Prasanna Sriganesh

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EDUCATION

Carnegie Mellon University — **Pittsburgh, USA**
Ph.D. in Robotics — **Aug 2023 – Aug 2027 (Expected)**

Carnegie Mellon University — **Pittsburgh, USA**
Master of Science in Robotics, GPA: 4.12/4.0 [Thesis] — **Aug 2021 – Jul 2023**

PES University — **Bengaluru, India**
Bachelor of Technology in Electronics and Communication Engineering (Major) — **Aug 2015 – Aug 2019**
GPA: 9.48/10, Rank 10 out of 325
Computer Science Engineering (Minor), GPA: 9/10

RESEARCH EXPERIENCE

Biorobotics Lab, Carnegie Mellon University — **Pittsburgh, USA**
Graduate Student Researcher — **Nov 2021 – Present**

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 a 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 — **Bengaluru, India**
Undergraduate Research Assistant — **August 2018 – Jul 2019**

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 to turning in-place using friction and slippage in the legs [paper]

Undergraduate Research Intern — **May 2017 – Jul 2017**

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

WORK EXPERIENCE

Cisco Systems Ltd. — **Bengaluru, India**
Software Engineer — **Aug 2019 – Jul 2021**

- 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. — **Bengaluru, India**
Intern — **Feb 2019 – Jun 2019**

- 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

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
- 1st place among 40 teams in the Cisco-RVCE hackathon at RV college of Engineering
- 1st place in poster presentation for the "TONY Humanoid Robot" project.
- Secured 1st 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 quadrotor 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