Amith Ramdas Achari

Urbana-Champaign, IL | amithr3@illinois.edu | +1 217 305 0768 | amithachari29 | amithachari

EDUCATION

University of Illinois at Urbana Champaign — **Urbana-Champaign, Illinois**
Master's in Mechanical engineering (GPA: 3.55/4.0) — *Expected Dec 2022*

Relevant coursework:

• Introduction to Robotics • Numerical Methods • Artificial Intelligence • Robot Dynamics and Control
• Advanced Robust Control • Applied Control System Design • Principles of Safe Autonomy

SKILLS

Programming Languages:	Python, C++, MATLAB
Software/Libraries:	ROS, Gazebo, RViz, MoveIt, Numpy, Scipy, OpenCV, Pytorch, Git
Modelling and Controls:	Simulink, KISSsoft, Solidworks, Ansys, CATIAV5
Hardware platforms:	Raspberry Pi, Arduino, ESP32, Photon

PROJECT HIGHLIGHTS

- ***Robust Controllers: Design and Comparative Analysis (RSLQR & H-infinity controller)*** *Oct 2021-Feb 2022*
  ▪ Designed an RSLQR Controller to command acceleration (Az) for an aircraft using state feedback. The design point was identified by analyzing LQR charts, and the robustness was validated using the small gain theorem.
  ▪ The results were compared to those of an H-infinity state feedback controller designed with gamma iteration to control Az. Improved Gain Margin by 8.3dB and Phase Margin by 22.7 degrees with similar rise and settling time.
- ***Pick & Place Robot: Warehouse automation*** *Aug 2021 – Dec 2021*
  ▪ Implemented on Universal Robot 5 to grab items from a conveyor using multiple suction grippers to sort the objects based on size, shape, and weight in Gazebo environment using custom Inverse Kinematics algorithm.
  ▪ Dynamic motion planning was done using MoveIt, in response to the motion planning request provided by the vision node to separate the blocks based on size and color while considering the constraints.
- ***Configuration Space Planning*** *Aug 2021-Oct 2021*
  ▪ Computed a roadmap for the robot's configuration space(3D) using A*, RRT and Dijkstra path planning algorithms.
  ▪ The movement and transformation space of the robot was modelled into a 3D maze, and then determined the shortest path to reach the destination.
- ***Capstone Project: Neurorehabilitation of wrist using assistive robot*** *Jan 2020-May 2020*
  ▪ Developed a manipulandum to assess and provide therapy for stroke and post-fracture(wrist) patients.
  ▪ Measured grip strength and coordination to assess motor ability of the patient using PID controller.
  ▪ Incorporated an auto-adaptive algorithm to provide appropriate therapeutic exercises based on the patient's competency, automatically changing the exercise level based on the performance of the patient.

EXPERIENCE

Xfinito Biodesigns Pvt Ltd — **Bengaluru, India**
New Product Development Engineer Intern — *June 2020-Feb 2021*

- Designed and analyzed wearable device in a cross-functional environment, considering mechanical and ergonomic aspects to determine the optimal placement of electronic components to prevent neurodegenerative disorders.
- Contributed to my team's success by participating in several pitch competitions; presented innovative solutions on the way to receiving 2nd runner-up in MEDTECHNOVATION.

Team Helios Racing (*Powertrain Engineer)* — **Bengaluru, India**
▪ Testing & validation lead at the official BAJA Club of our college comprising of 50 students. Led the team to become the National Champions at Enduro Student India, among 60 teams from all over the nation.

- ***Continuously Variable Transmission (CVT) for an All-Terrain Vehicle*** *June 2018-Dec 2019*
  ▪ Implemented 'Force Multiplication' mechanism in the primary clutch to reduce the rotational inertia of the system, with adjustable performance determining parameters to make it highly tunable.
  ▪ Devised a custom test rig to simulate the vehicle dynamics and tune the CVT. The testing results were compared with the simulation results based on the readings provided by the sensors on primary and secondary pulley.

CERTIFICATIONS & INTERESTS

• Modern Robotics Specialization, Coursera
• Machine Learning, Stanford University, Coursera
• Deep Learning Specialization, Coursera
• Ready Engineer TATA technologies