Prasanna Sriganesh

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EDUCATION

Carnegie Mellon University, Pittsburgh, USA **Aug 2021 – Aug 2023**

Master of Science in Robotics, GPA: 4.25/4.0

Coursework: Robot Planning and Decision Making, Biomechanics and Motor Control, Robot Localization and Mapping, Kinematics, Dynamics and Control, Computer Vision

PES University, Bengaluru, India **Aug 2015 – Aug 2019**

Bachelor of Technology in Electronics and Communication Engineering (Major), CGPA: 9.48/10, *Rank: 10 out of 325*

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

Coursework: Control Systems, Machine Learning, Digital Image Processing, Microcontrollers, Data Structures

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 using 3D point clouds
- Implemented a global planner on a fleet of heterogeneous robots to navigate robot to a target waypoint
- Developed the sliding-mode autonomy stack for the Spot Legged Robot

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

Dept. of ECE, PES University **Bengaluru, India**

Undergraduate Researcher **Aug 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

Project – SLAM using an array of low-cost ultrasonic sensor

- Designed an array of ultrasonic range sensors to be used as a low cost 2D lidar substitute
- Conducted experiments to evaluate feasibility of the sensor module
- Incorporated the module with a mobile robot capable of running ROS

Microsoft Innovation Lab, PES University **Bengaluru, India**

Undergraduate Research Mentor **May 2018 – Jul 2018**

- Guided two intern teams working on robot manipulation and SLAM
- Met weekly to go over ideas and help design a robot arm capable of catching projectile from camera feed
- Helped extend a previous 2D SLAM approach with semantic information

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**, Namya Bagree, Bhaskar Vundurthy and Matthew Travers, "Fast Staircase Detection and Estimation using 3D Point Clouds with Multi-detection Merging for Heterogeneous Robots", *Submitted to the 2023 IEEE International Conference on Robotics and Automation (ICRA)*
- **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, 11th-14th January 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, 12th-15th January 2020, pp. 384–389

WORK EXPERIENCE

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

- Developed feature enhancements in Java to standardize Rest-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 independent real-time operating system (RTOS) components like memory unit etc. on an ARM processor
- Deployment of boot OS on hardware 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

ACADEMIC and COURSE PROJECTS

Planner for Emergency Landing in Drones **Nov 2022**

- Designed an ARA* based 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

CR4 – A remote controlled cleaning robot inspired by Wall-E **Dec 2014**

- Built a robot using basic Arduino remote control to sweep the floor
- Remote control achieved through RF communication using PlayStation controller