

Libing Zeng

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<http://libingzeng.github.io>

EDUCATION

Texas A&M University
Ph.D. in Computer Science

2019.08 — Present

Hunan University
Bachelor in Electronic Information Engineering

2007.09 — 2011.06

RESEARCH

My current research interests are using deep learning techniques to solve problems in 3D-aware View Synthesis, Depth Estimation, and Video Denoising.

PAPERS

Test-Time Optimization for Video Depth Estimation

Advised by Dr. Nima Kalantari.

In Submission.

we propose a learning-based test-time optimization approach for reconstructing geometrically consistent depth maps from a monocular video. Specifically, we optimize an existing single image depth estimation network on the test example at hand. We do so by introducing pseudo reference depth maps which are computed based on the observation that the optical flow displacement for an image pair should be consistent with the displacement obtained by depth-reprojection. Additionally, we discard inaccurate pseudo reference depth maps using a simple median strategy and propose a way to compute a confidence map for the reference depth. We use our pseudo reference depth and the confidence map to formulate a loss function for performing the test-time optimization in an efficient and effective manner.

Multi-Stage Raw Video Denoising with Adversarial Loss and Gradient Mask

Advised by Dr. Nima Kalantari.

ICCP 2021.

we propose a learning-based approach for denoising raw videos captured under low lighting conditions. We propose to do this by first explicitly aligning the neighboring frames to the current frame using a convolutional neural network (CNN). We then fuse the registered frames using another CNN to obtain the final denoised frame. To avoid directly aligning the temporally distant frames, we perform the two processes of alignment and fusion in multiple stages. We train our multi-stage system using an adversarial loss with a conditional discriminator. Specifically, we condition the discriminator on a soft gradient mask to prevent introducing high-frequency artifacts in smooth regions.

Rectifying Proposal Failures in Metropolis Light Transport

Advised by Dr. Li-Yi Wei.

Preprint (HAL).

Based on MMLT, we propose a novel algorithm, Rectifying Proposal Failure MLT (RPFMLT), which distinguishes proposal failure paths from normal proposed paths and excludes them from the states of Markov chain. PFMLT better approximates the original path distributions especially for high proposal rejection rates, and can be easily integrated with various MLT algorithms.

PROJECTS (Prior to Ph.D.)

A Renderer Written from the Scratch (BART Animations with High-Frequency Textures)

Advised by Dr. Li-Yi Wei.

This renderer mainly has two components. First, parsing animation description files (AFF); Second, rendering the three animations of BART, which is presented by Dr. Ulf Assarsson.

Some key implementations: "Multi-Jittered" sampler + "Gaussian" filter for reconstruction + Mipmap + EWA filter for texture anti-aliasing.

A Renderer Extended from The Book, Ray Tracing from the Ground Up

Self-study.

I read the book and extended it from the following aspects: various objects, tessellations, 2D textures and several scenes.

A Renderer with Implementations of Various NON-TRIANGULATE Surfaces

Self-study.

This render is based on the framework of Peter Shirley's "ray tracing in one weekend" and is extended with tracing almost all of the NON-TRIANGULATE surfaces mentioned in the book, An Introduction to Ray Tracing.

OPEN SOURCE

Github

<https://github.com/libingzeng>

Blog

https://blog.csdn.net/libing_zeng

I summarized every topic I learned, every problem I solved and every verifiable idea I had in the journey of computer graphics, and I posted more than 200 technical reports of the summaries on my blog (written in simplified Chinese) which has over 800 followers and over 1.6 million visitors now.

WORK EXPERIENCE

Guo-Yuan-Li Fruit Store

2014.06 – 2016.02

"Guo-Yuan-Li" is Chinese pinyin which means fresh fruit in orchard.

I started the fruit business, and got everything working well with annual sales of millions of RMB, then transferred it to my younger brother.

MediaTek

2011.09 – 2014.05

Senior Software Engineer, Customer Project Leader

Developed secure and robust services and applications on embedded systems using C language.

Led customer project groups to build 4 blue-ray disc player for Pioneer Japan.

UNDERGRADUATE THESIS

The Design and Development of Experiment Teaching Management System

2011

Advised by Dr. Shaoyuan Wang

Top 1% Thesis Award

I designed a novel experiment teaching management system and implemented it with J2EE.

AWARDS

Innovation of Graduation Project, Hunan Univ., P.R. China **2011**
The First Prize. (top 1% in the class of 2011)

National Inspirational Scholarship, Ministry of Education, P.R. China **2010**
(top 5% in the class of 2011)

National University Students Intelligent Car Race, Ministry of Education, P.R. China **2010**
The First Prize in Southern China (Top 10 in more than one hundred teams.)
I developed the software on embedded system with C language. The software controls a car model to run very fast along a challenging path.

Programming Languages

PyTorch, Python, C++, and C.