SALLY (CHUHAN) CHEN

Graduate Student ◇ The Robotics Institute, Carnegie Mellon University
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EDUCATION

Carnegie Mellon University - School of Computer Science — Pittsburgh, USA
Master of Science in Computer Vision — *Jan 2022 - May 2023*

University of Toronto — Toronto, Canada
B.ASc in Computer Engineering — *Sep 2015- June 2020*

Kyoto University — Kyoto, Japan
Semester Exchange in Engineering Department — *April 2018 - August 2018*

RESEARCH INTERESTS

Computer graphics, computational photography, computer vision, robotics, human-computer intersection. Subtopics include but not limited to: rendering, animation, geometry processing, neural fields, digital human creation, depth of field rendering, image synthesis, scene understanding and reconstruction

PUBLICATIONS

Chuhan Chen, Matthew O'Toole, Gaurav Bharaj, Pablo Garrido, "Implicit Neural Head Synthesis via Controllable Local Deformation Field", Under Review, *CVPR 2023*

Wenxun Hu, **Chuhan Chen**, Hirotaka Ishihara, Islam Taha, Amer Shalaby, Baher Abdulhai, "Two-Way Transit Signal Priority for Optimizing Transit Reliability and Speed". Accepted, *2021 Annual Transportation Research Board Meeting* (Poster, Paper)

ACADEMIC RESEARCH EXPERIENCE

Light Transport Lab, Carnegie Mellon University — January 2021 - Present
Project: Interpolation with coordinate MLPs; Depth from focal stack — *Supervisor: Prof. Matt O'Toole*

- Experimented various coordinate MLP architectures on ability of representing and interpolating 2D (image) and 3D (SDF) signals
- Researching on monocular depth estimation from focal stack by learning Multiplane Images

Robotics Institute, University of Toronto — April 2020 - Present
Project: Differentiable Rendering for Adversarial Simulation — *Supervisor: Prof. Florian Shkurti*

- Extended Neural Radiance Field to reconstruct a large intersection in CARLA with NeRF++
- Designed methods to create adversarial scenarios by compositing objects with the scene at random locations within the intersection with realistic and controllable shadows.
- Designed method to efficiently perform gradient-based trajectory optimization using synthesized image with respect to objects' location, color and size to attack driving policy.

Transportation Research Institute, University of Toronto — May 2019 - March 2020
Project: Transit Signal Priority with Deep Q-learning — *Supervisor: Prof. Amer Shalaby*

- Trained deep Q-learning models to find green light timing that optimize buses' speed and reliability at an intersection in Toronto, based on number of cars in the intersection, time difference from the previous bus and time till end of signal cycle
- Developed two-way TSP system and integrated with AIMSUM
- Paper accepted at TRB 2021.

INDUSTRY EXPERIENCE

Flawless AI Inc. May 2022 - August 2022
Research Intern *Santa Monica, US*

- Invented an approach that uses local deformation fields with Neural Radiance Field to reconstruct, render, and rig deformable details on a human face from monocular videos
- Invented novel losses that enforces local control of deformation fields
- Our approach is able to achieve more accurate reconstruction of facial details and interpolation of asymmetric expressions in monocular video setting than SOTA. The paper from my internship is currently under review at CVPR 2023.

Royal Bank of Canada Jul 2020 - Oct 2021
Data Scientist in Cybersecurity Research *Toronto, Canada*

- Led research and development of cheque fraud detection: analyzed 40 million cheque image data; designed and implemented a novel pipeline consisting of text region detection with YOLO followed by CNN-based fraud classifier.
- Proposed a novel method that uses triplet networks to identify difference between cheques from different payers; PyTorch prototype achieved f-score of 0.84 for fraud detection on test set. A patent ("System and Method for Electronic Altered Document Detection") has been filed based on the novel pipeline and is currently approval pending.
- Developed, delivered and maintained an NLP model and developed a tool using Page Rank to analyze client connections and potential cybersecurity risks

Epson Canada Inc. Sep 2018 - April 2019
Computer Vision Research Intern *Markham, Canada*

- Worked along researchers on developing object detection and grasping point detection algorithms as well as data capturing and evaluation pipeline for flexible objects in cluttered environment.

GRADUATE COURSES

Computer Graphics (A)
Geometry-based Methods in Vision (ongoing)
Math Fundamentals for Robotics (ongoing)
Computer Vison (A)
Introduction to Machine Learning (A+)

TECHNICAL STRENGTHS

Programming	Python (PyTorch, Tensorflow, OpenCV, Scikit-learn, PySpark, NetworkX), C++
Tools	Blender, Meshlab, Carla, Github, DataIKU, Jira, Photoshop

AWARDS AND SCHOLARSHIPS

ECE Design Award (for undergraduate capstone project)
University of Toronto Excellence Award (provide funding for summer research)
JASSO Scholarship (for studying in Japan)