

Anirudha Ramesh

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EDUCATION

Carnegie Mellon University

Masters in Robotics, CGPA : 4.12/4.0

Pittsburgh, PA

August 2021 - August 2023

- Select Courses : Machine Learning (PhD), Computer Vision, Deep Learning, Computational Photography, Mathematics for Robotics & Optimization, Embodied AI, Visual Learning & Recognition.

International Institute of Information Technology (IIIT-H)

Bachelor of Technology (Honors) in Computer Science, CGPA : 9.32/10.0

Hyderabad, India

Aug 2017 - May 2021

- Dean's Research Award - In recognition of outstanding research contribution.

EXPERIENCE

InstaDeep

Research Engineer

November 2023 – Present (San Francisco, CA)

LLM post-training, DeepRL, AI4Science

- Building **DeepPCB**, the leading PCB routing and placement product in the market.
- Built and deployed tooling for the **world's first AI Lab Assistant, Laila**. Covered in **FT, Benzinga, & more**.
- Mentored two research interns in pushing the frontier in long range genomics, enabling effective, efficient inference of ultra-long genomic sequences > 1Mbp on a single GPU, generalizing zero-shot to sequences 100× longer than seen during training. Link to *Website*, papers at **ICLR 2025 @ LMRL** and **AI4NA**, and my **Spotlight Talk**.
- Modeled large financial and operations data to optimize costs and guide business strategy for a national insurance provider, **estimating potential benefits worth over \$100M**.

NREC / Auton Lab, Carnegie Mellon University

October 2021 – Nov 2023 (Pittsburgh, PA)

Graduate Research Engineer - Advisors: Jeff Schneider, Christoph Mertz Pytorch, Tensorflow, ROS, Python, C++

- Designed and deployed a first of a kind perception system capable of functioning off-road 24/7, utilizing multi-spectral inputs following CI/CD approaches. Lead effort in extending object detection and semantic segmentation to function beyond day-time, and collaborate with others for system design and integration.
- Introduced a new framework for DA, and showcased it on semantic segmentation, outperforming existing methods by **+40% mIoU** in unsupervised, and **+25-35% mIoU** in semi-supervised scenarios. Link to *Thesis Talk, Paper*.

Adobe

January 2021 – July 2021 (Noida, India)

Research Intern - Media and Data Science Research (MDSR) Lab

Python, Pytorch

- Discovered and solved biases in existing solutions, and in the structuring of prominent datasets for Few Shot Segmentation (FSS). Solving for these biases adds to the performance of all tested underlying networks by ~ 5% mIoU. **Published findings in NeurIPS 2021 (Datasets and Benchmarks)** and **Adobe Tech Summit 2021** along with a new dataset (TOSS) for nuanced evaluation of FSS. Link to *Paper*.

Robotics Research Center, IIIT-H

May 2019 – July 2021 (Hyderabad, India)

Undergraduate Researcher - Advisor : Madhava Krishna

Python, Matlab, C++, g2o

- Designed computer vision and monocular multibody SLAM systems in dynamic scenes relating to autonomous on-road navigation. Achieved state-of-the-art results in tracking the moving Ego-vehicle and other vehicles in the scene, as well as formulated a novel mechanism to bring everything to a uniform global metric scale. Achieved 3x smaller absolute tracking error over the former leading method. **Published works accepted in IEEE IV 2020 (Paper, Video), IV 2021(Paper), and VISAPP 2021(Paper)**.

PROJECTS

Learning to Detect by Learning to Predict | *Python (Pytorch)*

- Inspired by the theory of predictive coding, we develop a system which improves detection by infusing the ability to predict. Our novel pretraining consistently beats standard pretraining in average recall, particularly for small objects, by upto 2% on the COCO dataset, and shows promising results in improving current SoTA solutions. *Link*.

Robotic Vision And Mobile Robotics Mini-Projects | *Python, Matlab*

- Implemented visual odometry on KITTI-Odometry, Dense Stereo Reconstruction, Motion Estimation using PnP, and Extended Kalman Filter to combine motion and observation models to get better robot localization.

Computational Photography Projects : Implemented algorithms, and designed capture for,

- Image Development Pipeline, HDR Capture and Merging, Gradient Domain Processing for enhancement, Lightfield Rendering, Depth from Focus, Confocal Stereo, Capturing Unstructured Lightfields, Photometric Stereo etc.
- Motion Magnification, Motion Mode Extraction, and virtualization of physical objects based on these modes, which allows deformation on application of forces. *Link*.