Kaustubh Kuvalekar

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EDUCATION

Carnegie Mellon University

Master of Science in Mechanical Engineering – Applied Advanced Study

GPA: 4.0 / 4.0 Concentration: Design and Manufacturing

Manipal Institute of Technology

Bachelor of Technology in Mechanical Engineering

GPA: 8.55 / 10.0 Major: Machine Design

EXPERIENCE

MetaMobility Lab

Research Assistant

- Assisting development of an early prototype of a hip exoskeleton by integrating IMU sensors, fabricating circuitry and developing motor testing and data collection Python scripts on the Jetson Orin Nano
- Designing a variable-tension hip strap in **SOLIDWORKS** to enable multi-user compatibility of device •
- Developing prototypes of exoskeleton components using FDM 3D Printing

Articulus Surgical

Mechanical Design Engineer

- Designed 40+ component parametric assemblies in Fusion360 to develop a portable surgical robot •
- Prepared and reviewed drawings as per ASME Y14.5 with GD&T for 3-axis machined components •
- Designed and prototyped a compact belt drive mechanism and bevel geartrain to reduce robot size -
- Validated robot structures and components for structural load cases in ANSYS and Fusion360 and • implemented DFMA techniques during design to reduce part manufacturing cost by up to ~25%
- Generated and maintained bill of materials (BOM) in Fusion360 and created design documentation •
- Designed 8 mm surgical tools for metal injection molding process and developed prototypes using SLA and SLS 3D printing techniques
- Developed and manufactured testbeds to test and document robot parameters in MS Excel

Forbes Marshall

Summer Intern

Pune, India June 2021 - August 2021

Pittsburah. PA

August 2024 – Present

Jan 2024 – May 2024

April 2022 – July 2022

Manipal, India

- Decreased product assembly time by ~40% by designing fixture jigs for automating assembly process
- Calculated time saved (22s) by running motion analysis in SOLIDWORKS Motion, and generated renders • and animations of fixturing process for demonstration to senior management

PROJECTS

CubeSat – Mini Satellite

Course: Electromechanical System Design

- Ideated and designed hinge mechanism for a mini-satellite to deploy solar panels in low-earth orbit
- Developed multiple iterations of components to improve output torque by 2x and reduce volume by 40%
- Implemented DFM techniques for 3-axis CNC milling to reduce number of setups and tool usage
- Created CNC toolpaths in Fusion360 CAM and developed strategies to reduce cycle time per part by 16x Pittsburgh, PA

Jumping Robot - Hopper

Course: Bioinspired Robot Design and Experimentation

- Calculated and plotted dynamics of robot body in MATLAB to drive actuator and spring design •
- Designed and prototyped a 240:1 gear train using worm gears to load spring member in Fusion360 •
- Conducted FEA analysis based on loads from equations of motion in ANSYS Workbench to validate design •
- Selected and integrated positional sensors, power systems, micro-controller, and actuators for the robot

Planetary Gearbox

Personal Project

- Designed and prototyped a single-stage planetary gearbox to develop a proprioceptive robot actuator
- Calculated required output torque by solving dynamical equations of motion of quadrupedal robot •
- Selected machine elements (bearings, bushings, pins, gears, fasteners) based on static force calculations
- Designed assembly parametrically in SOLIDWORKS, to allow for different configurations of gear ratios •

SKILLS

Software: Expert: SOLIDWORKS, Autodesk Fusion360 CAD/CAM, ANSYS Workbench, Novice: Autodesk Inventor Manufacturing: Design for Manufacturing and Assembly-Machining, MIM, Laser cutting, Geometric Dimensioning and Tolerancing, Failure Modes and Effects Analysis, Additive Manufacturing - SLA, FDM, SLS **Programming:** C++, MATLAB, Python, Microcontroller programming (Arduino, Nvidia Jetson)

Pittsburgh, PA

May 2024 - Present

Pittsburgh, PA December 2024

Manipal, India

July 2022

Bangalore, India

January 2022 - May 2023