JATIN MAYEKAR

linkedin.com/in/jatin-mayekar jatin.mayekar@colorado.edu
github.com/gonfreces Portfolio Presentation

SKILLS

SolidWorks, Matlab, Mechanism Design, Mechatronics, 3D Printing, Altium, C++, Python, Git,

PROJECTS

Soft Electro-Hydraulic Rolling Robot - Thesis - Dr. Nikolaus Correll Jun 2019 - Dec 2020

- Design, fabrication, modeling, and characterization of an innovative, modular rolling robot powered with the Hydraulically Amplified Self-Healing Electrostatic Actuators (HASEL) soft actuators.
- Design of the modular frame equipped with snap-joint mechanism and sensor mounts to house electronics system manufactured using 3D printing with PLA material.
- Development of a mechanical & electrical testbed for force-time characterization of HASEL actuators at different angular positions using a force sensor to determine the optimum activation angle(22.5°).
- Development of a mechanical testbed to experimentally determine the center of gravity and rotational moment of inertia of the rolling robot to help balance the robot and reduce its wobbling and radial runout(0.34 mm).
- Built a test platform to determine the fall time of HASEL actuator using a laser-based on different actuator skin thickness and drain resistor values.(Achieved a minimum value of 0.53 seconds for 800μm skin and 200$M\Omega$ resistor)
- Development of Python scripts for automated data calibration and collection & MATLAB scripts for computerized data processing.
- Design of a hybrid dynamic model in MATLAB to depict the dynamics of the rolling robot.
- Experimentation for force estimation and model validation of the rolling robot. The maximum force generated by the actuator is estimated to be 0.73 N with the robot achieving a speed of 0.51 m/s.
- Integration of the Motive-OptiTrack motion capture system for tracking of the rolling robot acting with an error of 0.043 mm.
- Created a small precision micro-current sensor for HASEL actuators at 30% of the cost of market value.

Adaptive Multi-Choice Robotic Gripper Dec 2017 - Feb 2018

- Inspired from the Fin Ray effect and the mechanism of a fish's tail fin, the gripper was designed to pick up different objects underwater at the Singapore AUV competition.
- The gripper was designed in SolidWorks to handle maximum payload of 4N with FOS of 2.5 and can enclose an object of maximum 100 mm diameter.
- Manufactured using 3D printing, the longitudinal fibers of the fingers were made of soft-PLA for compliant mechanism while cross fibers comprised of rigid links using ABS for sturdiness.
- Designed an electronics system to drive the gripper utilizing a stepper motor, motor driver, and an Arduino.

Underwater ROV, CAPSTONE Project Jul 2016 - May 2017

- Design and development of an underwater remotely operated vehicle(UROV) with Raspberry Pi as the main microcontroller housing a camera, an accelerometer, a temperature sensor, and humidity sensor befitted to have an IP67 rating enclosure.

- Modelled the UROV CAD in SolidWorks and performed stress analysis to test it against water pressure at 10 m depth.
- Generated a PID control algorithm in MATLAB – Simulink for the autonomous deployment of the UROV at a target depth of 10 m.
- Performed live streaming of the UROV accelerometer, temperature sensor, and humidity sensor data using Node-RED hosted on IBM's Watson IoT Platform.
- Founded first-of-its-kind "The Marine Robotics Team" for K.J.S.C.E. and were accepted to participate at the Singapore AUV Challenge in our very first year.

EXPERIENCE

Teaching Assitant, Univeristy of Colorado at Boulder Spring - Fall 2019 & Fall 2020

- TA for three different courses: Computational Methods using MATLAB, Dynamics, and Component Design comprising of 130 students each.

Industrial Engineer, BOSCH Sep 2017 - Jun 2018

- Automated the ergonomic evaluation process (Industry 4.0), creating a new machine evaluation pipeline in BOSCH.
- Installation of a pneumatic plunger, weight lifter and rack sorting systems on the manufacturing automation lines as a part of the manufacturing project team.
- Accomplished the task of optimizing labor workload on a newly instated automation line by 32% through method time study(MTM).

Design Intern, SIEMENS Jun 2015-Jul 2015

- Designed a complete CAD model of the individual parts and the assembly of a three-phase standard induction motor.
- Created a material-flow process flowchart in PowerPoint for the entire electric motor manufacturing plant.

EDUCATION

Master of Mechanical Engineering 2018 - 2020
University of Colorado Boulder CGPA: 3.64/4

(Courses: Soft Robotics, Linear Control Systems, MEMS, Non-linear Control Systems, Mechatronics & Robotics, Methods of Engg. Analysis, Neural Nets & Deep Learning, Master Thesis)

Bachelor of Mechanical Engineering 2013 - 2017
K. J. Somaiya College of Engineering (K.J.S.C.E.) CGPA: 3.47/4