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ABOUT ME

My lifelong objective is to develop better automatic algorithms to assist humans like the internet and electricity. I believe the best assistant algorithm for humans is Artificial Intelligence since the most effective and efficient helpers for humans are humans.

EDUCATION

Bachelor of Art in Mathematics 2017 – 2021
New York University, College of Art and Science (Courant Institute), New York City, US

- ✓ *Related courses*: Real Analysis, Algebra, Topology, Math Modeling, ODE, Mathematical Stats, Operating System, ML, Computer Systems Organization, Natural Language Processing

Master of Science in Applied Urban Science and Informatics 2022 – 2023
New York University, Tandon School of Engineering (CUSP), New York City, US

- ✓ *Related courss*: Natural Language Understanding, Computational Linguistics, AR/VR

RESEARCH PAPERS AND PRE-PRINTS

- **Qinchan Li**, Sophie Hao. ERAS: Evaluating the Robustness of Chinese NLP Models to Morphological Garden Path Errors (*NAACL25 oral paper*)
- **Qinchan Li***, Kenneth Chen*, Changyue Su, Qi Sun. (*In submission*) BudgetFusion: Perceptually-Guided Adaptive Diffusion Models (*ICCV25*)
- **Qinchan Li**, Kenneth Chen, Qi Sun. (*in submission*) Integrating Generative Diffusion Models for Efficient 3D Modeling Workflow (*I3D25*)

RESEARCH PROJECTS

BudgetFusion: Perceptually-Guided Adaptive Diffusion Models Mar – Nov 2024

- ✓ Proposed BudgetFusion, a prompt-adaptive Diffusion model that predicts the optimal number of Denoising steps, and implemented with PyTorch.
- ✓ Conducted human evaluation to show that our generated images achieve ∼60% of preference against images from a similar amount of computing resources and ∼40% of preference against images from ∼ 6 times computing resources.
- ✓ BudgetFusion exceeds baselines by ∼10% in quality gaining efficiency per Floatingpoints Operations for all three selected image metric.
- ✓ Predict image quality evolvement about the number of denoising steps with LSTM and timestep embedding with ablation study proves the necessity of each component.
- ✓ Invented a reference-free Laplacian-filter-based metric to represent the generated images' noise level or sharpness.

ERAS: Evaluating the Robustness of Chinese NLP Models to Morphological Garden Path Errors
Mar 2023 – Oct 2024

- ✓ Synthesized the first Chinese local ambiguity benchmark with controlled templates.
- ✓ Designed evaluation protocol based on variance in probability score on assessing language models' implicit parsing ability. Showed that state-of-the-art sentiment analysis models achieve only ∼40% accuracy in handling Chinese local ambiguity.
- ✓ Conducting user study on assessing humans' parsing ability in local ambiguity and showed that humans can reach 91.3% accuracy.

*Equal contribution.

- ✓ Evaluated word segmentation models in facing local ambiguity and showed that models reach ∼90% accuracy in handling local ambiguity. Concluded that LMs read text left-to-right (Chinese reading order) because models perform better in left-branching segmentation,
- ✓ Mitigated the implicit parsing errors of sentiment analysis models by introducing explicit segmentation information during fine-tuning by ≥5%.
- ✓ Fine-tuned multiple sentiment analysis and Chinese Work Segmentation models.

Integrating Generative Diffusion Models for Efficient 3D Modeling Workflow May – Sep 2024

- ✓ Built a GenAI-powered expert-level user interface for efficient 3D texturing for modelers.
- ✓ Conducted human evaluation and showed that humans only achieve ∼50% in discrimination between our-pipeline-made and expert-made.
- ✓ Used Stable Diffusion for prompt-based image synthesis and ControlNet for geometry control.
- ✓ We implement mask in-painting generation for multi-view consistency over the 3D model.

Room-to-any 3D scene generation Jul – Dec 2023

It failed because 3D scene generation requires an unexpected amount of work.

- ✓ Injected a loose geometry loss into the SDS-based text-to-3D generation pipeline and achieved loosely converting a chair to pineapple.
- ✓ Ran and comprehend text-to-3D methods: DreamFusion, ProlificDreamer, Magic3D, etc.
- ✓ Developed a data collection pipeline for the 3D scene with NERF reconstruction, point cloud cleaning, and Blender-based floor plan drawing add-on.

Matrix Product State as a hyper-space classification model Apr – Jul 2021

- ✓ Implementing and training the quantum-inspired Matrix Product States (MPS) model for Sentiment analysis task in C++. MPS enable the hyper-dimensional operation by decomposing the hyper-dimensional weight tensor.
- ✓ Evaluated MPS in efficiency and performance compared to baseline methods: LSTM, RNN, MLP. MPS inference time is half of the baselines with only 2% - 4% scarification of accuracy.
- ✓ Invented and implemented transpose and mini-batch techniques in C++ from scratch that fit the expected >1000GB VRAM in training consumption to 60GB.

Modeling the population of bacteria and macrophages May – Oct 2020

- ✓ Designed a mathematical model and corresponding fitting algorithm that predicts the population and winner of bacteria and macrophages and engineered this model in Python.
- ✓ Analyzed the evolvement of the population by plotting the population of bacteria and macrophages.

PROFESSIONAL EXPERIENCE

Computer Vision Intern Nov 2024 - Present

International Digital Economy Academy, Shenzhen, China supervisor: Dr. Yu Li

- ✓ Leading a text to sign language video generation project.
- ✓ Reproduced and Trained video generation pipelines like TalkAct and RealisDance.

Software Developer Intern Jun - Aug 2019

MicroPattern Software Group, Wuhan, China supervisor: Dr. Youbin Chen

- ✓ Designed and implemented an algorithm to detect whether streaming video is frozen with more than 90% accuracy in practical usage. (with C++)
- ✓ Wrote a video frame encryption algorithm that is robust to lossy compression after encryption.
- ✓ Edit and shoot promotional videos for the product.

TECHNICAL SKILLS

Programming languages

Python, C, C++, C#, Java, Assembly, Javascript, HTML.

3D Development

Unity, Blender, Meshlab.

Mathematical
Modeling, Analyses, Derive.

CASUAL INTEREST

Badminton, Workout, Game of Go, Hiking, Boardgames