Ravikumar Chaurasia

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Education

University of Bonn — *Bonn, Germany*

Master of Science in Mobile Robotics — *2025 - Present*

University of Mumbai — *Mumbai, India*

Bachelor of Engineering in Information Technology — *2018 - 2022*

CGPA: 8.52/10.0

Experiences

Freelancer and Independent Researcher — *Pune, India*

Self-employed — *Oct. 2023 - Aug. 2025*

- Conducting research and developing a novel method for various 3D streaming applications
  - Focused on **improving the efficiency** of applications in **robotic perception**, such as **remote robotic navigation**
  - Utilizing **low-cost stereo hardware** (Jetson Nano based) and existing video encoding infrastructure for streaming
  - Exploring **AI-driven techniques** to improve the accuracy and efficiency of depth data processing
- Worked as a freelance robotics consultant, providing solutions for early-stage robotics startups
  - Developed **autonomous co-bot systems** integrating UAVs and UGVs for precision farming applications
  - Contributed to the development of an **inspection robot** for autonomous navigation in construction sites

ERTS Lab, Indian Institute Of Technology Bombay — *Mumbai, India*

Senior Project Technical Assistance — *Sep. 2022 - Oct. 2023*

- Principal Investigator: **Prof. Kavi Arya**
- Optimized **Autonomous Ground Vehicle(AGV)** with Jetson AGX Xavier and ROS 2 for improved performance
  - Streamlined codebase to increase flexibility and scalability, cutting development time by 50%
  - Improved performance by 25% in real-world testing, in perception and navigation
  - Developed the **AGV into a self-driving research platform** by integrating advanced sensors like ZED 2
- Developed a **Collaborative Warehouse Management System** integrating AGV and UR5 arm
- Implemented **Autonomous Outdoor Navigation System (AONS)** for real-time navigation
  - Developed perception pipeline with C++ (PCL) and used Pure-Pursuit algorithm for controls
- Engineered a **Simplified Self-Driving Stack** as an **educational platform** for students to learn self-driving technologies
- Researched on **Enhancing Robotic Arm Grasping Capabilities** with minimal prior knowledge
  - Innovated a novel method, Elliptical Centroid Grasp (ECG), and compared it with GraspNet and HAF algorithms

Research Intern — *May 2021 - Jul. 2021*

- Mentored by **Prof. Kavi Arya** and mentors at ERTS Lab (**e-Yantra**)
- Researched **Outdoor Navigation for Delivery Robots** in dynamic environments [**Video**]
- Trained **deep-learning** models for **road segmentation**, **object detection**, and tracking on a custom **IIT Bombay road dataset**
- Achieved **91% accuracy in segmentation** tasks and **improved real-time object detection by 15%**
- Developed an **Efficient High-Fidelity Map (EHFM) for bot localization using key environment features** on an onboard computer
- Published research in the **14th International Conference on Agents and Artificial Intelligence (ICAART)** [**Paper**]

Technical Skills

Programming Languages	Python, C/C++, JavaScript, Bash, MATLAB, Octave, LaTeX
Environments	ROS/ROS2, Git/Github, Jupyter, Docker, Linux
Libraries	TensorFlow, PyTorch, OpenCV, Gazebo, PCL, MoveIt, Nav 2, Octomap, Matplotlib, NumPy, Scipy
Embedded Boards	Jetson Nano, Jetson AGX Xavier, Jetson TX2, Raspberry Pi, Arduino

Projects & Competitions

KnowTheScene - An efficient deep-learning perception pipeline for the 3D scene understanding — *Mumbai, India*

Final Year Major Project **[Undergraduate research]** [**Video**] — *Nov. 2021 - Apr. 2022*

- Developed a **flexible deep-learning pipeline for 3D scene understanding** in self-driving cars and rovers
- Utilized 2D segmentation (ESPNetV2, DeepLabV3) mask to map onto depth data for **3D segmented point clouds** (Tested on the KITTI dataset)

Strawberry Stacker (Swarm drones for Box Delivery)

Mumbai, India

eYantra Robotics Competition 2021-22 **[Awarded 1st Rank]** [**Video**] *Nov. 2021 - Mar. 2022*

- Programmed a **UAV swarm system** for identifying, tracking, and stacking boxes on a delivery truck
- Implemented with ROS Noetic, PX4, and Gazebo for autonomous box delivery in strawberry fields
- Competed with **259 teams** from across Asia in this theme

GroBOT – The Grocery Bot

Mumbai, India

3rd Year Mini - Project *Apr. 2021 - May 2021*

- Simulated a grocery-shopping bot, **enhancing the ROS perception stack with Octomap for precise arm motion planning**

Sahayak Bot (Assistant Bot Theme)

Mumbai, India

eYantra Robotics Competition 2020-21 **[Under top 10 teams]** [**Video**] *Nov. 2020 - Feb. 2021*

- Programmed an **AGV with a UR5** and an RGB-D camera on arm for **autonomous indoor navigation** and **object manipulation**
- Used ROS Navigation, 2D-3D Mapping, Perception, and Manipulation stacks
- Competed with **200+ teams** from across Asia in this theme

ancBOT - Autonomous Navigation and Charging Bot

Mumbai, India

Side Project [**Video**] | | [**GitHub**] *Aug. 2020*

- Developed **ROS-based autonomous navigation and 2-stage docking process for charging system**, simulating a workplace helper robot
- **Achieved <1 cm precision** using ArUco markers, depth cameras, and laser scanners

AcciLERT 3.0

Mumbai, India

IoT mini-Project [**Video**] | | [**GitHub**] | | [**Presentation**] *Jul. 2020*

- Implemented using the IOTs like Raspberry Pie 3, and NB-IoT LTE-GPS hat, with its **combination of sensors** for accurate accident detection
- Integrated cloud computing for **real-time hospital notification** based on traffic and bed availability

Survey and Rescue (Drone-based Theme)

Mumbai, India

eYantra Robotics Competition 2019-20 **[Theme Completed]**[**GitHub**] *Nov. 2019 - Feb. 2020*

- Developed **an autonomous micro-quadcopter** for an abstracted version of **disaster search and rescue operations**
- Focusing on **control systems (PID)** and **image processing**

Publications

LCPP: Low Computational Processing Pipeline for Delivery Robots

14th International Conference on Agents and Artificial Intelligence (ICAART) *Nov. 2022*

Soofiyan Atar, Simranjeet Singh, **Ravikumar Chaurasia***, Srijan Agrawal, Shreyas Sule, Sravya Gadamsetty, Aditya Panwar, Amit Kumar, Dr. Kavi Arya

https://doi.org/10.5220/0010786300003116

Mentorship & Teaching

e-Yantra, IIT Bombay

Mumbai, India

ERTS Lab *Sep. 2022 - Oct. 2023*

- e-Yantra Robotics Competition (**eYRC**) 2022-23, 2023-24
  - **Led 3 competition themes**, designed problem statements
  - Provided technical guidance to participants, promoting **hands-on learning in robotics and automation**
- e-Yantra Summer Internship Program (**eYSIP**) 2023
  - **Mentored 7 interns** on my research projects in **advanced robotics and automation** at ERTS, IIT Bombay
  - Fostered **skill development** and **hands-on learning** by providing insights into current trends and methodologies
- e-Yantra Lab Initiative Program (**eLSI**)
  - Conducted training sessions for **25 faculty members and 30 students** of Adani Institute of Infrastructure Engineering
  - Provided comprehensive instruction on robotics and automation, **enhancing their technical skills and pedagogical approaches**

Honors & Awards

2022 **1st Place**, eYantra Robotics Competition 2021-22

2021 **6th Place**, eYantra Robotics Competition 2020-21

2021 **3rd Place**, e-Yantra Dream Lab Design Sprint 2021

2021 **Top 10 teams**, Hacknagpur 2021

2017 **Fully-Funded Sponsorship**, IIT-JEE coaching at CSRL Super 30, Mumbai, by MGL