CHINMAY AMRUTKAR

623-217-7539 | chinmay.amrutkar@asu.edu | https://chinmayamrutkar.github.io/ | www.linkedin.com/in/chinmay-amrutkar -153375209 | https://scholar.google.com/citations?user=a7ymhIIAAAAJ&hl=en | github.com/ChinmayAmrutkar

PROFILE

As a dedicated Robotics Engineer, I bring expertise in **computer vision, image processing**, and **robotic manipulation**, fueled by a passion for **robotics, AI** and **autonomous navigation**. I am committed to harnessing these skills to develop cutting-edge **algorithms** that tackle complex real-world challenges while advancing the betterment of society. Guided by a deep dedication to **inventing and simplifying**, I strive to **deliver impactful results** that push the boundaries of robotics technology. I thrive in **collaborative** settings, partnering with teams to transform obstacles into **innovative solutions** that create a meaningful difference.

EDUCATION

Master of Science in **Robotics and Autonomous Systems (AI)** at **Arizona State University (Tempe, AZ)** *Aug 2024 – Present*

- Achievements: NAMU University Scholarship ($10,000), Engineering Fellowship ($1000)
- Courses: Artificial Intelligence, Robotics Systems, Space Robotics and AI, Machine Vision and Pattern Recognition

Bachelor of Technology in **Robotics and Automation** at **MIT World Peace University (Pune, India)** *Aug 2019 – May 2023*

- Achievements: CGPA: **9.77**/10, Graduated as a Gold Medalist, 3 times merit scholarship holder ($3750)

SKILLS

- Programming Languages: **Python, C++, C, Java, PyTorch, Tensorflow, Machine Learning**
- Software and Frameworks: MSC Adams, Virtual Test Drive, SolidWorks, Fusion 360, MATLAB, ROS, ROS2, Git, Optimization, **Linux, Ubuntu**
- Soft Skills: **Problem Solving**, **Teamwork, Leadership, Effective Communication**, Time Management

PUBLICATIONS

- **Chinmay R. Amrutkar**, *et al.* "Towards Robotic Trash Removal with Autonomous Surface Vessels," *Robots in the Wild Workshop, IEEE ICRA 2025*. *(Accepted & Presented)*
- **Chinmay R. Amrutkar**, *et al.* "A State-of-the-Art Review on Robotics in Waste Sorting: Scope and Challenges," *International Journal on Interactive Design and Manufacturing (IJIDeM)*, Vol. 17, pp. 2789–2806, 2023. https://doi.org/10.1007/s12008-023-01482-5
- **Chinmay R. Amrutkar**, *et al.* "Overview of Autonomous Vehicles and Its Challenges," *Techno-Societal 2022. ICATSA 2022*, Springer, Cham. https://doi.org/10.1007/978-3-031-34648-4_25

ACADEMIC PROJECTS

Low-Level Admittance Controller for Risky Teleoperation *(Ongoing)* *May 2025*

- Developing a latency-aware low-level controller for smooth and responsive teleoperation in risky 2D locomotion tasks; integrates admittance control principles with shared autonomy to improve stability and operator safety under high-lag network conditions.

Pitch Perfet – Real-Time Feedback Tool for Job Seekers (24-Hour Hackathon Project) *April 2025*

- Built a Gradio-based NLP tool in 24 hours using whisper.cpp, Vander, and Olama to transcribe interview videos, analyze sentiment and relevance, and deliver real-time feedback for job seekers.

Autonomous Drone for Geological Mapping and Landing *April-May 2025*

- Developed a ROS 2 node for autonomous lawnmower (boustrophedon) survey using PX4 SITL and onboard RGB-D input which performed real-time environment mapping via RTAB-Map and logged 3D terrain data for post-analysis.
- Detected cylindrical as geological features using ArUco markers and executed a controlled landing sequence using altitude-based selection and velocity-smooth descent.

Autonomous Moving Platform Tracking and Landing with Parrot Mambo Drone *April 2025*

- Developed a real-time image-based tracking system in Simulink for the Parrot Mambo drone to autonomously follow and align with a moving platform using thresholding, centroid detection, and dynamic masking.
- Implemented smooth and reliable landing behavior using Stateflow logic and control, enabling robust target locking, and velocity compensation under platform motion.

3D Reconstruction of ARISPE Meteorite using NeRF Variants *April 2025*

- Captured a 55-image 360° dataset of a real-world meteorite and performed pose estimation using Agisoft Metashape; converted outputs to NeRF-compatible formats via custom scripts and compared Instant-NGP, Nerfacto, and TensoRF on training time vs. reconstruction fidelity.

Robotic Boat for Trash Removal *March – May 2025*

- Designed a ROS–Gazebo simulation pipeline on the Heron USV to perform boustrophedon (lawnmower-style) surveys with constraint-aware detours for opportunistic trash interception, ensuring scientific sampling integrity was preserved through bounded lateral deviation.
- Validated the perception-driven control logic in 10 Monte Carlo simulation trials with 100% waypoint recovery and 54% collection rate and separately deployed YOLOv8 on the R/V Karin Valentine ASV to confirm real-time trash detection feasibility under natural lighting.

Enhanced Real-Time 3D Object Detection using CBAM-FPN-ResNet18 *April 2025*

- Conducted a comparative study of VoxelNet and SFA3D on the KITTI dataset, selecting SFA3D for its real-time performance; trained baseline models using LiDAR point clouds and evaluated 3D/BEV/2D AP metrics.
- Designed and implemented a lightweight attention-enhanced architecture (CBAM-FPN-ResNet18), improving detection of occluded and small-scale objects in cluttered scenes while maintaining inference efficiency on embedded hardware.

Autonomous Maze-Solving Robot with Digital Twin (MyCobot Pro 600) *Dec 2025*

- Designed a complete vision-to-motion pipeline by solving a physical maze using OpenCV (Python), mapping the path to robot coordinates, and converting waypoints to joint angles via MATLAB-based inverse kinematics.

- Simulated and visualized robot motion in a digital twin using URDF and animated execution paths; prepared TCP-ready joint commands with >95% execution accuracy

Design and Prototyping of Robotic Arm for Waste Sorting using Computer Vision *Sep 2022 – Nov 2022*

- Built a 4 DOF **robotic arm** with Arduino control for **robotic manipulation**, capable of sorting recyclables (glass, paper, cardboard, tin cans) with a payload capacity of 200 grams, addressing **real-world sustainability challenges**.
- Trained a **deep learning** model **(YOLOv7)** on 2000+ images for **object detection**, achieving high accuracy in **perception** tasks.

WORK EXPERIENCE

Graduate Engineer Trainee at **Jabil Circuit India Private, Pune, India** *Jan 2024 – July 2024*

- Engineered a Wrist Band Monitoring System for ESD compliance, integrating **fault-tolerant hardware** with critical manufacturing lines to enforce operator grounding; ensured zero added downtime through a hot-swappable, automation-ready design.
- Identified and proposed automation opportunities across the production line, presenting actionable improvements to enhance efficiency, safety, and compliance within the electronics manufacturing workflow.
- Collaborated with cross-functional teams in test, production, and quality to align system behavior with factory workflow requirements, contributing to higher audit compliance and operator accountability.

R&D Intern at **Hexagon Manufacturing Intelligence, Pune, India** *Feb 2023 – Aug 2023*

- Designed and automated 1000+ end-to-end test cases using **Sikuli** (OCR-based tool), accelerating regression testing workflows across Virtual Test Drive and MSC Adams environments.
- Developed a **script generation tool** to empower non-technical users in test automation, improving cross-functional productivity by **40%** and reducing manual scripting overhead.

LEADERSHIP AND VOLUNTEER WORK

Volunteer – CHART Lab (Center for Human, AI, and Robot Teaming), Arizona State University *Jan 2025 – Present*

- Supporting research in human–AI–robot teaming for mission-critical applications; gaining hands-on experience with platforms like FETCH, Husky, UR5, ABB YuMi, and TurtleBot.

Team Captain – Electric Vehicle Design & Manufacturing Team *Jan 2020 - Jan 2023*

- Led a 14-member interdisciplinary team in designing a competition-grade electric vehicle; secured **1st place in acceleration** through bold system-level innovation and cross-functional coordination.

Robotics Instructor, Volunteer *Jan 2023*

- Successfully led hands on **training** program in robotics and IoT to enhance technological skills in rural India.