September 2024 – Present
- Advisor: *Professor Srinath Sridhar*

Zhejiang University, B.Eng. in Robotics Engineering, Chu Kochen Honor College   September 2020 – June 2024
- GPA: 3.99/4.0
- Advisors: *Professor Qixing Huang*

Hong Kong University of Science and Technology, Exchange Student   January 2023 – June 2023
- Dean's List
- Advisors: *Professor Qifeng Chen* & *Professor Chenyang Lei*

Research Interests

My research interest lies in broad aspects of Computer Vision, Computer Graphics and Machine Learning topics, more specifically 3D spatiotemporal visual perception, understanding and reasoning of human physical interactions with the world. I am also interested in understanding generative models (diffusion, flow model...) from both theoretical and application perspectives.

Publications

OscillationInversion: Understand the structure of Large Flow Model through the Lens of Inversion Method   October 2024
Anonymous
Under Review

Automatic Controllable Colorization by Imagination   June 2024
Xiaoyan Cong, Yue Wu, Qifeng Chen, Chenyang Lei
IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2024 [arxiv: 2404.05661]

4DRecons: 4D Neural Implicit Deformable Objects Reconstruction from a single RGB-D Camera with Geometrical and Topological Regularizations   2024
Xiaoyan Cong, Haitao Yang, Liyan Chen, Kaifeng Zhang, Li Yi, Chandrajit Bajaj, Qixing Huang
Under Review [arxiv: 2406.10167]

Research Experience

Graduate Researcher, Brown University   Sep. 2024 – Present
- Advisors: *Prof. Srinath Sridhar*
- **Gaussian Splatting for Markerless Grasp and Manipulation Understanding of Hand-Object Interactions**
  - Try to propose a novel dynamic gaussian splatting based pipeline for reconstructing and understanding the hand-object interactive process.
  - Utilize two different templates to model objects and hands respectively, hopefully supporting downstream applications such as arbitrary grasp and manipulation animation generation.

Research Intern, University of Texas at Austin   Jun. 2023 – Nov. 2023
- Advisors: *Prof. Qixing Huang* & *Prof. Li Yi*
- **4D Neural Implicit Deformable Objects Reconstruction**
  - Introduced a novel approach 4DRecons that takes a monocular RGB-D sequence of dynamic objects as input and outputs a complete textured deforming reconstruction.
  - Proposed an optimization procedure that enforces the deformation among adjacent frames is

as-rigid-as-possible (ARAP) and ensures the topology remains fixed over time.
  - Demonstrated that 4DRecons can handle large deformations and complex inter-part interactions, outperforming state-of-the-art approaches considerably.

Research Intern, Hong Kong University of Science and Technology   Jan. 2023 – Nov. 2023
- Advisors: *Prof. Qifeng Chen* & *Prof. Chenyang Lei*
- **Automatic Controllable Colorization by Imagination**

  - Introduced a novel framework for automatic and controllable colorization, enabling iterative editing and modifications.
  - Proposed an Imagination Module that utilizes Diffusion Models (ControlNet) to generate multiple reference candidates with similar semantics and structures to a black-and-white input. The optimal reference is composed from all reference candidates by selecting each segment with the most similar DINO feature.
  - Devised a Colorization Module that colorizes the black-and-white input under the guidance of the optimal reference.
  - Demonstrated our framework's superiority over state-of-the-art methods, achieving controllable and editable colorization, which is non-trivial in the automatic colorization community.

Research Intern, Zhejiang University   Jun. 2022 – Dec. 2022
- Advisors: *Prof. Xiaowei Zhou* & *Prof. Sida Peng*
- **Neural Reconstruction and Novel View Synthesis of Transparent Objects**

  - Proposed a novel neural implicit signed distance function (SDF) field of 3D-varing index of refraction (IOR).
  - Introduced a refraction-ray-tracing based volume rendering scheme, adhering to the laws of eikonal light transport.

Selected Awards and Honors

Excellence Scholarship, by Chu Kochen Honors College, Zhejiang University, Top 1%	2022
Chinese National Scholarship, by Ministry of Education of the People's Republic of China, Top 0.2%	2021
Chunhui Scholarship, by College of Control Science and Engineering, Zhejiang University, Top 1%	2023
Zhejiang Provincial Government Scholarship, Top 2%	2020 - 2022
First-prize Scholarship of Zhejiang University, Top 2%	2020 - 2022

Computer and Language Skills

Programming Languages: Proficient in C/C++, Python (Pytorch), MATLAB.

Technical Skills: Linux/Windows, MeshLab, Blender, SolidWorks, CoppeliaSim, Multisim.

Language: Mandarin (native), English (fluent).