JOSHUA ERNEST P

+1(551) 247-9350 | josherne@seas.upenn.edu | Joshuaernestp | JoshuaErne | Portfolio

EDUCATION

University of Pennsylvania, School of Engineering & Applied Science - Philadelphia, PA, USA

Masters of Science in Robotics - GPA: 3.71/4.0 Aug 2021 – May 2023

- Relevant Coursework: Machine Learning, Computer Vision and Computational Photography, Introduction to Robotics, Learning in Robotics, Autonomous Racing, Controls and Optimization with Applications in Robotics, Advanced Machine Perception

Sreenidhi Institute of Science and Technology - Hyderabad, TS, India

Bachelor of Technology in Electronics and Communications Engineering - GPA: 9.53/10.00 July 2016 – May 2020

- Relevant Coursework: Signal Processing, Control Systems, Signals & Systems, Radar Systems, Analog & Digital Communication, Internet of Things

EXPERIENCE

Research Assistant

XLAB for Autonomous Systems - Penn Engineering May 2022 – Oct 2022

- *Differentiable Trajectory Generation for Car-like Robots with Interpolating Radial Basis Function Networks*: Implemented a computationally efficient method for pproximating parametric optimal control using differentiable trajectory generation and cost evaluation based on grid segmentations for autonomous vehicles closed-form trajectory generation using radial basis function (RBF) networks.

Team Lead

Maverick Medicare Systems - Hyderabad, India Jan 2019 – June 2021

- Built a Smart Pill Expert System with an API and web services that can provide real time diagnosis with the ability to cater to the needs of single/multiple users and a failure rate of <5%. Worked on the product prototypes and redefined the 'go to market' strategy based on customer demands.
  - Best Innovator Award - Amongst all startups across the state of Telangana - IKON Awards, India | Funded by All India Council for Technical Education (AICTE) - Ministry of Human Resource Development (MHRD) | Best Innovation Award at The Indus Entrepreneurs Business Idea Tournament (TiEGrad) across the country | Awarded gold at Bangkok IP, Innovation and Technological Exposition | Innovation Recognition Award - 9th Higher Education and Human Resource Conclave, India | Design Patents: Patent No. 322959-001, 353987-001

Research Intern

Integrated Test Range (DRDL) - Chandipore, Balasore, India May 2019 – July 2019

- Implemented an effective method of de-noising radar signals to localize and detect obstacles and moving targets using wavelet transforms.

Defense Research and Development Laboratory (DRDL) - Visakhapatnam, India May 2018 – July 2018

- Developed a radar imaging system in the field of surveillance for detecting obstacles and foreign objects behind various concrete structures, in submarines and other marine vessels.

PROJECTS & ACHIEVEMENTS

Model Predictive Approach (MPC) for collision free robot manipulator arm control Nov 2022 – Dec 2022

- Applied an online planning and model predictive control mechanism for safe control of 7 Degrees-of-Freedom robot arm in static and dynamic environment with varying complexity of obstacles. Results: GitHub

Extension of Faster R-CNN for Instance Segmentation Nov 2022 – Dec 2022

- Implemented MaskRCNN for instance segmentation, which involves identifying and separating objects in an image. Results: GitHub

Second Place in F1tenth Head-to-Head Racing: Feb 2022 – May 2022

- Applied multiple algorithms (including RRT motion planning) on the F1tenth vehicle capable of overtaking and blocking maneuvers using a LiDAR and RealSense camera powered by a Jetson Xavier NX. Participated at **ICRA 2022.** Results: Report, Video

Vehicle State Estimation and Friction Grids: Mar 2022 – May 2022

- Bridging the sim-2-real gap by applying tire-road friction coefficient estimates on an F1tenth vehicle using a two stage network of EKF and UKF filters. Results: Report, GitHub

Winner of the Robot Arm Pick and place challenge using Franka Emika Panda: Oct 2021 – Dec 2021

- Implemented a robust solution to precisely stack stationery and dynamic blocks on the target platform in an efficient and safe manner by implementing Forward and Inverse kinematics, obstacle avoidance and path planning concepts. Demonstrated at **ICRA 2022**. Results: Report, Video

Vision-Based Driver Assist for Dash-cams: Nov 2021 – Dec 2021

- Implemented an all-in-one driver assist solution that uses readily available dash cameras which can perform the following tasks: lane centering error calculation, lane departure warning, collision warning and obstacle detection and top-down view. Results: Report, Video

Identifying and Classifying Malicious Windows Executables: Nov 2021 – Dec 2021

- Segregation of malware vs good-ware by applying various unsupervised/supervised machine learning algorithms such as regression techniques, neural nets, clustering and high-performance gradient tree boosting on SOREL-20M dataset. Results: Report, Notebook

Paper Publications

- "*Comprehensive Healthcare Model for a Smart Left Ventricle Assisting Device*" - Advances in Computational Intelligence & Informatics. ICACII 19
- "*AI-IoT based Smart Pill Expert System*" - 2020 4th International Conference on Trends in Electronics and Informatics (ICOEI)

SKILLS

Technical**:** Python, C++ | MATLAB | Simulink | SolidWorks | Linux | Git | Docker | ML | ROS | OpenCV | PyTorch | Gazebo |Rviz| LiDAR | IoT Devices
Extra-Curricular: Music, Animation and Cinematography, Audio and Visual Production

POSITIONS OF LEADERSHIP

- Basketball Captain for School team, University team (2015-20) | School Captain in High School - Heading the student council & organizing key events (2013-16) | Organizing Committee Head for various Inter Collegiate Robotics Events (2018-20)