



# HARI SHARAN DANGI

## Mechatronics/Mechanical Engineer

Robotics | SLAM | Control | CAD Automation for AM

Cham, Germany

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Portfolio | GitHub

LinkedIn

Mechatronics Engineering Master's student focused on autonomous mobile robots, SLAM-based navigation, control systems, deep reinforcement learning, and CAD automation for Additive Manufacturing. Experienced with ROS/Gazebo simulation, MATLAB/Simulink control design, 2D LiDAR-based navigation, and text-to-CAD system architecture.

## Education

### Master's in Mechatronics and Cyber-Physical Systems

Deggendorf Institute of Technology

Mar 2025 – Present

Cham, Germany

- First semester average: 1.5 German Grade

### Bachelor in Mechanical Engineering

Tribhuvan University, Pashchimanchal Campus

Dec 2018 – Aug 2023

Pokhara, Nepal

- First Division: 76.68%

## Research & Projects

### Goal-Driven Autonomous Exploration Using TD3 Deep Reinforcement Learning

2026

Intelligent Robotics Lab, Technische Hochschule Deggendorf

- Built a TD3-based TurtleBot3 navigation system using 2D LDS-02 LiDAR in Gazebo.
- Used curriculum learning, reward shaping, and waypoint testing for goal navigation and obstacle avoidance.

### TextoCAD: Text-to-CAD Web Application

2026 – Present

Independent CAD Automation Project

- Developing a web app that converts natural-language design prompts into validated canonical CAD JSON.
- Designed multi-mode generation for fast browser preview, backend CAD generation, STEP/STL/GLB export, and robot URDF/Xacro workflows.

### Integrated SLAM-Based Navigation and LQR Stabilization of a Two-Wheeled Self-Balancing Robot

2025

ROS Noetic, Gazebo, SolidWorks, Simulink URDF

- Implemented and evaluated dynamic and steady-state responses of an LQR controller in MATLAB/Simulink.
- Extended the system toward autonomous navigation in ROS/Gazebo.

### Planning and Control for Mobile Robot Navigation Using Dijkstra Global Planner and Local Planner [GitHub]

2025

ROS, Gazebo, RViz, GMapping

- Developed a Dijkstra-based global planner, local obstacle-avoidance planner, and velocity-based kinematic controller.
- Built a Gazebo simulation environment, generated maps using GMapping, and visualized navigation topics in RViz.

### PID Control of a Two-Wheeled Self-Balancing Robot Using IMU Feedback

2025

ROS Noetic, Gazebo, SolidWorks, URDF

### Digital Twin Integration in Gear Manufacturing: ema Process Simulation with visTABLE Factory Optimization

2026

Process simulation and factory layout optimization

- Eliminated bottlenecks using 3D workflow modeling, MTM-UAS analysis, and ergonomic assessments.
- Optimized material handling and designed a 7,200 m<sup>2</sup> plant layout supporting 36,000 units/year.

### Servo-Cam Gripper for MIS Spine Surgery

2026

Additive manufacturing and medical device design

- Engineered a compact, 3D-printed titanium Ti-6Al-4V gripper to manipulate spinal rods within a strict  $\leq 12$  mm surgical channel.

### Design and Fabrication of a Medical Equipment Delivery Drone

2023

Young Scientist Research Sponsorship Program, NAST

- Designed and tested the model using CFD simulation.
- Fabricated and tested physical models using different materials and manufacturing processes.

## Professional Experience

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<b>Mechanical Instructor</b> <i>Balaju School of Engineering &amp; Technology</i>	Dec 2023 – Feb 2025 <i>Kathmandu, Nepal</i>
<ul style="list-style-type: none"><li>Taught mechanical, biomedical, and mechatronics engineering subjects.</li></ul>	
<b>Founder &amp; Managing Director</b> <i>GadiDokan Pvt. Ltd.</i>	May 2023 – Present <i>Kathmandu, Nepal</i>
<ul style="list-style-type: none"><li>Managed refurbishment, procurement, repair coordination, and online operations for used vehicles.</li><li>Led a small technical team for inspection, repair planning, and digital operations.</li></ul>	
<b>Mechanical Design Engineer</b> <i>National Innovation Center</i>	Apr 2023 – Sep 2023 <i>Kathmandu, Nepal</i>
<ul style="list-style-type: none"><li>Designed and optimized biomedical devices, including improvements to the Nyano Nani baby warmer.</li><li>Designed and optimized a medical equipment delivery drone prototype.</li></ul>	
<b>Intern – Maintenance, Repair &amp; Overhaul</b> <i>Global Auto Land Private Limited</i>	Apr 2022 – May 2022 <i>Pokhara, Nepal</i>

## Skills

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<b>Programming</b> Python, MATLAB, C, C++, JavaScript, JSON, Git, Linux, Docker	<b>Robotics &amp; Control</b> ROS, Gazebo, RViz, TurtleBot3, SLAM, GMapping, Dijkstra planning, local planning, LQR, PID, URDF, Xacro, 2D LiDAR
<b>Reinforcement Learning</b> TD3, DDPG, curriculum learning, reward shaping, waypoint-based navigation, autonomous exploration	<b>CAD Automation</b> Three.js, OpenSCAD-style CSG, CadQuery, OpenCascade, canonical CAD JSON, parameterized modeling, STEP/STL/GLB export workflows
<b>CAD, Simulation &amp; Manufacturing</b> SOLIDWORKS, CATIA, AutoCAD, Ansys, MATLAB/Simulink, CFD, FDM, SLA, DMLS, CNC machining, welding, laser cutting	<b>Additional Tools</b> Docker, GitHub, Linux terminal, ROS workspaces, CAD export pipelines, technical documentation

## Publications

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- H. S. Dangi, D. Tamang, M. C. Mahatto, R. Tripathi, N. Bhattarai, *“Design and Fabrication of An Electrical Glider to Compare Theoretical and Experimental Parameter”*, Journal of Innovations in Engineering Education.
  - H. S. Dangi, D. Basnet, R. Shrestha, U. Karki, *“Design, Construction, and Setup of Low-Speed Open Circuit Wind Tunnel”*, Journal of Academic Research in Engineering and Sciences.
  - Bis. Poudel, Bim. Poudel, S. Shrestha, S. Dhami, H. S. Dangi, *“Discrete Electronic Load Controller for Minimizing Total Harmonic Distortion in Micro Hydro Power Plants”*, Journal of Innovations in Engineering Education.

## Certificates and Trainings

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- [Instructional Skills for TVET Instructors Part-I, TITI Bhaktapur](#) – 17 working days. Jan 2024
  - [Scientific Paper Writing: Format, Submission & Publication](#), Department of Mechanical and Automobile Engineering, WRC Campus. Jul 2022

## Awards

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- University Grants Commission creative and hardworking student award; received NRS 6,000 per month during bachelor’s studies. 2018 – 2023
  - Full scholarship for Bachelor in Mechanical Engineering by the Government of Nepal. 2018 – 2023

## Leadership

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<b>SEDS-WRC – Students for the Exploration and Development of Space</b> <i>Pashchimanchal Campus</i>	2022 – 2023 <i>Pokhara, Nepal</i>
<ul style="list-style-type: none"><li>Founding member and Technical Head; Executive Committee Member for 2022/23.</li></ul>	
<b>Technical Trainer</b> <i>UAV fabrication and SOLIDWORKS mechanical component design</i>	2022 <i>Pokhara, Nepal</i>