PARTH KHARCHE

+91 8767458133 ◇ parthkharche01@gmail.com ◇ LinkedIn ◇ Portfolio

EDUCATION

Bachelor of Technology in Mechanical Engineering 2023 - 2027
Minors in Supply Chain Management
COEP Technological University, Pune.

PUBLICATIONS

CONFERENCE PAPER: P. Kharche et al. *Design of a 106:1 Compact 70 mm Actuator for High-Torque Applications.* **ICASET 2026**, Presented March 2026. Journal extension currently under review.

INTERNSHIP / INDUSTRY EXPERIENCE

Mechanical Engineering Intern – Humanoid Robotics May 2026 - July 2026
Techligence Pvt. Ltd, Pune

- **Receptionist robot subsystems:** Designing, manufacturing, testing, and iterating mechanical subsystems for a humanoid receptionist robot intended for customer-facing deployment; own the full design-to-validation cycle including tolerance stack-up, prototyping, and functional testing.
- **Harmonic drive research:** Researching and developing harmonic drives and robotic arm system to improve torque density and backdrivability for humanoid joints; analysing flexspline radial deflection and bending stress as primary design constraints.
- **Robotic arm development:** Designing a 7+ DOF anthropomorphic robotic arm using a mixed actuator architecture – cycloidal actuators at high-load proximal joints, harmonic drives at mid-joints, and custom spur gear servo motors at distal joints; selected to balance torque density, backdrivability, and packaging across the kinematic chain; responsible for full mechanical design, joint sizing, and documentation for handover.

ENGINEERING PROJECTS

Compact High-Torque Actuator – Planetary-Cycloidal Hybrid November 2025 - January 2026

- Designed a 70 mm, 105.88:1 actuator combining a planetary input stage (feeding into a 25:1 cycloidal output stage) to achieve high torque and reduction density within a minimal envelope; the hybrid architecture offsets the backlash limitations of planetary drives against the manufacturing complexity of standalone cycloidal drives.
- Sized all gear geometry analytically against output torque requirements; applied prime tooth counts across mating pairs to distribute contact and minimise localised tooth wear (hunting tooth principle); validated structural adequacy through hand calculations.

Robocon 2025 - Basketball Robots September 2024 - July 2025

- Designed and owned the jumping mechanism for the competition robot; iterated from an initial 10 cm jump height to 21 cm through successive changes to spring preloading, cam geometry, and release timing against a revised target of 30 cm.
- Designed chassis for dynamic stability under repeated jump-and-land loading; incorporated structural isolation to prevent impact load transmission to onboard electronics.
- Executed rapid prototyping, manufacturing and maintenance & testing cycles across the full season under strict weight and dimensional constraints.

Autonomous Surface Vessel (ASV) for Marine Navigation & Logistics June 2026 - Present

- Designing the mechatronics and propulsion subsystem for an autonomous marine platform, including hull layout, propeller drive control, and gyroscopic stabilization for stable operation under riverine and marine current loads.
- Integrating the vessel's autopilot system with onboard sensor suites (GPS, IMU, LiDAR, Ultrasound) to enable fully autonomous operation and real-time collision avoidance.

Heavy-Duty Modular Swerve Drive System for Industrial and Vehicular Mobility Platforms Dec 2025 - Present

- Developing an omnidirectional swerve drive module designed for 25 kg payload at FOS = 2; integrating a custom planetary gear mechanism for steering actuation with a high-torque wheel drive.
- Responsible for structural layout, gear ratio selection, bearing specification, and packaging of drive and steering axes within a compact module envelope for industrial mobility platforms.

SPOT-Inspired Quadruped Robot January 2024 - March 2024

· Designed a full quadruped mechanical assembly in SolidWorks with focus on leg geometry for static stability, modular joint design, and terrain adaptability.

Humanoid Locomotion via Reinforcement Learning in MuJoCo June 2026 – Present

· Building a custom humanoid model in MuJoCo from scratch and training locomotion policies using reinforcement learning on CPU; exploring reward shaping, joint torque constraints, and stability criteria as part of a self-directed study in physical AI.

POSITION OF RESPONSIBILITY

Technical Team Member, ROBOT STUDY CIRCLE, COEP TECH. September 2024 - July 2025
Head of Technical Design, Renewable Energy Club. January 2024 - September 2024

SKILLS AND INTERESTS

Mechanical	SOLIDWORKS, Fusion 360 (CAM), ANSYS (Static Structural, Explicit Dynamics), 3D Printing, Prototyping, CNC Machining, Manufacturing, Assembly, GD&T
Robotics	C++, Python, ROS2, Sensor Integration & Fusion, MuJoCo

CERTIFICATIONS

DD-ROBOCON'25, ANSYS, ROS2 - Odometry and Control, OpenCV, JLPT N5

LANGUAGES

English, Hindi, Japanese [N5; N4-conversational; N3-ongoing]