Haojun Qiu

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Education

University of Toronto *Sep 2020 - Jun 2025*
B.Sc. Computer Science *cGPA 4.0/4.0*
Courseworks: Linear Algebra (MAT240, MAT247), Multivariable Calculus (MAT237), Geometry of Curves and Surfaces (MAT363), Probability (STA347), Statistics (STA261), Numerical Methods (CSC336), Computer Graphics (CSC317), Computer Vision (CSC320), Imaging (CSC2529), Probabilistic Machine Learning (CSC412), Deep Learning (CSC413, MAT1510), Enriched Data Structure & Analysis (CSC265), Algorithm (CSC373)

Research Interest

My research interests span *machine learning*, *computer vision*, *computer graphics*, and *computational imaging*. My current research focus includes using diffusion models to solve ill-posed inverse problems, modeling conditional distribution for visual data, and motion distillation from video diffusion models.

Research Experience

Stanford University, CogAI Group Stanford, CA
Advisors: Prof. Jiajun Wu & Dr. Elliott Wu *Jun 2024 - Present*
Topics: *video diffusion models, motion generation, score distillation sampling*
(1) Finetuned a video diffusion models (VDM) OpenSora on synthetic dataset, implemented image-based differentiable video renderer and 3D differentiable renderer in PyTorch3D, and implemented score distillation sampling for VDM by extending on threestudio.
(2) Designed incremental optimization scheme that resolves vanishing gradient-issue.

University of Toronto, Toronto Computational Imaging Group Toronto, ON
Advisors: Prof. Kyros Kutulakos & Prof. David Lindell *Jan 2024 - Present*
Topics: *internal learning, diffusion models, consistent content sampling, infinite zoom-in*
(1) Developed my training-sampling scheme for diffusion models on a single image that enables consistent image sequence sampling by score averaging.
(2) Applied the model for infinitely zoom-in a fractal-like photograph.

University of Toronto, Toronto Computational Imaging Group Toronto, ON
Advisors: Prof. Kyros Kutulakos & Prof. David Lindell *May 2022 - Dec 2023*
Topics: *internal learning, diffusion models, inverse problems in imaging*
(1) Modeled neighboring patch and their spatial relationship (e.g., scale and displacement) from a single image with regression approach for image denoising, and super-resolution (see report).
(2) Modeled the same mappings as conditional distributions using diffusion models (see slides).
(3) Discovered the equivalence between Gaussian kernel regression & conditional generative modeling trained by Gaussian noised conditioning during memorization stage (see slides).

Projects

Fast Textual Inversion with Supreme Intialization (see report) *Winter 2023*
Improved the convergence speed of Textual Inversion through multi-tokens initialization and better token initialization by out-of-shelf captioning model.

TA Experience

CSC320: Introduction to Visual Computing, University of Toronto *Winter 2024*
Teaching Assistant with Prof. Kyros Kutulakos. Graded assignments and exams. Ran a tutorial.

Honors and Awards

The Dorothy Walters Scholarship *2025*
Woodsworth Collage, University of Toronto

Nora Kathleen Gillies Scholarship Fund *2023*
Woodsworth Collage, University of Toronto

Alexander T. Fulton: Computer Science *2022*
Faculty of Arts and Science, University of Toronto

Dean's List Schalor *2021-2023*
University of Toronto