Harishankar Prabhakaran

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Dedicated engineer adept in control systems design, bringing 3 years of experience in developing/testing software systems.

Experience

Ultrasound Imaging Systems Engineer, *Exo; Santa Clara, CA* **09/2021 - 07/2024**

- Engineered a python-based user interface application for real-time parameter tuning and control of a portable ultrasound imaging device, achieving a switch time between multiple imaging modes and presets within 300 milliseconds.
- Orchestrated design and development of command line API calls for each independent function of the device by refactoring large amount of development code into modules, facilitating cross-functional team collaboration with other companies.
- Spearheaded a project to develop methods for continuous hardware testing and validation without human supervision, utilizing USB switches to automate battery charging and cooling, enabling extensive multi-day endurance testing.
- Increased software test and validation speed for new feature integration by 10x by designing fully automated scripts to test the functionality of every software subsystem, covering all possible corner test cases.
- Oversaw image quality improvements during development to calculate performance metrics by developing production-level hardware test setups for ultrasonic transducers.
- Reduced device characterization time by developing battery and temperature monitors for multiple sub components.
- Facilitated clinicians to procure data for training neural networks twice as fast by developing a data collection user interface.

Graduate Service Assistant, *Arizona State University; Tempe, AZ* **09/2019 - 05/2021**

- Instructed over 260 students in System Dynamics & Control course, using feedback sensors and Arduino micro-controllers, to model an electric vehicle powertrain lab setup and design PID controllers.

Graduate Researcher, *Intelligent Control and Estimation of Things Lab (ASU); Tempe, AZ* **12/2019 - 06/2020**

- Collaborated on model predictive control design for uncertain systems by using set-based abstract state-space models.

Research Assistant, *SASTRA University; Tamil Nadu, India* **07/2016 - 07/2017**

- Developed a new 3D model & fabricated hardware for a drive simulator (3-RRRS 6-DOF parallel manipulator), and reduced total cost by 20% while increasing available robot workspace.

Manufacturing Internship, *Shanmuga Precision Forging; Tamil Nadu, India* **06/2015 - 06/2016**

- Walked the shop floor and handled forging, milling, & CNC machining operations for manufacturing precision automotive parts.

Education

Master of Science in Mechanical Engineering, 2021, *Arizona State University; Tempe, AZ*

Control Systems: Advanced System Modelling, Dynamics & Control, System Identification, LMIs in Optimal & Robust Control
Robotics: Modelling & control of Robots, Multi-Robot Systems, Perception in Robotics, Dynamics Computation & Statistics, Deep Neural Networks

Bachelor of Technology in Mechanical Engineering, 2017, *SASTRA University; Tamil Nadu, India*

Dynamics & design: Kinematics, Dynamics, Mechatronics, Control Systems, CAD/CAM/CIM, Industrial Robotics, Product Design and Development

Skills

Programming Languages: Python, C, C++, MATLAB, Simulink, HTML, CSS
Libraries: PyQt, PyQtGraph, NumPy, SciPy, Matplotlib, pandas, CVXPY, ROS
Developer Tools: Git, Bash, Visual Studio Code, Xcode
Concepts: State-space system modelling, classical & modern control algorithms, vectors & 3D geometry, state estimation, robot arms & platform design, user interface design, object-oriented programming.

Projects

- Control Systems Design & Simulation of an inverted pendulum in a cart with swing-up capability. (Control Theory)
- Interactive user interface to simulate Robotic Arm dynamics and control. (Industrial Robot Modeling)
- Lateral vehicle dynamics model of a car to control the lateral velocity and heading angle. (Control System design)
- Simulation of randomly scattered collective of robots to self-assemble into a structure. (Multi-Robot System)
- Non-linear transmission dynamics of COVID-19 | doi.org/10.1101/2020.05.11.20098418. (Data fitting)
- Signal Classification using 1D-Convolutional Neural Networks with reduced number of parameters. (Neural Networks)
- Stereo camera model calibration, rectification, and depth sensing. (Perception in Robotics)