

Hrishi Sharad Pinjan

☎ +1 (267) 228-3589 | @ hpinjan@seas.upenn.edu | 🌐 <https://www.linkedin.com/in/hrishi-sharad-pinjan/>

EDUCATION

University of Pennsylvania

Master of Science in Mechanical Engineering and Applied Mechanics

Research Interests : Mechatronics, Robotics and Automation, Mechanical Design

Aug. 2022 – Present

GPA - 3.63/4

National Institute of Technology

Bachelor of Technology in Mechanical Engineering

Aug. 2018 – May 2022

GPA - 9.47/10

WORK EXPERIENCE

Cummins-Meritor

Engineering Intern

Troy, USA

May 2023 – Aug. 2023

- Developed a novel wheel bearing health monitoring sensor for heavy-duty commercial operations, contributing in the design process from conceptualization to prototype manufacturing, adhering to company standards and customer specifications.
- Coordinated with suppliers and sourcing teams to facilitate the initial prototype build. Deployed the prototype of the hardware on laboratory dynamometer testing systems and test vehicles for data collection.
- Developed an algorithm in Python leveraging Fourier transforms and envelope analysis to analyse vibration data and pinpoint bearing defect frequencies. Empirically demonstrated reliable outputs even in situations with very low signal-to-noise ratios.

Sung Robotics Lab at GRASP, University of Pennsylvania

Graduate Research Assistant

Philadelphia, USA

Sep. 2022 – Apr. 2023

- Designed a tunable stiffness coiled-spring actuator integrating closed-loop real-time sensing, allowing for dynamic stiffness adjustments up to 20x without physical alterations.
- Implemented sensor fusion by integrating data from force and flex sensors, enabling precise control of spring stiffness values.
- Formulated process strategies to develop fixture designs for cost-effective production of friction test and spring hardware, utilising injection molding, 3D printing, and rapid assembly prototyping, prioritizing efficiency and production quality.

PROJECTS

Predicting Finger Flexions using Electrocorticographic (ECoG) Signals

Jan 2024 – Present

- Leveraged intracranial EEG signal recordings and current finger position to predict future finger flexion movements.
- Developed and implemented a Multi-layer Perceptron Regressor model that incorporates past finger motion data to accurately predict finger flexions from intracranial recordings.
- Evaluated the performance of the predictive algorithm against standard machine learning models using Mean Squared Error and correlation scores, achieving a significant correlation value ($r = 0.46$) between true finger flexions and model predictions.

Path Planning and Control of CrazyFlie Quadrotor

Jan 2023 – May 2023

- Implemented geometric nonlinear controller for stable control of CrazyFlie quadrotor. Developed an obstacle free path using A* algorithm and implemented minimum snap trajectory algorithm.
- Incorporated State Estimation through Visual Inertial Odometry (VIO) and Error State Kalman Filter (ESKF)

Path Planning for 7 DOF Franka Panda Arm and Object Manipulation

Aug 2022 – Dec 2022

- Implemented path planning for 7 DOF Panda manipulator arm using potential fields approach and gradient descent inverse kinematics in ROS for a pick and stack task for static and dynamic blocks.

Grand Theft Autonomous (GTA) - Runner up

Aug. 2022 – Dec. 2022

- Designed and integrated electro-mechanical components for an ESP32-S2 based autonomous robot with pushing capabilities.
- Demonstrated successful autonomous behaviors, including beacon tracking and wall-following, employing HTC Vive for localization and Wi-Fi control via an HTML interface.

Formula SAE

Powertrain Lead

December 2020 – May 2021

- Performed 3D CAD modeling to design and fabricate a performance-focused exhaust system for FSAE race-car application.
- Conducted COMSOL modeling for optimal header length calculation and CFD analysis for exhaust routing, improving scavenging performance and reducing exhaust noise (reduction from 94dB to 88dB).
- Facilitated vehicle preparation for evaluation, ensuring readiness for both static and dynamic testing, identifying issues and implementing necessary fixes. Enforced design and manufacturing deadlines to ensure timely project completion.

SKILLS

Programming : C, C++, Python, MATLAB (Simulink), ROS, Arduino, L^AT_EX

Technologies : nCode GlyphWorks, COMSOL, AWS, LabView, Minitab, Jira, PTC Windchill PLM, MS Office Suite

Design : SOLIDWORKS, PTC Creo, Siemens NX, AutoCAD, 2D Drawings, Engineering Design, DFMEA, GD&T, Prototyping

Misc. : Mechatronics, Feedback Control Design, Manufacturing Technology, Data Analytics, Technical Documentation