# Prasanna Sriganesh

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## EDUCATION

**Carnegie Mellon University** — **Pittsburgh, USA**
*Ph.D. in Robotics* — **Aug 2023 – Present**

**Carnegie Mellon University** — **Pittsburgh, USA**
*Master of Science* in Robotics, GPA: 4.25/4.0 — **Aug 2021 – Aug 2023**

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

## RESEARCH EXPERIENCE

**Biorobotics Lab, Carnegie Mellon University** — **Pittsburgh, USA**
Graduate Research Assistant — **Nov 2021 – Present**
*Project – Multi-Modal Perception UnderGround (MMPUG)*

- Ideated and implemented a novel algorithm for detecting and estimating staircases from 3D point clouds
- Implemented a global planner on a fleet of heterogeneous robots to navigate robot to a target waypoint
- Developed a stair-climbing routine based on detected staircases for legged robots

*Project – Vertical Robot Transport (VeRT)*

- Evaluated different robot mechanisms to benchmark robot mobility on staircases and unstructured terrains
- Designed controls for a planetary-gear wheeled robot that could carry 100lbs of weight upstairs

**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*

- Designed and built a bipedal robot with 5 degrees of freedom in each leg
- Devised a fast inverse kinematics solution based on geometric constraints for quasi-static balance
- Ideated and implemented a turning mechanism using friction and slippage in the legs

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

- Built a robot named 'Explodroid' as a platform for SLAM and robot-delivery applications
- Successfully implemented 'gmapping' package to map an area and move robot to a target goal

## PUBLICATIONS

- **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**, 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** 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

## 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**

- Verified different real-time operating system (RTOS) components like memory unit etc. on an ARM processor
- Deployment of tools to test functionality of a mission critical real-time operating system (RTOS) used in aviation

## AWARDS

- Seven-time recipient of the Prof. C N R Rao Scholarship at PES University
- Two-time recipient of the Prof. M R Doreswamy Scholarship at PES University
- 1st place 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 Team Member, Microsoft Innovation Lab** **Aug 2018 – Jul 2019**

- Review and interview incoming students interested in joining the lab
- 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 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 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 on a quadrotor based on the dynamics
- 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