Zongnan Bao

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Education

- **University of California, Los Angeles (UCLA)** — Los Angeles, CA
  Master of Science in Computer Science; GPA: 3.58/4.00 — *Sep. 2021 - June 2023*
- **University of Illinois at Urbana-Champaign** — Urbana, IL
  Bachelor of Science in Computer Engineering; GPA: 3.74/4.00 — *Aug. 2017 - May 2021*

Experiences

- **Dolby Laboratories, Inc.** — Los Angeles, CA
  Image Engineering Intern — *June 2022 - Dec. 2022*
  - Designed, developed and tested a modular system for restoring Dolby Vision metadata from HDR/SDR pairs utilizing **Particle Swarm Optimization** (PSO).
  - Accelerated optimization process by 30× using **multiprocessing** and intelligent down-sampling.
  - Wrote benchmarks for the system, visualized result in a dashboard using **Plotly** and **Dash**.
  - Implemented, trained and evaluated deep learning papers in the fields of **HDR** and **photo enhancement** using **PyTorch**.
- **YITU Technology** — Hangzhou, China
  Research Intern - Computer Vision — *Feb. 2021 - May. 2021*
  - Trained and evaluated **Single Shot Multibox Detector** (SSD). Experimented with the model design and hyper-parameters, achieved recall rate around 80% under 1% False Alarm Rate.
  - Wrote scripts in Python and Bash that can extract potential training images from entire unlabeled image database, increased recall rate by 5%.
  - Automated task submission pipeline, saved at least 70% of time compared to previous process.
  - Wrote and assessed annotation guidelines for object detection tasks.

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 on the MIT-Adobe-5K dataset with a PSNR of **24.22**, SSIM of **0.906**, LPIPS of **0.043**.
  - Implemented, trained and evaluated the model in **PyTorch**, documented experimentations (e.g. loss functions, pre-train datasets & model archs) in technical reports.
- **Focus Stacking - Image Processing Tool**
  - Developed a tool to blend images with different depths of focus into an "all-in-focus" image.
  - Utilized **Laplacian Pyramid Decomposition** for image fusion and reconstruction, achieved better visual/quantitative result than simple blending methods.
  - Implemented in **Python**, documented detailed design, quantitative & visual evaluation
- **LazyTrip - Smart Travel Planner**
  - Developed backend functionalities in **RESTful API** using **Django REST Framework** (DRF).
  - Integrated **Google OAuth** into the backend's JWT Token based authentication system.
  - Developed **KMeans**-based greedy scheduling algorithms and **Google Map API** for route planning.
  - Fully documented and unit-tested APIs, deployed app on **Heroku**.

Skills

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