

Prasanna Sriganesh

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RESEARCH INTERESTS

- **Motion Planning for Mobile Robots:** Focus on developing path-planning algorithms that can reason about robot's capabilities (non-holonomic wheeled robots, quadrupeds) to navigate in complex environments. My goal is to enable real-time planning strategies that can reason about robot's traversability in uncertain terrain.
- **Uncertainty-aware Active Perception:** Developing strategies for robots to actively minimize uncertainty in perceived environment information through targeted sensing actions. My long-term goal is to integrate active perception with motion planning, enabling robots to make informed decisions in dynamic and uncertain scenarios

EDUCATION

Carnegie Mellon University

Ph.D. in Robotics

Pittsburgh, USA

Aug 2023 – Aug 2027 (Expected)

Carnegie Mellon University

Master of Science in Robotics, GPA: 4.12/4.0

Pittsburgh, USA

Aug 2021 – Jul 2023

Thesis: Fast Staircase Detection and Estimation with Multi-View Merging for Multi-Robot Systems [\[Link\]](#)

PES University

Bachelor of Technology in Electronics and Communication Engineering (Major)

Bengaluru, India

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

Graduate Student Researcher

Pittsburgh, USA

Nov 2021 – Present

Project – Multi-Modal Perception UnderGround (MMPUG)

- Designed and implemented a **novel staircase detection algorithm** using **3D point cloud data**, achieving a **processing time of under 30ms** on an NVIDIA Jetson Xavier AGX. This algorithm combined projections of point-clouds from different viewpoints to improve real-time staircase detection times by an order of magnitude compared to previous methods while retaining parameter estimation accuracy. *This work was published in IEEE ICRA 2023* [\[link\]](#)
- Developed a modeling and estimation framework for **identifying safe regions on cluttered or damaged staircases**. This representation is integrated into a **Bayesian inference framework** to fuse noisy measurements enabling accurate estimation of staircase location even **with partial observations and occlusions**. Results were validated on an NVIDIA Jetson Orin onboard a Boston Dynamics Spot robot. *This work is currently under review in IEEE Robotics and Automation Letters (RA-L)* [\[link\]](#)
- Developed a **modular and interoperable system architecture** for **heterogeneous multi-robot field deployment**. This decentralized architecture, inspired by lessons learned from the DARPA SubT Challenge, features adaptive interfaces and context-aware suggestions to streamline operator control and facilitate the development of new robotic capabilities. *This work was presented at the IEEE ICRA 2024 Workshop on Field Robotics* [\[link\]](#)

Microsoft Innovation Lab, PES University

Undergraduate Research Assistant

Bengaluru, India

August 2018 – Jul 2019

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

- Developed and experimentally validated an algorithm **for turning in-place using slippage** in the legs of a **small-scale humanoid robot**. This algorithm enabled turning maneuvers on small-sized humanoid robot that did not have a yaw DOF actuator. *This work for published in the 2021 IEEE International Conference on System Integration (SII 2021)* [\[link\]](#)
 - Designed and developed a **17-DOF small-sized humanoid robot** as a research platform. Developed an **inverse kinematics solution using geometric constraints** for generating stable walking gaits. *This work for published in the 2020 IEEE International Conference on System Integration (SII 2020)* [\[link\]](#)
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WORK EXPERIENCE

Cisco Systems Ltd.

Software Engineer

Bengaluru, India

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.

Intern

Bengaluru, India

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**, Burhanuddin Shirose, and Matthew Travers, "A Bayesian Modeling Framework for Estimation and Ground Segmentation of Cluttered Staircases", in *Review for IEEE Robotics and Automation Letters (RA-L)*, Dec 2024 [\[link\]](#)
- **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 [\[link\]](#)
- **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 [\[link\]](#)
- James Maier, **Prasanna Sriganesh** and Matthew Travers, "Longitudinal Control Volumes: A Novel Centralized Estimation and Control Framework for Distributed Multi-Agent Sorting Systems", in *Proc. 2024 IEEE International Conference on Robotics and Automation (ICRA)*, Yokohama, Japan, 2024 [\[link\]](#)
- **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 [\[link\]](#)
- **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 [\[link\]](#)

TEACHING EXPERIENCE / MENTORSHIP

16 - 474: Robotics Capstone

Carnegie Mellon University

- Conducted office hours for debugging systems issues and advised students on their robotics capstone project

Jan – May 2024

16 - 450: Robotics Systems Engineering

Carnegie Mellon University

- Graded assignments and delivered a guest lecture on robotic system design, incorporating a real-world case study on one of my projects

Aug – Dec 2023

Student Mentor

Student: James Maier, M.S. in Robotics, Carnegie Mellon University

Aug 2023 – Jul 2024

- *Topic:* Material flow modeling and estimation on multi-agent sorting systems.
 - This work was published in IEEE ICRA 2024 [\[link\]](#)

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

- Mentored two undergraduate student teams during their summer research internships
- Review and interview student applications for the annual summer internship program
- Successfully organized the '#code' hackathon with students from multiple colleges across Bengaluru

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
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SKILLS

- Programming: C++, MATLAB, Python
 - Software: Robot Operating System (ROS), Gazebo, Isaac Sim
 - Robots/Platforms: Jetson AGX Orin/Xavier, Boston Dynamics Spot, Ghost Vision 60, Pixhawk
 - Others: HTML, DaVinci Resolve Video Editing
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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
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