

ARTI ANANTHARAMAN

artia@andrew.cmu.edu | 412-626-4847 | linkedin.com/in/arti-anantharaman

EDUCATION

Carnegie Mellon University (CMU), School of Computer Science <i>Master of Science, Robotic Systems Development (MRSD) QPA: 4.08/4.33</i> Coursework: Planning and Decision-making in Robotics; Underactuated Robots; Robot Autonomy; Robot Localization & Mapping; Manipulation, Estimation, & Control; Introduction to Computer Vision	Pittsburgh, PA May 2021
R.V. College of Engineering (RVCE) <i>Bachelor of Engineering, Electronics and Communication Engineering CGPA: 9.70/10</i>	Bangalore, India July 2019

SKILLS

Programming Languages	C/C++, Python, MATLAB
Libraries/Frameworks	NumPy, SciPy, PyKDL, PyRep, OpenCV, Robot Operating System
Robotics	Motion Planning, PID Control, Optimal Control, Spatial Kinematics, SLAM, Machine Learning

PROFESSIONAL EXPERIENCE

Johnson & Johnson <i>Software Engineering Intern, Robotics & Digital Surgery</i> <ul style="list-style-type: none">Defined functional requirements for robotic arm to clip & unclip bronchoscope devices and developed a working prototypeWriting scripts to automate testing of faults associated with joint limit, joint velocity, gravity compensation, collision detection and autonomous navigation of a robotic bronchoscope	Redwood City, CA May 2020-July 2020
Robert Bosch Manufacturing Solutions GmbH <i>Robotics Software Engineering Intern</i> <ul style="list-style-type: none">Collaborated in the research of dynamic multi-agent planning for scheduled deployment of robotic fleetsProgrammed work plans of collaborative robots for customized applications to fit end-user requirements	Stuttgart, Germany June 2018-July 2018
Industry 4.0 Intern <ul style="list-style-type: none">Programmed TwinCAT3 modules for PLC-systems, in accordance with IEC 61131-3Designed hardware architecture and developed software to test internal prototypes	June 2017-July 2017

ACADEMIC & RESEARCH PROJECTS

Augmented Reality for Minimally Invasive Surgery [website] <i>Robotic surgical system built atop the da Vinci Research Kit and incorporating methods in registration, organ motion compensation, force sensing to autonomously localize liver tumors</i> <ul style="list-style-type: none">Registered robot and stereo camera coordinate frames within 4 mm RMSE using Horn's methodDeveloped a motion planner for robot arm to scan region of interest on silicone liver and yield 3D point cloudRegistered 3D point cloud to ground truth within 3 mm RMSE using Iterative Closest Point algorithmEstimated motion frequency of silicone liver within 0.05 Hz of ground truth using Principal Component Analysis and Fast Fourier Transform	Sept 2019-present
Robotic Bin Picking <ul style="list-style-type: none">Implemented a manipulation system for robot arm to grasp objects using 6-DoF poses obtained from wrist cameraImplemented RRT algorithm in task space for robot arm to transfer objects from source bin to target bin	Feb 2020-May 2020
3D Dense Reconstruction using ICP and Point-based Fusion <ul style="list-style-type: none">Implemented point-to-plane ICP to estimate 6DoF pose of RGB-D sensor relative to sceneReconstructed 3D dense model of scene using point-based fusion algorithm	Mar 2020-Apr 2020
Path Planning on Constraint Manifolds <ul style="list-style-type: none">Implemented RRT algorithm to generate collision-free trajectory for robotic arm to reach target configurationProjected C-space samples onto constraint manifold to keep end-effector in vertical orientation	Feb 2020-Mar 2020
Spatial Kinematics of a 7-DoF Robotic Arm <ul style="list-style-type: none">Computed inverse kinematics of Franka Emika robot using Jacobian transpose methodImplemented collision detection of two oriented bounding boxes using Separating Axis Theorem	Jan 2020-Feb 2020
Extended Kalman Filter for 2D SLAM <ul style="list-style-type: none">Derived measurement Jacobians with respect to robot pose and landmark in analytical formImplemented EKF algorithm to get robot trajectory and landmark positions from control input and measurements	Jan 2020-Feb 2020
Control and Trajectory Generation of a Quadcopter <ul style="list-style-type: none">Developed elementary state machine to simulate quadcopter takeoff, hover and trajectory trackingImplemented PD controller and LQR controller to enable robot to track trajectory, and compared their performances	Sept 2019-Oct 2019
Object Tracking <ul style="list-style-type: none">Implemented Lucas-Kanade algorithm to track a moving car with template correctionOptimized the algorithm by using Inverse Compositional Algorithm	Sept 2019-Oct 2019