

# Aravind Adhith Pandian Saravanakumaran

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## SUMMARY

A Robotacist skilled at designing and developing autonomous systems including ground, aerial and aquatic robots & vehicles, and has 2 years of Industry and Research experience each.

## EDUCATION

- **Masters in Robotics and Autonomous Systems** GPA : 3.83  
Arizona State University, Tempe, AZ Aug 2021 - May 2023
- **Bachelor of Mechanical Engineering** GPA : GPA: 3.136  
Anna University, Chennai, India Aug 2015 - May 2019

## SKILLS SUMMARY

- **Tools:** ROS1, ROS2, CAD, AutoDesk Fusion 360, Solidworks, Gazebo, PX4 Stack, RTOS, Scikit, SciPy, Keras, OpenCV, Git, Jira, Microsoft Tools, Rapid Prototyping
- **Computer Languages:** Python, C/C++, MATLAB
- **Platforms:** PIXHAWK, ModalAI, Arduino, Raspberry Pi(ARM), Intel UPBoard(x86/64), ODROID(ARM), IMU, UR5 Robot Arm, Motion Capture (Optitrack), CAN Systems, LINUX Systems, Delta, Omron, & Siemens PLC, HMI
- **Concepts:** Robotics, AGV, UAV, AUV, ROV, Hardware in the Loop (HIL) Simulation, Software in the Loop(SIL) Simulation, OOPS Concepts, Path Planning, Autonomous Navigation, Collision-Resilient Drones, 3-D Modelling, Classical Control, Machine Learning, Coordinate Transformations, Forward/Inverse Kinematics, Multi-Robot Control

## EXPERIENCE

- **Research Assistant** Aug 2021 - Present  
Robotics and Intelligent Systems Laboratory ASU, Mesa
  - **SNAM using CRUs:** Development of Simultaneous Navigation And Mapping (SNAM) Algorithm for Collision-Resilient UAV (CRU). 3D Map synthesizing by Point Cloud Generation whilst Exploring environments
  - **ROS2-PIXHAWK Pipeline:** Development of ROS2 - PIXHAWK Pipeline to be used with OptiTrack Motion Capture System to enable HITL Experiments and indoor flights
  - **UAV Localization using 5G Signals:** Carried out Simulation setup, Experimentation with drones, and Error Data Analysis for 3D localization using 5G signals for drones for Honeywell Industry partner
- **Distributed Robotic Exploration and Mapping Systems Laboratory** ASU, Tempe
  - **RoboBoat:** Built an Autonomous Boat which was deployed and tested in Bermuda in collaboration with the Bermuda Institute of Ocean Sciences(BIOS) to conduct Coral and Bathymetric mapping
  - **ShakeBOT:** Developed the real-time control system in ROS for an Earth Quake Simulation Robot to study how Precariously Balanced Rocks (PBR) behave for seismic motions
  - **NSF-CPS Challenge:** Created the ROS1 - PIXHAWK Pipeline to be used with Optitrack motion capture system to enable indoor localization and navigation
- **Controls Valve Engineer** May 2019 - May 2021  
Emerson Process Management Chennai, India
  - **Application Engineering:** Prepared Techno-Commercial Quotes and generated 3D AUTO CAD drawings after keen RFQ review and advocated suitable control valve automation solutions as best bids to customers
- **Design & Automation Intern** May 2019 - May 2021  
Simpson and Co. Ltd. Chennai, India
  - **Automation Engineering:** Designed a fixture that can be used in Induction Heater to reduce the lead time. Carried out the design process in AutoDesk Fusion 360. This was done in order to reduce the lead time of the component and implemented Just-in-Time Production

## PROJECTS

- **Planning and Control of Ensembles of Robots with Non-Holonomic Constraints:** Convergence of Multi-Robots to certain shapes which has minimal knowledge of neighboring robots implemented in MATLAB
- **Sensor Fusion using AutoML for Fire Detection:** Integration of various sensor data from a smoke detector to determine the presence of a fire using AutoML to identify the best algorithm and parameters. Used FLAML and MLJAR packages to compare and contrast the results.
- **Computer Vision Control of DJI Tello:** Implemented Face Detection, Object Tracking, Body Postures detection, Hand Gesture detection, Object detection, and Trajectory control of DJI Tello quadcopter
- **Simulation and Manipulation of an RPP Robot using MATLAB:** The objective of the project is to employ trajectory calculation and workspace plotting of an Industrial RPP robot using a robotic toolbox. Computation of Joint Space Trajectory in accordance with end effector position and the profiles of Joint velocities and acceleration are studied
- **System design of an Inverted Pendulum using optimal control techniques:** Analyzed a cart pendulum for its effects due to eigenvalues due to Pole placement, LQR, and LQG and studied its response using PID. Results are plotted & compared by adjusting tuning parameters for PID & weighting matrices for LQR or LQG control action by carrying out SITL simulations
- **Automation projects using PLCs and HMIs:** Spearheaded the project involving designing a fixture for computer vision-based inspection of Hyundai's car Dashboards. Designed and Fabricated an automated product lifting system that used PLCs and Pneumatic actuators. It involved implementing ladder logic and UI design in HMI
- **Design and Fabrication of Emergency Drone Recovery System:** A System to prevent Drones from crashing by deploying a parachute system. Used a combination of IMUs and Pressure sensors and implemented filtering algorithms to detect the free fall