# AYUSH KATIYA

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## SUMMARY

Master's student in Robotics & Autonomous Systems (AI) at Arizona State University with hands-on experience building ROS2-based perception–planning–control pipelines and LLM/VLM-driven robot behaviors. Skilled in C++/Python, OpenCV, camera & hand–eye calibration, kinematics/IK, and motion planning in simulation (Gazebo) and on hardware. Seeking roles in robotics software, perception, or ML for robotics focused on reliable, real-world systems.

## EDUCATION

**Arizona State University - M.S., Robotics & Autonomous Systems (AI)** **Tempe, AZ • Aug 2025 – Jun 2027 (exp.)**
**Selected Coursework:** Kinematics & Dynamics; Perception & CV; AI for Robotics; Probabilistic Robotics; Controls (PID/state-space); Planning (PRM/RRT*), Traj. Opt.; URDF/Xacro, TF2/frames; ROS2/DDS (nodes/launch); Embedded/RTOS (C/C++); Mechatronics & Sensors; Estimation & Fusion (EKF/UKF), SLAM **GPA: 4/4**
**Acropolis Institute of Technology & Research** **Indore, India • Aug 2020 – Jun** 2024
Bachelor of Technology in Computer Science and Information Technology **GPA: 4/4**

## TECHNICAL SKILLS

**Languages:** Python, C++ (11/14/17), C, TypeScript/JavaScript, SQL, Bash/Zsh, MATLAB | *Familiar:* Rust, Go, Julia, CUDA, R | *Config/Markup:* YAML, JSON, XML/URDF
**Robotics & Perception:** ROS2, MoveIt, Gazebo, OpenCV, AprilTag/ArUco, camera & hand-eye calibration, kinematics/IK, trajectory planning, rosbag2
**ML & Data:** PyTorch, TensorFlow/Keras, scikit-learn, NumPy, Pandas, data augmentation, model evaluation (CV splits, cross-validation), pipelines, Power BI
**Back End & DevOps**: FastAPI, REST, Docker, Linux/Ubuntu, Git/GitHub, PostgreSQL, MySQL, MongoDB, ETL, data validation, basic CI/CD
**Front End:** React, TS, HTML5/CSS3, React Router, Redux Toolkit/Zustand, React Hook Form, Tailwind/CSS Modules, MUI/Chakra UI, Axios/fetch, Recharts/Chart.js.
**Quality & Testing:** Unit tests (pytest/gtest), linting/formatting (flake8/black, clang-tidy), documentation, experiment logging, config/launch reproducibility

## PROFESSIONAL EXPERIENCE

**ASU RAS Lab — Robotics Research Student (LLM/VLM Robot Arm)** **· Nov 2025 – Dec 2025**

- Built an LLM/VLM-driven pipeline that maps natural-language prompts (e.g., "place the small blue block in the right box", "rotate 90° in z and stack on the red block") into parameterized pick-and-place tasks for a robot arm.
- Used monocular depth estimation to infer relative depth between blocks and the end-effector so the agent stayed kinematically aware under varying robot/camera heights.
- Implemented a perception->planning->control loop to select grasp poses, compute target poses (left/right of, on top of, rotated about z), and execute reliable pick-and-place sequences across a library of trained prompts.

**Finlatics — Business Analyst Intern – Mumbai, INDIA** **· Apr 2025 – Jul 2025**

***Tech Stack: Python, Pandas, SQL, Power BI, Git***

- Automated weekly reporting with Python + Pandas + SQL; cut manual compile time by ~20% and eliminated copy-paste errors via scripted validations and exception logs.
- Designed parameterized SQL views and reusable queries to standardize KPIs; improved cross-team consistency and simplified dashboard refreshes.
- Built concise Power BI dashboards with drill-through and role-level filtering; enabled faster leadership readouts with one-page KPI briefs and aligned metric definitions.

**Finlatics — Data Science Intern – Mumbai, INDIA** **· Jun 2024 – Aug 2024**

***Tech Stack: Python, scikit-learn, Pandas, NumPy, Power BI, Git***

- Prototyped predictive trend models in scikit-learn; implemented reproducible preprocessing (imputation, scaling, encoding), feature engineering, and k-fold cross-validation.
- Established deterministic seeds and clear train/validation splits; organized results/plots for rapid model comparison and review.
- Delivered interactive Power BI reports tied to documented KPIs; added data-quality notes and caveats to improve stakeholder trust.

**ArtifIntel — Data Science Intern – Bangalore, INDIA** **· Feb 2022 – Mar 2022**

***Tech Stack: Python, scikit-learn, Pandas, Matplotlib, Jupyter***

- Performed structured EDA on large datasets (schema checks, missing-data analysis, outlier scans) and prepared clean feature sets for prototyping.
- Piloted segmentation with decision trees and clustering; compared alternatives and summarized findings with clear tables/plots for stakeholders.
- Applied the same validation, versioning, and basic testing habits to ROS2 nodes and perception pipelines to "ensure reproducible runs and safer changes"

## ACADEMIC PROJECTS

**Tic-Tac-Toe Robot on Dobot (Vision + Planning) — ASU RAS Lab | 2025**

***Tech Stack: ROS2, Python, OpenCV, AprilTag/ArUco, TF frames, IK, rosbag2, launch files***

- Built an OpenCV pipeline for board-state detection (perspective rectify -> grid localization -> robust cornering via AprilTag/ArUco).
- Integrated ROS2 nodes for Dobot control; executed inverse kinematics with safety clearances and workspace checks for precise placement.
- Bounded Minimax search by IK and collision feasibility to avoid unreachable states; verified behavior via repeated demos and rosbag2 log replay.

**4x4 Maze Solver with Autonomous Path Execution — ASU RAS Lab | 2025**

***Tech Stack: Python, OpenCV, BFS/A*, trajectory generation, rate control***

- Parsed maze images into a grid; solved paths with BFS/A* and converted pixel routes to robot waypoints in a 3.5x3.5-inch workspace.
- Applied waypoint smoothing and velocity limits with Z-axis safety margins; robust across multiple maze patterns and resets.
- Established coordinate-frame conventions and unit tests for image->robot transforms to ensure repeatability.

## CERTIFICATIONS

MATLAB Onramp, Advanced MATLAB, Machine Learning & Deep Learning in MATLAB, Simulink Onramp, Simulink Fundamentals, AWS Cloud Practitioner (training), Palo Alto Cybersecurity (training), TCS iON Career Edge, UiPath Diploma, Microsoft AI, Blockchain Builder