

Do Tam Thuc

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Technical skills

Languages: Python, C++, C, JavaScript.

Big data analysis: Pyspark, SQL, Spark, Hadoop.

Machine Learning & Deep Learning: Sklearn, XGboost, Tensorflow, Pytorch, Jax.

High performance computing: CUDA.

Graphic Programming: OpenGL, Physical based rendering.

Compression-related algorithms: Region-adaptive hierarchical transform, DCT, Wavelet transform, Arithmetic Coding, Run-Length Encoding.

3D graphic related: 3D Gaussian Splatting Learning.

Experience

PhD student/Research Assistant, York University – Toronto, ON September 2021 – Present

- Developed interpretable deep learning model that gave SOTA compression performance for 3D points cloud attributes. We gain $> 0.7\text{dB}$ PSNR over the standard compression algorithms and $\sim 10\%$ reduction in term of bit-rate.
- Developed mathematical interpretable lightweight deep learning transformer models for images super resolution. Hence, the development process of a deep learning model is significantly transparent.
- Wrote multiple published papers for various conferences: NIPS, ICASSP, ICIP

Google student researcher, Google – Toronto, ON April 2022 – April 2023

- Conducting research for compressing non-traditional types of media, including volumes, 3D meshes.
- Developed methods to design interpretable deep learning models using algorithm unrolling.

Data scientist, Trusting Social (Singapore based) – Ho Chi Minh, Viet Nam August 2017 – July 2021

- Designed and implemented locations/moving feature extraction pipeline to capture telecom user behavior patterns. These additional features help improve Area Under the ROC Curve by 0.5%.
- Using machine learning tools (XGBoost) to predict the credit risk of 0.5 billions telecom users in India, Indonesia, Viet Nam (IDEA, Airtel, Telkomsel, Viettel).
- Alleviated the adverse effect of covariance shift due to telecom users behavior changes by combining deep learning models with stability constraints.

Machine Learning Engineer, Bioturing (US based) – Ho Chi Minh, Viet Nam 2016–2017

- Using machine learning tools to differentiate normal and disease samples using gene expression.
- Developed visualization platform for high dimension data using dimension reduction methods (PCA, t-SNE).
- Developed pipeline to analyze gene expression, protein dependency networks.

Education

PhD in Computer Science, York University, Fully funded Sept 2024 – Present

- *Research topic:* Mathematical interpretation for deep learning models architecture design.
- *Coursework:* Advance algorithm design, Advance data structure, Information Theory.

Msc in Computer Science, York University, Fully funded Sept 2021 – Sept 2023

- *Thesis:* Volumetric Attribute Compression for 3D Point Clouds with Geometric Attention
- *Coursework:* Graph Signal Processing, Computer Vision, Probabilistic Models & Machine Learning

BS in Applied Mathematics, Ho Chi Minh International University, Fully funded Sept 2013 – Sept 2018

- *GPA:* 3.3/4.
- *Coursework:* Abstract Linear Algebra, Optimization, C/C++ programming language, Probability and Statistic

Publications

Interpretable Lightweight Transformer via Unrolling of Learned Graph Smoothness Priors - <i>Do Tam Thuc</i> , Parham Eftekhari, Seyed Alireza Hosseini, Gene Cheung, and Philip Chou.	Neural Information Processing Systems (NISP) 2024
Lightweight Transformer via Unrolling of Mixed Graph Algorithms for Traffic Forecast - Ji Qi, <i>Do Tam Thuc</i> , Mingxiao Liu, Zhuoshi Pan, Yuzhe Li, Gene Cheung, H. Vicky Zhao.	Pre-print and submitted for NISP 2025
Learned Nonlinear Predictor for Critically Sampled 3D Point Cloud Attribute Compression - <i>Do Tam Thuc</i> , P. A. Chou and G. Cheung	IEEE International Conference on Image Processing (ICIP) 2024
Constructing an Interpretable Deep Denoiser by Unrolling Graph Laplacian Regularizer - Seyed Alireza Hosseini, <i>Do Tam Thuc</i> , Gene Cheung, Yuichi Tanaka	IEEE International Conference on Image Processing (ICIP) 2024
Volumetric 3d Point Cloud Attribute Compression: Learned Polynomial Bilateral Filter for Prediction - <i>Do Tam Thuc</i> , P. A. Chou and G. Cheung	IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2024
Volumetric Attribute Compression for 3D Point Clouds Using Feedforward Network with Geometric Attention - <i>Do Tam Thuc</i> , P. A. Chou and G. Cheung	IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) 2023
Hybrid model-based/data-driven graph transform for image coding - Bagheri, Saghar, <i>Do Tam Thuc</i> , Gene Cheung, and Antonio Ortega	IEEE International Conference on Image Processing (ICIP) 2022

Personal Learning Projects (Github)

Learning Graphic Programming - 2025

- Follow the books "Learn OpenGL", and "Physically Based Rendering" to learn the mathematic aspect of real-time graphic rendering
- Tools Used: C++, OpenGL, glm, GLFW

Probabilistic Graphical Models Part 1 & Part 2 - 2020

- Learning about probabilistic graphical modeling
- Tools Used: Python, Matlab
- Coursera: Certificate part 1 and Certificate part 2

Implementation of Attention Memory Network - 2016

- Learning about deep learning while I was undergrad student.
- Tools Used: Python, Theano (outdated deep learning framework)

Completed Graduate Courses

Probabilistic Models & Machine Learning	Grade: A+
Computer Vision	Grade: A+
Engineering Optimization	Grade: A
Digital Image Processing	Grade: A+
Advanced Data Structures	Grade: B
Coding and Information Theory	Grade: A+
Advanced Algorithm Design and Analysis	Grade: A