## Prasanna Sriganesh

prassi@cmu.edu | https://prassi07.github.io

### EDUCATION

### **Carnegie Mellon University**

Ph.D. in Robotics

Carnegie Mellon University Master of Science in Robotics, GPA: 4.12/4.0 [Thesis] PES University Bachelor of Technology in Electronics and Communication Engineering (Major)

GPA: 9.48/10, Rank 10 out of 325

Computer Science Engineering (Minor), GPA: 9/10

### RESEARCH EXPERIENCE

### **Biorobotics Lab, Carnegie Mellon University**

Graduate Student Researcher

Project – Multi-Modal Perception UnderGround (MMPUG)

- Developed a novel algorithm for detecting and estimating staircases from 3D point clouds within 50ms [paper]
- Devise a method to identify safe regions on cluttered/damaged staircases using maximum a-posteriori estimation

• Developed a decentralized software architecture for field deployment of heterogeneous multi-robot systems [paper] Project – Vertical Robot Transport (VeRT)

- Evaluated different robot mechanisms (legs, track, wheeled) to traverse staircases with varying payload weights
- Implemented a low-level controller using CAN-protocol for a robot with triangle-wheel-mechanism

### Microsoft Innovation Lab, PES University

Undergraduate Research Assistant

Project – TONY Humanoid Robot, 17 DOF small-sized humanoid platform for research

- Devised a fast inverse kinematics solution based on geometric constraints for quasi-static balance [paper]
- Developed an algorithm for turning in-place using friction and slippage in the legs [paper]

Undergraduate Research Intern

• Designed and built a robot named 'Explodroid' as a platform for SLAM and robot-delivery applications

### WORK EXPERIENCE

Cisco Systems Ltd.

Software Engineer

• Developed feature enhancements to standardize APIs for an automated Network Compliance Check software

# Design automation scripts to benchmark timings and implement solutions for performance improvements Honeywell Technology Solutions Lab Ltd. Bengalu

Intern

- Tested different real-time operating system (RTOS) components like memory unit etc. on an ARM processor
- Deployment of embedded tools to test functionality of real-time operating system (RTOS) components

### PUBLICATIONS

- **Prasanna Sriganesh**, Namya Bagree, Bhaskar Vundurthy and Matthew Travers, "Fast Staircase Detection and Estimation using 3D Point Clouds with Multi-detection Merging for Heterogeneous Robots", *in Proc. 2023 IEEE International Conference on Robotics and Automation (ICRA)*, London, United Kingdom, 2023, pp. 9253-9259
- **Prasanna Sriganesh**, James Maier, Adam Johnson, Burhanuddin Shirose, Rohan Chandrasekar, Charles Noren, Joshua Spisak, Ryan Darnley, Bhaskar Vundurthy and Matthew Travers, "Modular, Resilient, and Scalable System Design Approaches Lessons learned in the years after DARPA Subterranean Challenge", *in IEEE ICRA Workshop on Field Robotics*, 2024
- James Maier, **Prasanna Sriganesh** and Matthew Travers, "Longitudinal Control Volumes: A Novel Centralized Estimation and Control Framework for Distributed Multi-Agent Sorting Systems", *accepted to be published at the 2024 International Conference on Robotics and Automation (ICRA),* Yokohama, Japan, 2024
- Prasanna Sriganesh and Prajwal Rajendra Mahendrakar, "Generating curved path walking gaits for biped robots with deficient degrees of freedom", in Proc. 2021 IEEE/SICE International Symposium on System Integration (SII), Iwaki, Fukushima, Japan, 2021, pp. 786-793
- Prasanna Sriganesh, Prajwal Rajendra Mahendrakar and Rajasekar Mohan, "Solving inverse kinematics using geometric analysis for gait generation in small-sized humanoid robots," *in Proc. IEEE/SICE International Symposium* on System Integration (SII), Honolulu, Hawaii, USA, 2020, pp. 384–389

Pittsburgh, USA Aug 2023 – Aug 2027 (Expected) Pittsburgh, USA Aug 2021 – Jul 2023 Bengaluru, India Aug 2015 – Aug 2019

> Bengaluru, India August 2018 – Jul 2019

Pittsburgh, USA

Nov 2021 – Present

Bengaluru, India

May 2017 - Jul 2017

### Aug 2019 – Jul 2021

### provements

Bengaluru, India

Feb 2019 – Jun 2019

### AWARDS

- Seven-time recipient of the Prof. CNR Rao Scholarship (USD 2000) at PES University awarded to top 20% of the class
- Two-time recipient of the Prof. MRD Scholarship (USD 1000) at PES University awarded to top 5% of the class
- 1<sup>st</sup> place among 40 teams in the Cisco-RVCE hackathon at RV college of Engineering
- 1<sup>st</sup> place in poster presentation for the "TONY Humanoid Robot" project.
- Secured 1<sup>st</sup> prize at HackIT Hackathon at Cisco Systems Ltd, Bengaluru, India

#### LEADERSHIP Core Member, Robotics Institute Student Organization, Carnegie Mellon University Mar 2024 – Present Organize student events for the robotics student community **Core Team Member, Microsoft Innovation Lab** Aug 2018 – Jul 2019 Review and interview student applications for the annual summer internship program Successfully organized the '#code' hackathon with students from multiple colleges across Bengaluru **COURSE PROJECTS Planner for Emergency Landing in Drones** Nov 2022 Designed a 3D A\* planner using C++ for drones to reach a landing zone while maximizing coverage Developed a behavior executive on ROS to enable switching between emergency planner and coverage planner **Standing Balance Strategies for Biped Robot** Nov 2022 Achieved standing balance with stepping and hip strategies to recover from external forces in bipedal robots Created a custom model on Simulink to test balance for different disturbance forces Design of LQR Controller for a Quadrotor Apr 2022 Designed and implemented an LQR controller for a guadrotor based on PX4 drone simulation Compared with an existing cascaded PID controller for fixed trajectories and compute cross-track error Predicting the grasps of an object for Robot Arm using RGB-D image Mar 2018 - May 2018 Predicted grasp locations of objects like spoon, bottle, calculator etc. using RGB-D images Tested using different supervised learning models like regression, feed forward neural networks and support vector machine Regression model had highest accuracy of 89%, support vector machine had accuracy of 84% **Biometric Recognition using Iris segmentation and Template Matching** Apr 2018 - May 2018 Captured and extracted iris of an eye using near infrared images, segmentation performed using Hough transform Encoded the iris using 1-D Gabor filters to be stored in database Ensured no false positives in recognition by using hamming distance for template matching The Scripting Arm – Robotic arm to write text in handwritten form Jan 2017 - Mar 2017 Designed a robot arm with 2 translational axes with precise control in millimeter range • The arm was capable of writing alphabets and print pictures using the G-code CNC format Processed digital text into a vector image using pre-decided pattern to be sent as G-code Hexapod robot based on tripod gait Mar 2016 Built a hexapod robot with simple 3-actuator tripod gait for walking and turning in place Modeled an ultrasonic sensor array to provide information about entire surroundings Achieved occupancy grid mapping using inputs from sensor array on an Arduino microcontroller