Jahnav Rokalaboina

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EDUCATION

Ph.D. in Systems Engineering **August 2023 - Present**
Arizona State University, Mesa, Arizona GPA: 4.0/4.0

Masters in Robotics and Autonomous Systems **August 2021 - May 2023**
Arizona State University, Mesa, Arizona GPA: 4.0/4.0

Bachelor of Technology in Mechanical Engineering **August 2017 - May 2021**
National Institute of Technology, Warangal, India GPA: 30/4.0

SKILLS

Design and Modeling: Solidworks, Simulink, Autodesk, Creo, Catia
Analysis Tools: Ansys workbench, Abaqus CAE
Programming Languages: Python, C++, MATLAB
Additional Tools: ROS, Gazebo, OpenCV, TensorFlow, Arduino, Raspberry Pi
Technical: Microsoft Office Suite, Google Suite, Adobe Suite, Rapid Prototyping, 3D Printing

EXPERIENCE

Graduate Research Associate **August 2023 - Present**
Robotics and Intelligent Systems Laboratory **Mesa, Arizona**

- Designed and developed a soft inflatable knee exosuit with pneumatic actuators to provide targeted flexion and extension assistance during gait.
- Implemented real-time control using Reinforcement Learning framework, enabling precise actuator control with millisecond-level timing for more adaptive assistance with wearable robot.
- Led end-to-end experimental workflows include hardware prototyping, control system development, biomechanics data collection, and quantitative performance analysis.
- Developed an evaluation platform for additional soft robots testing which includes a communication pipeline between motion capture system, microcontrollers and a computer.
- Mentored various Undergraduate and Graduate students in different projects relevant to the field of Soft Robotics.

Graduate Research Aide **November 2021 – July 2023**
Robotics and Intelligent Systems Laboratory **Mesa, Arizona**

- Perform Finite element analysis using Abaqus CAE to evaluate and optimize performance of actuators.
- Develop high level control system for proportional valves using Arduino IDE and MATLAB to control pneumatic actuators for a wearable exosuit.
- Manufactured wearable insoles with pneumatic actuators to monitor and track gait cycle and provide haptic feedback, performed human testing on various subjects.

Design Engineer **December 2019 - February 2021**
Aufenbach **Bengaluru, India**

- Engineered and designed a three-wheel electric vehicle, both chassis and mechanical parts with dual torque transmission for heavy payload using Solidworks 3DS.
- Performed explicit dynamic analysis, including crash test on chassis in Ansys workbench to evaluate and improve the safety of the design prior to manufacturing.
- Generated an optimized mathematical simulation model of electricals involved in the electrical vehicle transmission in MATLAB Simulink to estimate and improve the battery capacity and performance.

RESEARCH PUBLICATIONS

- **Rokalaboina, Jahnav**, Tolemy M. Nibi, Weijia Tao, and Wenlong Zhang. "Soft Inflatable Knee Exosuit for Flexion Assistance in Swing Phase." IFAC-PapersOnLine 58, no. 28 (2024): 462-467.

- Quinones Yumbla, Emiliano, **Jahnav Rokalaboina**, Amber Kanechika, Souvik Poddar, Tolemy M. Nibi, and Wenlong Zhang. "Gait Sensing and Haptic Feedback Using an Inflatable Soft Haptic Sensor." ASME Letters in Dynamic Systems and Control 4, no. 1 (2024): 011003.

PROFESSIONAL & CAMPUS INVOLVEMENT

Master's Opportunity for Research in Engineering (MORE) **August 2022 - December 2022**

- Selected for an opportunity to conduct thesis-based research under the supervision of Dr. Wenlong Zhang in the field of soft robotics and control systems.
- Created methods of design optimization and control of inflatable actuators and validated the experimental results with Finite Element Analysis results of the model in Abaqus.
- Presented the work done in symposium held at Arizona State University to fellow researchers including students and professors and communicated ideas to further research.

Student Success Aide – Graduate Advising, Arizona State University **March 2022 – August 2022**

- Provided front desk support in assisting students to make appointments with academic advisors and to give useful information.
- Responded to calls from multi line phone system in a professional manner to help prospective and current students to schedule meetings with respective advisors and help them with their issue.
- Replied to email enquiries from students using salesforce and redirected them to proper advisors when questions were specific to ensure students get their questions answered efficiently and quickly.
- Involved in multiple projects which include extensive data entry and sorting of over 1000 students in fast paced environment.

Formula SAE, *Design Team Lead* **August 2018 - July 2019**

- Lead a team in development and manufacturing of an open-wheel formula type car as a part of Formula SAE.
- Designed and manufactured steering and suspension systems of the vehicle with the help of AutoCAD and Creo and secured third best design award during the competition.

AWARDS & HONORS

- Awarded a stipend of 1500$ as a part of Master’s Opportunity for Research in Engineering (MORE) program.
- Secured 3rd position in best design category as a part of Formula SAE competition 2019.

ACADEMIC PROJECTS

Control of Proportional valves **August 2022 - November 2022**

- Modeled closed loop control system (Model Predictive Control) for maintaining and tracking desired pressure inside an actuator with the help of Arduino and proportional valves managing the flow rate.
- Initiated methods of state-space identification in MATLAB with collected data to construct models to simulate behavior of the system in Simulink.

Heart Failure Clinical Records Analysis **October 2022 - November 2022**

- Created techniques of clustering on the data with K Means to execute unsupervised learning of the dataset as a part of team project.
- Devised various machine learning classifiers including logistic regression, naive bayes and KNN to train and predict heart failure condition based on multivariate data from UCI Machine Learning repository.

Autonomous Drone Control **January 2022 - April 2022**

- Developed a hover and flying program for an Unmanned Aerial Vehicle (UAV) in Python.
- Implemented autonomous face tracking, hand-gesture, and body posture tracking in the drone with OpenCV in Python.

Animatronic System **January 2022 - April 2022**

- Studied various animatronic systems and principles of puppetry and biomimicry in industry.
- Created an animatronic dragon with multiple mechanisms to emulate expressions using Arduino.

Robot Arm **August 2021 - December 2021**

- Built a 6 DOF Robot Arm with smart phone operation with app built and flashed using MIT app tool.
- Implemented autonomous trajectory generation, obstacle avoidance and sorting algorithm using Arduino and TensorFlow.

Simulation studies on mine/ordnance detection systems **August 2020 - April 2021**

- Simulated hover, flying and autonomous movement of UAV in Simulink to cover a designated area searching as a part of team project.
- Executed mine detection system in the Simulink utilizing the heat signatures of ordnance systems underground to detect using UAVs.

CERTIFICATES

- Machine Learning
- Robotics: Perception
- Robotics: Aerial Robotics
- Robotics: Estimation and Learning