

ANKIT V. MANERIKAR

Deep Learning | Computer Vision | Robotics

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EDUCATION:

Doctor of Philosophy (Ph.D.) <i>Electrical and Computer Engineering</i>	Purdue University <i>Indiana, USA</i>	GPA: 3.80	(2017 – 2023)
Master of Science <i>Electrical and Computer Engineering</i>	Purdue University <i>Indiana, USA</i>	GPA: 3.84	(2017 – 2023)
Bachelor of Engineering <i>Electronics Engineering (Distinction)</i>	Mumbai University <i>Mumbai, India</i>	AP: 81.52%	(2012 – 2015)
Pre-University Course (Engineering Diploma) <i>Industrial Electronics (Distinction)</i>	SBM Polytechnic <i>Mumbai, India</i>	AP: 89.26%	(2008 – 2012)

WORK EXPERIENCE:

- Intel Corporation** *Hillsboro, US*
 - Role: AI Algorithm Engineer** **Aug 2023 – Present**
 - Responsible for development and maintenance of **oneDNN**, a cross-platform performance library providing highly vectorized and threaded building blocks for deep learning applications. [\[link\]](#)
 - Developed new features and algorithms for the library optimized for Intel processors, GPUs and other hardware: *support for COO sparse encoded tensors* [\[link\]](#), *conditional select op kernels* and *advanced verbose diagnostics* [\[link\]](#).
 - Product Security Expert** for the oneDNN team, reviewing and consulting on security risks and secure code design.
 - Role: Deep Learning SWE Intern** **May 2022 – Dec 2022**
 - Profiled and identified performance bottlenecks for CV-ML workloads (**3D-UNets, ViTs**) for the latest Intel x86 ISA.
 - Worked on ML-based autotuning of **DGEMM** kernels for deep learning workloads for **Intel** hardware specifications.
- Purdue University** *West Lafayette, US*
 - Role: Doctoral Research Assistant - Robot Vision Lab** **Aug 2017 – May 2022**
 - 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. [\[link\]](#)
 - Member**, *RVL-Botzee Robotics Initiative*: worked on the development of SLAM frameworks for hospital robotics. [\[link\]](#)
 - Cloudmaster**, *RVL Cloud* – An Openstack-based cloud ecosystem for computer vision applications. [\[link\]](#)
 - Developed RRT/CHOMP-based path-planning techniques for robotic harvesting applications. [\[link\]](#)
 - Role: Graduate Researcher – Digital Photogrammetry Research Group** **Aug 2016 – May 2017**
 - Designed and developed a SLAM-assisted coverage path planner for indoor autonomous mapping robot using a variant of the Exact Cellular Decomposition Method with an MSA optimality criterion. [\[link\]](#)
 - Implemented a SLAM-based Pseudo-GNSS/INS system for LiDAR-based mobile mapping in GPS-devoid locations. [\[link\]](#)
 - Role: Teaching Assistant – Elmore Family School of Electrical and Computer Engineering**
 - Course:** ECE 40400 *Introduction to Computer Security* (Jan 2021 – May 2021)
 - Course:** ECE 38200 *Feedback System Analysis and Design* (Jan 2016 – May 2017)
- Gade Autonomous Systems** *Mumbai, India*
 - Role: Intern: Machine Learning, Firmware & Robotics** **Jun 2016 - July 2016**
 - Headed the Firmware team to design HMM-ML Algorithms for smart devices in fitness/automotive applications.
- Citizen Scales India (P) Ltd.** *Mumbai, India*
 - Role: Research Intern / Co-op** **Dec 2011 – May 2012**
 - Collaborated with the Firmware team to design Moisture Analysis and Micro-Precision Weighers on an ARM7 platform.
- Technophilia Systems** *Mumbai, India*
 - Role: Robotics Intern / Co-op** **Jun 2010 – Nov 2010**
 - Designed navigation algorithms for a four-wheel drive robot with a centroid-based object-tracking algorithm.

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, T. Prakash and A. C. Kak. "Adaptive target recognition: A case study involving airport baggage screening." *Anomaly Detection & Imaging with X-Rays (ADIX)*. Vol. 11404. Intl. Society for Optics & 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:

- Core Programming** Python (Expert), C, C++ (Proficient), Bash, Shell, UNIX/Linux, Matlab/Octave.
- AI / Machine Learning** PyTorch (Expert), TensorFlow (Expert), OpenVINO, TensorRT, scikit-learn. GANs, Diffusion, GenAI, LLMs, VLMs, Transformers.
- MLOps / Backend** oneDNN (Contributor), HuggingFace, Weights & Biases, SYCL, OpenCL.
- Computer Vision / Robotics** ROS (Expert), OpenCV (Expert), SLAM, Image Segmentation, Path Planning.
- Cloud / Computer Security** Openstack (Expert), Eucalyptus, Docker, AWS SageMaker
- DevOps** Git, SVN, Gitlab, Confluence, JIRA, CloudBees, Coverity, OSS-Fuzz

MAJOR PROJECTS / RESEARCH:

- Self-Supervised One-Shot Learning for Segmentation of StyleGAN 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 with Dual Energy CT 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.
- 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.
- Indoor Place Categorization for Visual SLAM:** [[video](#)] [[GitHub](#)]
(Course Project: BME595 (Deep Learning), Fall 2017 – Purdue University)
 - Developed a Place Recognition Classifier using ResNets to learn indoor visual landmarks during mobile robot navigation.
- 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.

(List of References/Certifications available upon request)