

ANKIT V. MANERIKAR

West Lafayette, Indiana, USA

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EDUCATION:

Purdue University, USA	Doctor of Philosophy (PhD) <i>Electrical and Computer Engineering</i>	3.80/4.00	Aug 2023
Purdue University, USA	Master of Science <i>Electrical and Computer Engineering</i>	3.84/4.00	Aug 2017
Mumbai University, India	Bachelor of Engineering <i>Electronics Engineering (First Class with Distinction)</i>	81.52% (1 st Rank)	July 2015
SBM Polytechnic, India	Pre-University Course (Engineering Diploma) <i>Industrial Electronics (First Class with Distinction)</i>	89.26% (1 st Rank)	July 2012

WORK EXPERIENCE:

- Intel Corporation** Aug 2023 – Present
Title: AI Algorithm Engineer **Santa Clara, US**
 - Contributed to development of Intel oneAPI libraries for improving cross-platform performance for Deep Learning applications.
- Intel Corporation** May 2022 – December 2022
Title: Deep Learning SWE Intern **Santa Clara, US**
 - Conducted design and development to build and optimize AI software for the latest Intel x86 isa.
 - Profiled distributed deep learning models to identify performance bottlenecks for state-of-the-art ML workloads – worked specifically on the profiling of 3D-UNets and Vision Transformers.
 - Worked on ML-based autotuning of DGEMM kernels for deep learning workloads for varying hardware specifications.
- Robot Vision Lab, Purdue University** August 2017 – May 2022
Title: Graduate Research Assistant **West Lafayette, US**
 - **Project Member, BAA-1703 Contract on Dual Energy ATR for Airport Security:** A DoHS (Department of Homeland Security) project to research machine learning methods for X-ray-based threat detection at airport checkpoints. [\[link\]](#)
 - **Project Member, ALERT TO-7 AATR Initiative:** An ALERT-sponsored project on Adaptive Automatic Target Recognition (AATR) for CT-based Threat Detection Systems for airport baggage screening. [\[link\]](#)
 - **Author, GANecdotes** – a SwAV-based self-supervised learner for one-shot segmentation of StyleGAN images. [\[link\]](#)
 - **Author, BagGAN** – a StyleGAN-based framework for high-resolution synthesis of baggage CT scans. [\[link\]](#)
 - **Author, DEBISim** – a model-based CT simulator software for security screening with ML-based threat detection. [\[link\]](#)
 - **Cloudmaster, The RVL Cloud (2020- Present)** – an Openstack-based custom cloud ecosystem for vision applications. [\[link\]](#)
- School of Electrical and Computer Engineering, Purdue University** January 2016 – May 2021
Title: Graduate Teaching Assistant **West Lafayette, US**
 - Courses: ECE404 – Computer Security (Spring 2020 -2021), ECE382 - F/b System Design & Analysis (Spring 2016 -2017).
- Gade Autonomous Systems** June 2016 - July 2016
Title: Intern: Machine Learning, Firmware & Robotics **Mumbai/Frankfurt**
 - Headed the Firmware team to design HMM/Machine Learning Algorithms for smart devices in fitness/automotive applications.
- Citizen Scales India (P) Ltd.** Dec 2011 - May 2012
Title: Research Intern/Co-op **Mumbai**
 - Collaborated with the Firmware team for designing Moisture Analysis and Micro-Precision Weighers on an ARM7 platform.
- Technophilia Systems** June 2010 – Nov 2010
Title: Robotics Intern /Co-op **Mumbai**
 - Designed navigation algorithms for a four-wheel drive robot with a centroid-based object-tracking algorithm.

RESEARCH EXPERIENCE:

- Self-Supervised One-Shot Learning for Automatic Segmentation of GAN-Generated Images:** [\[pub\]](#)[\[code\]](#)[\[video\]](#)
(PhD Doctoral Thesis, Purdue University)
A novel SwAV-based self-supervised learning framework for one-shot segmentation of GAN images – the proposed model outperforms baselines in terms of IoU (by 1.02 %) and speed (by a factor of 4.05).

- **BagGAN – A StyleGAN-based Data Synthesis Software for Baggage CT scans:** [\[pub\]](#)[\[code\]](#)
(PhD Doctoral Thesis – Robot Vision Lab, Purdue University)
- A StyleGAN-based simulation software for data synthesis of baggage CT and X-ray scans.
- **DEBISim – A Simulation Pipeline for Material Detection using Dual Energy X-ray Inspection Systems:** [\[pub\]](#)[\[code\]](#)
(DoHS AATR Initiative – Robot Vision Lab, Purdue University)
- A CT simulation pipeline for X-ray image data generation for CT based object detectors in non-destructive testing applications.
- **Classifier Design for 3D Segmentation using Dual Energy X-ray Tomography:** [\[pub\]](#)
(DoHS AATR Initiative – Robot Vision Lab, Purdue University)
- This project involves the design of improved classifier and image reconstruction frameworks for X-ray based object detection.
- **Adaptive Automatic Target Recognition (AATR) for CT-Based Object Detection Systems:** [\[pub\]](#)
(ALERT TO-7 AATR Initiative – Robot Vision Lab, Purdue University)
- This project deals with Adaboost-based X-ray Threat Detectors for segmenting target objects with varying specifications.
- **Indoor Place Categorization for Visual SLAM:** [\[video\]](#) [\[GitHub\]](#)
(Course Project: BME595 (Deep Learning), Fall 2017 – Purdue University)
- Developed a Place Recognition Classifier using ResNet CNNs to learn indoor visual landmarks during mobile robot navigation.
- **SLAM-Assisted Coverage Path Planning for Lidar Mapping Systems:** [\[pub1\]](#) [\[pub2\]](#)
(Digital Photogrammetry Research Group, Purdue University)
- Developed a SLAM-based Pseudo-GNSS/INS framework for a ROS Mobile-Mapping System for terrestrial/aerial mapping.
- **Optimal Constrained Coverage Path Planning for Mobile Robot Navigation:** [\[pub\]](#) [\[GitHub\]](#)
(Course Project: AAE568 (Applied Optimal Control & Estimation), Spring 2016 – Purdue University)
- Developed a Pseudospectral Optimal Control Algorithm for Coverage Path Planning for complex obstacles and boundaries.

MAJOR PUBLICATIONS:

- Manerikar, Ankit, and Avinash C. Kak. "Self-Supervised One-Shot Learning for Automatic Segmentation of StyleGAN Images." *arXiv preprint arXiv:2303.05639* (2023). [\[pdf\]](#) [\[code\]](#) (Submitted to and under review by IEEE T-PAMI).
- Manerikar, Ankit, Fangda Li, and Avinash C. Kak. "DEBISim: A simulation pipeline for dual energy CT-based baggage inspection systems." *Journal of X-Ray Science and Technology* 29.2 (2021): 259-285. [\[pdf\]](#) [\[code\]](#)
- Manerikar, Ankit, Tanmay Prakash, and Avinash C. Kak. "Adaptive target recognition: A case study involving airport baggage screening." *Anomaly Detection and Imaging with X-Rays (ADIX) V*. Vol. 11404. International Society for Optics and Photonics, 2020. [\[pdf\]](#)
- Manerikar, Ankit, Fangda Li, and Avinash Kak. "A Spectrum-Adaptive Decomposition Method for Effective Atomic Number Estimation using Dual Energy CT." *IS&T Electronic Imaging: Computational Imaging VIII, IS&T International Symposium on Electronic Imaging*, 2020. [\[pdf\]](#)
- Li, Fangda, Ankit Manerikar, Tanmay Prakash, and Avinash Kak. "A Splitting-Based Iterative Algorithm for GPU-Accelerated Statistical Dual-Energy X-Ray CT Reconstruction." *IS&T Electronic Imaging: Computational Imaging VIII, IS&T International Symposium on Electronic Imaging*, 2020. [\[pdf\]](#)
- Li, Fangda, Ankit V. Manerikar, and Avinash C. Kak. "RMPD—A Recursive Mid-Point Displacement Algorithm for Path Planning." In *Twenty-Eighth International Conference on Automated Planning and Scheduling*. 2018. [\[pdf\]](#).
- Shamseldin, Tamer, Ankit Manerikar, Magdy Elbahnasawy, and Ayman Habib. "SLAM-based Pseudo-GNSS/INS localization system for indoor LiDAR mobile mapping systems." In *2018 IEEE/ION Position, Location and Navigation Symposium (PLANS)*, pp. 197-208. IEEE, 2018. [\[pdf\]](#)
- Manerikar, Ankit, Tamer Shamseldin, and Ayman Habib. "SLAM-Assisted Coverage Path Planning for Indoor LiDAR Mapping Systems." *arXiv preprint arXiv:1811.04825* (2018). [\[pdf\]](#)
- Manerikar, Ankit, and Anandpara, Tanvi. "Design of a Practical Cat-righting Reflex (CRR) Model." *Procedia Computer Science* 45 (2015): 514-523. [\[pdf\]](#)[\[GitHub\]](#)

SKILLS:

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|-----------------------------|---|
| • Core Programming | Python (Expert), C++ (Expert), C (Expert), SYCL (Proficient), Matlab. |
| • Machine Learning | PyTorch (Expert), TensorFlow, scikit-learn, oneDNN, OpenVINO. |
| • Computer Vision /Graphics | OpenCV, PCL, Qt, ASTRA, Blender. |
| • Robotics | ROS (Expert), Gazebo, ARIA. |
| • Cloud Computing | Openstack (Expert), Docker, AWS. |

HONORS/AWARDS:

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|---------------------------------------|---|
| • J.R.D. Tata Trust Scholarship Award | Scholarship for Undergraduate Engineering (Years: 2012-13, 2013-14) |
| • Best Student Paper Award | "Particle Swarm Optimization in Control Systems Design", <i>IEEE Technomania</i> 2013, |
| • Student Award for Academic Merit | 1 st Rank in B.E. (Electronics, DJSCoE), 6 th Rank in University of Mumbai. |