

# ANKIT V. MANERIKAR

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## EDUCATION:

Purdue University, USA	<b>Doctor of Philosophy (PhD)</b> <i>Electrical and Computer Engineering</i>	3.79/4.00	May 2023
Purdue University, USA	<b>Master of Science</b> <i>Electrical and Computer Engineering</i>	3.84/4.00	Aug 2017
Mumbai University, India	<b>Bachelor of Engineering</b> <i>Electronics Engineering (First Class with Distinction)</i>	81.52% (1 <sup>st</sup> Rank)	July 2015
SBM Polytechnic, India	<b>Pre-University Course (Engineering Diploma)</b> <i>Industrial Electronics (First Class with Distinction)</i>	89.26% (1 <sup>st</sup> Rank)	July 2012

## WORK EXPERIENCE:

- 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. [\[link\]](#)
  - **Primary Author, BagGAN** – a StyleGAN-based framework for high-resolution synthesis of baggage CT scans. The research also included one-shot learning for automatic segmentation of synthetic images using StyleGANs.
  - **Primary 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. [\[link\]](#)
  - Developed Robot Motion Planning Algorithms in a ROS environment using RRT and CHOMP techniques. [\[link\]](#)
- 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.

## Teaching Experience:

- Graduate Teaching Assistant, Purdue University, USA** *Terms*
  - **Course: ECE 404 - Introduction to Computer Security** Jan 2021 – May 2021
  - **Course: ECE 382 - Feedback System Analysis and Design** Jan 2016 – May 2017

## RESEARCH EXPERIENCE:

- Self-Supervised One-Shot Learning for Automatic Segmentation of Synthetic Images Using StyleGANs:** [\[link\]](#)  
(DoHS AATR Initiative – Robot Vision Lab, Purdue University)  
A SwAV-based self-supervised learner for one-shot segmentation of StyleGAN-generated images.

- **BagGAN – A StyleGAN-based Data Synthesis Software for Baggage CT scans:** [\[link\]](#)  
(DoHS AATR Initiative – 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)  
- Research and development for a CT Simulation pipeline (DEBISim) for X-ray image data generation designed to train and test Single-/Dual-energy CT based object detection systems for 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, 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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|---------------------------------------|---|
| • <b>Core Programming</b>             | Python (Expert), C++ (Proficient), C (Proficient), Matlab (Proficient). |
| • <b>Computer Vision</b>              | OpenCV, PCL, PyTorch3D.   |
| • <b>Machine Learning</b>             | PyTorch (Expert), TensorFlow, scikit-learn, oneDNN, OpenVINO.           |
| • <b>Computer Graphics/Simulation</b> | Qt, MayaVi, ASTRA, Simulink, Blender.                                   |
| • <b>Robotics</b>                     | ROS (Expert), Gazebo, ARIA  |
| • <b>Cloud Computing</b>              | Openstack (Expert), Docker, AWS.  |

## HONORS/AWARDS:

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|--|---|
| • <b>J.R.D. Tata Trust Scholarship Award</b> | Scholarship for Undergraduate Engineering (Years: 2012-13, 2013-14)                               |
| • <b>Best Student Paper Award</b>            | "Particle Swarm Optimization in Control Systems Design", <i>IEEE Technomania 2013</i> ,           |
| • <b>Student Award for Academic Merit</b>    | 1 <sup>st</sup> Rank in B.E. (Electronics, DJSCoE), 6 <sup>th</sup> Rank in University of Mumbai. |
| • <b>Juhu Lions Club Scholarship Award</b>   | 1 <sup>st</sup> Rank in Industrial Electronics (Years: 2008-09, 2009-10, 2010-11, 2011-12)        |