

Anant Saraf

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EDUCATION

Brown | RISD Dual Degree Program GPA 3.98/4.0

Providence, RI | Expected Graduation May 2027

Brown University, B.A. Computer Science

Relevant Coursework: Computer Vision, Deep Learning, Intro to Computer Graphics, Computational Photography, Linear Algebra

Rhode Island School of Design (RISD), B.F.A. Photography

EXPERIENCE

Undergraduate Teaching and Research Award, Geospatial Object Detection Pipeline **Providence, RI | June – Aug 2025**

- Designed and implemented an end-to-end SAR computer vision pipeline to detect ocean eddies in open water and marginal ice zones; packaged as a reproducible, config-driven workflow for non-technical domain experts.
- Built GeoTIFF ingestion via API, SAR-specific preprocessing, YOLO inference, and geospatial post-processing to produce analysis-ready outputs.
- Fine-tuned YOLOv11 with SAHI sliding-window inference on a 3,000-image dataset (including null samples), achieving approximately 90% precision, 78% recall, and 83% mAP@0.5.
- Partnered with 2 domain experts to translate scientific objectives into dataset and modeling decisions; monitored training and created dataset curation tools to support iteration and handoff.

JISIASR, Medical Imaging Research Intern (Deep Learning)

Kolkata, India | July 2024 – Sept 2024

- Developed a repeatable training and evaluation pipeline for lung segmentation on chest X-rays using U-Net variants, working under small-data and label-quality constraints.
- Ran controlled experiments on preprocessing and training choices (e.g. CLAHE, augmentations, early stopping) to reduce overfitting and improve validation behavior; compared U-Net variants and summarized results for handoff.
- Implemented a ResNet-50 classifier baseline and applied Integrated Gradients to probe model sensitivity and failure cases.

Joint Undergraduate-SRC Teaching Assistant, Intro to Software Engineering (CSCI 0320)

Providence, RI | Fall 2025

- Led weekly software engineering labs for 100+ students, reviewed repos and app demos, evaluated implementations against technical criteria, and mentored teams on testing, code quality, Git workflow, and system design decisions.

SELECTED PROJECTS

Gaussian Splatting Pipeline (Python, PyTorch)

Providence, RI | Spring 2025

- Implemented a 3D Gaussian Splatting pipeline in PyTorch for differentiable 3D reconstruction, including model structure, parameter initialization, and end-to-end optimization.
- Built a mixed-precision PyTorch training workflow on an HPC cluster, monitored over 58 hours of training, and debugged numerical stability issues in differentiable rendering. ([GitHub](#))

Realtime Graphics Renderer (C++, OpenGL/GLSL)

Providence, RI | Fall 2025

- Built an end-to-end real-time rendering pipeline and collaborated on a 4-person integration phase that merged independent subsystems into a unified codebase.
- Implemented GPU instanced rendering for repeated geometry, reducing per-frame render time from 800 ms to 0.015 ms on repeated-primitive stress-test scenes.
- Implemented shading and post-processing effects including color grading, stylized filters, multiple screen-space passes, and a custom LUT for the final scene.

RayTracer (C++)

Providence, RI | Fall 2025

- Built a C++ ray tracer from scratch, designing the renderer architecture and implementing ray generation, intersections, shading, and recursive reflections.
- Debugged floating-point precision issues and reflection-recursion failures that produced rendering artifacts, using scene-based visualization to improve numerical robustness across complex reflective scenes.
- Implemented anti-aliasing and mipmapped texture filtering, caching mip levels and using separable kernels to improve sampling efficiency and image quality in the rendering pipeline.

Panorama Stitching (Python, NumPy/OpenCV)

Providence, RI | Fall 2025

- Implemented core components of planar and cylindrical panorama stitching, including least-squares estimation of translation, affine, and homography transforms with RANSAC-based robust alignment.
- Completed image warping and compositing functions for multi-image panorama generation, including EXIF-based focal length conversion for cylindrical projection and spherical projection as an extension.

Dense Optical Flow (Lucas–Kanade) (Python, NumPy)

Providence, RI | Fall 2025

- Implemented coarse-to-fine Lucas–Kanade optical flow with iterative warping to estimate dense displacement fields under larger motion; debugged flow estimation and tuned windowing and regularization choices to improve stability.

Technical Skills: Python, C++, Java, OpenGL/GLSL, NumPy, TensorFlow, PyTorch, OpenCV, Git, Firebase, React.