Jasmeet Singh

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Education

- **Maharaja Agrasen Institute of Technology, GGSIPU** *August 2019 - July 2025*
  Bachelor of Technology, Electronics and Communications Engineering New Delhi, India
  - Graduated in *First Division*. Awarded *Outstanding (O)* grade for *Minor* and *Major* projects. Overall CGPA: 8.88/10.00
  - Co-founded *A.T.O.M Robotics Lab*, our institute's first student driven robotics initiative focused on advanced robotics research and development.

- **Bhai Parmanand Vidya Mandir** *2017-2019*
  Senior Secondary Education New Delhi, India
  - Subjects: Mathematics, Physics, Chemistry, Computer Science and English. Average Percentage: 87.6%

- **Cambridge School Indirapuram** *2016*
  High School Education Uttar Pradesh, India
  - Subjects: Mathematics, Science, Social Sciences, English, Hindi and Computer Science. Overall CGPA: 10.0/10.0
  - Compeleted a co-curricular *Aero-Modelling* course with *Outstanding (A+)* grade, involving the design and fabrication of small-scale aerial systems including quadcopters, ornithopters, and gliders.
  - Awarded a *Certificate of Appreciation* for *Outstanding* performance in Karate — the only recipient in the batch — and achieved the Senior Green Belt.

Work Experience

- **Eight Vectors [🌐]** *November 2025 - Present*
  Robotics Engineer Remote
  - Leading the development of VSLAM-based forklift RTLS and driver assistance systems.

- **Peer Robotics [🌐]** *October 2023 - July 2025*
  Robotics Engineer Gurugram, India
  - Contributed significantly to the first successful field deployment of Peer3000, company's flagship collaborative AMR platform.
  - Designed and implemented docking, docking safety and motion-planning controllers for Peer3000, a steering-based mobile robot for autonomous pallet and trolley transport in industrial settings.
  - Developed a hybrid drive controller for Peer3000 capable of runtime switching between Ackermann steering and differential-drive behavior using custom forward and inverse kinematics.
  - Built a Stanley controller–based navigation module for the Peer3000's ROS 2 navigation stack, improving path-tracking accuracy in dynamic environments
  - Created the complete simulation stack in Gazebo Harmonic, including custom plugins for pallet lifting, trolley grasping, PLC communication, emergency switches, and charging systems. These efforts helped speed up development, testing and integration cycles across teams.
  - Developed a camera extrinsic calibration framework using AprilTags and 2D LiDAR ground truths to enhance sensor alignment on existing AMR platforms.

- **Articulus Surgical [🌐]** *September 2023 - September 2023*
  Robotics Freelancer Remote
  - Worked as a freelancer on integrating the companies surgical robot and its teleoperating controller with the microROS framework.

- **Gazebo, Open Robotics [🌐]** *June 2023 - August 2023*
  Google Summer of Code (GSoC) Remote
  - Extended the libsdformat C++ library to compute mass and moments of inertia for robot links based on primitive geometries and material densities.

- Designed a plugin-based architecture enabling custom mesh-inertia calculators for Gazebo simulations, improving extensibility and modularity.
- Implemented a custom mathematical mesh inertia plugin integrated into gz-sim, validated through unit and integration tests achieving over 90 % coverage.
- Contributed to upstream open-source Gazebo repositories following rigorous CI/CD and review workflows.

- **Acceleration Robotics India [🌐]** *August 2021 - March 2022, November 2022 - July 2023*
  Robotics Intern Remote
  - Developed camera-sensor plugins with image-processing pipelines for Gazebo, enhancing realism in simulation-based perception tasks.
  - Built terrain and weather simulation modules using real-world elevation and climate data for AGV testing in Ignition Gazebo.
  - Migrated an existing ROS 1 + Classic Gazebo stack to ROS 2 + Ignition Gazebo, implementing SLAM (slam-toolbox) and navigation (Nav2).
  - Created a VR-based control interface for real and simulated UR5 robotic arms using Oculus Quest, ROS, and MoveIt, enabling immersive teleoperation experiments.

- **e-Yantra Robotics Lab, IIT Bombay [🌐]** *June 2022 - July 2022*
  Robotics Intern Mumbai, India
  - Developed a ROS-based mobile robot capable of SLAM and autonomous navigation for the eYRC challenge.
  - Designed schematics and PCBs for the robot's power system using KiCAD, including distribution, battery management, and Li-ion charging circuits.
  - Built an ESP32-based control board integrating IMU, ToF sensors, and motor drivers for onboard control and sensing.

Leadership Experience

- **Co-Founder, A.T.O.M Robotics Lab** *November 2020 - Present*
  Maharaja Agrasen Institute of Technology [🌐]
  - Co-founded **A.T.O.M Robotics Lab**, the institute's first student-led robotics research and development community, introducing a culture of open-source collaboration and project-based learning in robotics.
  - Led the development of several open-source and interdisciplinary projects in autonomous systems, embedded electronics, and perception.
  - Designed and fabricated **MR (ModulaR) Robot** — a custom ROS-based Autonomous Mobile Robot platform with modular attachments for diverse applications such as sanitation, logistics, and material handling.
  - Initiated and maintained **ROS-Perception-Pipeline**, an open-source plug-and-play perception framework providing reusable ROS 2 packages with automated CI/CD testing using GitHub Actions.
  - Initiated industry collaborations with robotics companies and local makerspaces.
  - Fostered a self-sustaining ecosystem of project-based learning, innovation, and open-source development that continues to drive the lab even today.

- **Video Department Head, Expressions: The Fine Art Society** *July 2019 - July 2023 Year*
  Maharaja Agrasen Institute of Technology [🌐]
  - Promoted to **Video Department Head** in my final year after three years of active participation as a sketch artist in the college's official fine arts and media society.
  - Led a creative team responsible for conceptualizing, shooting, editing, and producing videos, promotional media, and 3D animations for college events and campaigns.
  - Designed and delivered engaging media content for social platforms, significantly enhancing the society's digital presence and outreach.

Skills

- **Robotics:** Physics-based simulations, Controls, Motion Planning, Perception, System Design and Architecture
- **Programming / Frameworks:** ROS / ROS 2, C++, Python, C#, Elixir, Shell Scripting, Git, Docker, Linux, Android Development / Kotlin
- **Robotics Simulations:** Gazebo, Isaac Sim, Unity 3D
- **Electronics / Embedded Systems:** PCB Designing (KiCAD), Arduino Dev Boards, Espressif Chipsets, Raspberry Pi, Soldering and fabrication
- **Mechanical / Hardware:** CAD (Fusion360, Blender), 3D Printing, Wood Working

Honors and Awards

- **First Prize, Rally to Tally Hackathon** *Sept 2021*
  Mitsubishi America [🌐]
  - Secured **First Prize** (USD 750) for developing *S.T.E.W.A.R.D*, an autonomous outdoor inventory management robot for counting large steel pipes. Project Video.
  - Implemented real-time pipe detection and counting using circle-detection–based computer vision algorithms.
  - Built a complete simulation environment in ROS and Gazebo for proof-of-concept demonstration.
  - Integrated ROS with InfluxDB and Grafana for telemetry visualization and analytics.

- **Project Showcase, NASA SpaceROS Summer Sprint Challenge** *November 2024*
  Official Gazebo Community Meeting [🌐]
  - Our team ranked among the **Top 10 global submissions** in NASA's SpaceROS Summer Sprint Challenge; project showcased at the official Gazebo community meeting. Project Video.
  - Generated 3D terrain models of Martian and Lunar surfaces from DEMs (HiRISE imager, Mars Reconnaissance Orbiter and LOLA imager, Lunar Reconnaissance Orbiter) for high-fidelity robotic simulations.
  - Migrated and integrated a lens-flare plugin in Gazebo to improve camera-based perception realism.
  - Developed weather and daylight simulation plugins to emulate fog, dust storms, and lighting variations.

- **First Runner Up, Nx EVOS Hackathon** *May 2024*
  Network Optix [🌐]
  - Awarded **First Runner-Up** (USD 3000) for developing *G.A.R.U.D*, a geospatial wildlife reconnaissance dashboard integrating UAV data and computer vision. Project Video.
  - Integrated YOLOv8 with the Network Optix Video Platform for real-time animal detection and monitoring.

- **Finalist, e-Yantra Robotics Competition** *March 2022*
  e-Yantra Robotics Lab, IIT Bombay [🌐]
  - Ranked among the **Top 5 teams out of 300** nationwide; awarded a two-month internship at IIT Bombay.
  - Developed *Functional Weeder*, a fleet of custom 3D-printed pick-and-place line-following robots.
  - Implemented grid-based path planning, mapping, auction-based fleet management, and manipulation algorithms in Elixir.

- **Finalist, e-Yantra Robotics Competition** *March 2021*
  e-Yantra Robotics Lab, IIT Bombay [🌐]
  - Ranked among the **Top 7 teams out of 500** nationwide.
  - Developed the autonomy stack for *Sahayak Bot*, a differential-drive mobile platform with a 6-DoF UR5 manipulator.
  - Implemented navigation, SLAM, perception, and task planning modules using ROS, Gazebo, and MoveIt!.

- **Project Showcase, MagPi Magazine** *Issue 86, October, 2019*
  Official Raspberry Pi Magazine [🌐]
  - Featured in **MagPi Magazine** for the project *Real Harry Potter Wand using Computer Vision*.
  - Developed a custom SVM-based handwritten character recognition model deployed on Raspberry Pi 3.
  - Designed detection and tracking for an interactive wand with retroreflective tip via a night-vision camera in real time.