Siddhant **Pani**

Final Year Student · M.Tech, Mechanical Engineering

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Education

Indian Institute of Technology Dharwad

Dharwad, Karnataka

M.Tech. in Mechanical Engineering

July. 2024 - Present

- Current CGPA: 9.04/10

Kalinga Institute of Industrial Technology

Bhubaneswar, Odisha

B.Tech. in Mechanical Engineering (Minor in Computer Science and Engineering)

September. 2020 - June. 2024

- Graduated with CGPA: 9.31/10

Projects

Motion-Aware Depth Reconstruction under Dynamic Scene Conditions

Research Work (Ongoing)

- Investigated **depth estimation errors** in ToF, structured-light and stereo depth cameras under relative camera/object motion.
- Designed controlled experimental setup to analyze **motion-induced artifacts** in depth maps and point cloud reconstructions.
- Quantified depth distortion by comparing **static vs dynamic** captures using geometric reference objects.

Soft Robotics Experimental Actuator Design

Research Work

- Designed and fabricated a **soft pneumatic bending actuator** to study **nonlinear deformation** under varying internal pressures.
- Conducted experiments to record pressure–pose data and validated deformation behavior against **hyperelastic models.**
- Built a **pressure-pose mapping model** of the actuator using 3D depth sensing for **real-time deformation tracking**.

Areca Nut Segmentation, Classification & 3D Surface Characterization

Lab Project

- Captured dense point clouds of arecanut surfaces using **structured-light, stereo, and ToF depth cameras** for geometric analysis.
- Performed **point cloud filtering, outlier removal and volume computation**; validated measurements across multiple sensors & viewpoints.
- Developed **Mask R-CNN** based instance segmentation and integrated HSV-based colour-space clustering for quality assessment.

Automated Conveyor-Based Sorting System

Lab Project

- Built **perception–action pipeline** integrating sensing, image classification, and servo-based actuation.
- Implemented multi-stepper motion control with **ramp profiles** and real-time interruption logic.
- Explored synchronization between **sensing latency and physical motion** for reliable sorting.

Publications

WCCM-ECCOMAS (Submitted)

Munich, Germany

Bending Direction Reversal in Pressurized Slender Hyperelastic Eccentric Tube: Regime Map for Mooney-Rivlin

2026

- Discovered and mapped bending direction reversal in hyperelastic tubes across Mooney-Rivlin parameter space using 200+ FE simulations and SVM classification, revealing nonlinear regime boundaries governing deformation mode selection

Skills

AI/ML & Data Analysis	PyTorch, TensorFlow, MySQL, Pandas, NumPy, ROS2
Depth Perception	Geomagic, Simpleware, Artec Studio, Realsense SDK, Arena SDK, OpenCV, Open3D
CAD & Simulation	Solidworks, Fusion 360, Blender, AutoCAD, ANSYS, Abaqus
Programming	C/C++, Python, Matlab

Experience

Central Mine Planning & Design Institute

Ranchi, Jharkhand

E&M Intern

Jun. 2023

- Assisted in planning mechanized coal-handling infrastructure, validating conveyor design calculations and contributing to maintenance and automation concepts aligned with industrial safety standards.