Nikhil Chinnalapatti Gopinath

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EDUCATION

- **Carnegie Mellon University**   Pittsburgh, PA
  Master's in Mechanical Engineering - Robotics and Control Systems; **GPA: 4.00/4.00**   Aug 2022 - Dec 2023
  Relevant Coursework: Intro to Deep Learning(S23), Optimal Control and Reinforcement Learning(S23), Trustworthy AI Autonomy(S23), Robot Dynamics and Analysis, Computer Vision for Engineers, and Modern Control Theory

- **RV College of Engineering**   Bangalore, India
  Bachelor in Mechanical Engineering (Honors); **GPA: 9.00/10.00**   Aug 2018 - Jul 2022

SKILLS

Programming Languages: C, C++, Python, Matlab, SQL, HTML, C#
Tools: Pytorch, OpenCV, GCP, AWS, Solid Works, Ansys, AutoCAD, Arduino, Unity3D, Git
Simulation: ROS, Gazebo, Pybullet, Simulink, Webots, Anylogic, Flexsim

EXPERIENCE

Robomechanics Lab, Carnegie Mellon University   Pittsburgh, PA
Research Assistant   Aug 2022 - Present
- Developed computational design optimization of a Quadruped Robot with a Spine using Pybullet simulation on ROS
- Devised a hierarchical MPC controller for generating joint commands of the quadruped.

Airbus India   Bangalore, India
Intern - Industrial System   Mar 2022 - July 2022
- Designed, and simulated the process flow of a Final Assembly Line (FAL) of A320 in India to manufacture 50 aircraft in a month using Anylogic and Flexsim; Achieved a 20% increase in production compared to existing plant layouts.
- Built a Digital Twin of the FAL using Unity3D; Simulated the motion of a user-controllable avatar and created custom animations of material handling equipment.
- Developed the UI/UX for the Digital Twin to be used on a Computer, and Mobile Device, as a visual interface for Discrete Event Simulation and training tool for engineers.

ACADEMIC PROJECTS

Construction Site Hazard Detection using Computer Vision - CMU   Oct 2022 - Dec 2022
- Programmed a worker detection network using YoloV7 and Transfer Learning to run on CCTV footage.
- Computed the 3D global coordinates of the worker from the 2D coordinates using transformation matrices; Generated a real-time Birdseye view mapping of the workers and danger zone.

Path planning and control strategies for an autonomous buggy - CMU   Oct 2022 - Dec 2022
- Fine-tuned LQR and MPC controllers for lateral and longitudinal control of a buggy; using a bicycle dynamics model.
- Deployed EKF-SLAM and MPC to navigate a GPS-based trajectory within 120s and 3m deviation in Webots.

Mars Rover - Astra Robotics (RVCE)   Jul 2018 - Aug 2022
- Spearheaded a team of 30 as the Mechanical subsystem head in the design and fabrication of two Mars Rover
- Implemented a bar differential with a rocker boogie mechanism to traverse rugged martian terrain, validated using Matlab simulation; developed a 6 DOF robotic arm to lift objects upto 5 Kgs and operate the control panel; redesigned the wheels into honeycomb structures to help stress distribution and increased durability.

Nitinol Shape Memory Alloy Actuator for Satellite Solar Panel Deployment - RVCE   May 2021 - Aug 2021
- Built prototype of a miniature satellite that controls the motion of solar panels by using Nitinol actuators in space; Attained 63% less voltage consumption and 42% less power consumption compared to conventional motors.
- Compared the structural analysis of the experiment to computational structural analysis from Ansys.

Face Mask Recognition System using Computer Vision - RVCE   Aug 2020 - Sept 2020
- Created a Face Mask Recognition System at the Cisco Centre of Excellence using TensorFlow, MobileNetV2, and OpenCV for detection of masks worn, not worn, or incorrectly worn; Achieved an accuracy of 92% when deployed on low computational consumption devices(CCTV cameras, Old mobile devices).
- Implemented concepts of Image Processing, Machine Learning, and Deep Learning Models with tools like OpenCV - Viola Jones and LabelImg

ACHIEVEMENTS

Student Ambassador CMU Mechanical Graduate Student Ambassador
Rover Challenge: Indian Rover Challenge: Rank 7 - Jan 2020; Indian Rover Design Challenge: Rank 12 – Aug 2020
Debate: National Tournaments at IIT Bombay, NLSIU Bangalore, PES University Bangalore, ILS Pune, Christ University Bangalore, SMC Chennai, RIT Bangalore