Zongnan Bao

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Education

- **University of California, Los Angeles (UCLA)** — Los Angeles, CA
  Master of Science in Computer Science — *Sep. 2021 - June 2023*
- **University of Illinois at Urbana-Champaign** — Urbana, IL
  Bachelor of Science in Computer Engineering — *Aug. 2017 - May 2021*

Experiences

- **Qualcomm Technologies, Inc.** — San Diego, CA
  Camera System Architect — *July 2023 - Present*
  - Modeled Qualcomm Spectra ISP architecture analyzing bandwidth, latency, and core frequency requirements across use cases, directly informing critical design decisions for camera pipeline optimization.
  - Developed Python framework and modeling methodology that standardized ISP dataflow modeling, creating a unified representation adopted by multiple teams, enabling seamless cross-functional collaboration.
  - Developed technical architecture documentation and delivered presentations to stakeholders, effectively translating complex camera systems into actionable implementation strategies.
- **Dolby Laboratories, Inc.** — Los Angeles, CA
  Image Engineering Intern — *June 2022 - Dec. 2022*
  - Developed Dolby Vision automatic content-mapping (HDR to SDR) tuning system using Particle Swarm Optimization, automated HDR tone-mapping workflow and reduced colorists processing time. (patented)
  - Developed benchmarks and visualization dashboards using Plotly and Dash for faster tuning evaluation.
- **YITU Technology** — Hangzhou, China
  Research Intern - Computer Vision — *Feb. 2021 - May. 2021*
  - Optimized Single Shot Multibox Detector (SSD) performance through systematic architecture modifications and hyperparameter tuning, achieving 80% recall at 1% false alarm rate.
  - Streamlined ML workflow infrastructure by developing an end-to-end task submission system that reduced experiment cycle time by 70%, dramatically accelerating development iterations and time-to-production.

Projects

- **Learning Sequential Image Enhancement in Bilateral Space**
  - Proposed a novel deep learning model architecture for image enhancement, combining sequential image processing and bilateral grid learning methods for faster runtime and lower memory consumption.
  - Evaluated the proposed model on the MIT-Adobe-5K dataset with a PSNR of 24.22, SSIM of 0.906, LPIPS of 0.043.
- **Focus Stacking**
  - Implemented multi-focus image fusion algorithm using Laplacian Pyramid decomposition to generate all-in-focus images with extended depth of field.
  - Engineered adaptive focus measure computation with configurable pyramid depths and kernel sizes, outperforming standard max Laplacian of Gaussian techniques in preserving fine details.
  - Developed quantitative evaluation framework comparing reconstruction quality across methods using metrics like Variance of Laplacian (focusness).

Skills

- **Programming Languages**: C/C++, Python, Bash
- **Libraries**: PyTorch, Django, NumPy, Matplotlib, Plotly, CUDA, OpenMP, MPI, nosetests
- **Others**: LaTeX, Git, AWS, Linux, Perforce, Adobe Lightroom, Photography