

Prasanna Venkatesan Kettavarapalyam Sriganesh

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EDUCATION

B.Tech. – PES University

Aug 2019

Electronics and Communication Engineering (Major), CGPA: 9.48/10, *Rank: 10 out of 325 (Gold Medalist)*

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

Coursework: Control Systems, Machine Learning, Digital Image Processing, Artificial Neural Networks, Microcontrollers, Data Structures, Design of Algorithms

12th Grade – Nandi P.U College

97%

May 2015

10th Grade – Nandi High School

95.2%

March 2013

RESEARCH EXPERIENCE

Undergraduate Research as Elective, PES University

August-December 2018

- Designed an array of ultrasonic range sensors to be used as a low-cost substitute lidar for SLAM
- Successfully perform SLAM with good accuracy using ultrasonic sensor array

Research Mentor, Microsoft Innovation Lab

June-July 2018

- Guided two intern teams working in the field of mobile robotics and conducted research.
- Implemented a ball-catching algorithm in a robotic arm using trajectory prediction from video stream.
- Guided a team to extend a previous 2D SLAM approach into a visual 3D SLAM implementation

Research Intern, Microsoft Innovation Lab

June-July 2017

- Built a robot named 'Explodroid' equipped with Xbox Kinect and Intel NUC® to perform SLAM.
- Successfully implemented gmapping package and performed SLAM using ROS
- Performed autonomous navigation on an existing map using Adaptive Monte Carlo Localization

PUBLICATIONS

- Prasanna Venkatesan K S 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 Venkatesan K S, 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
- Prasanna Venkatesan, N. Pavitra, and Rajasekar Mohan, "Performing SLAM using Low-Cost Sensors for Autonomous Navigation in household environments", *2019 IEEE 5th International Conference for Convergence in Technology (I2CT)*, Pune, India, 2019

WORK EXPERIENCE

Software Engineer, Cisco Systems Ltd.

August 2019-present

- 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

Intern, Honeywell Technology Solutions Lab Ltd.

February-June 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.

ACHIEVEMENTS and AWARDS

- Awarded the Prof. C N R Rao Scholarship for all the 7 semesters of the B.Tech. course
 - Awarded the Prof. M R Doreswamy Scholarship during the first two semesters of B.Tech.
 - Won 1st prize in the Cisco-RVCE hackathon 2018 conducted at RV college of Engineering
 - Regional finalist in the e-Yantra robotics competition conducted by the Indian Institute of Technology, Bombay
 - Won 1st prize in poster presentation for the undergraduate project work.
 - Secured 1st prize in the Cisco Systems internal hackathon – HackIT.
 - Core member of the Microsoft Innovation Lab, PES University.
 - Runner-up in PES University's Science Expo for showcase of Hexapod Robot.
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UNDERGRADUATE PROJECT

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

January 2019-May 2019

- 17 Degrees of Freedom in total – 5 per leg, 3 per arm, 1 in neck.
- 30 centimeters in height, works using Bluetooth serial communication
- Devised an independent Inverse Kinematics solution based on geometric approach

ACADEMIC PROJECTS

Predicting the grasps of an object for Robot Arm using RGB-D image

March 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

April 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

INDEPENDENT PROJECTS

Non-Intrusive Sleep monitoring system using In-Ear Electro Encephalogram (EEG)

October 2018

- Captured In-ear brainwaves for monitoring sleep through designed memory foam-based electrodes.
- Classified collected data into different sleep cycles and accurately predict current sleep cycle
- Diagnose different disorders from the data collected via a portal collaborated by medical practitioners.

Autonomous pick and place robot by using third-person camera stream

January- March 2018

- Developed an algorithm to identify objects and goal positions via overhead RGB camera.
- Autonomously control a robot to pick and navigate to the goal point for drop-off
- Solution implemented on the FireBird-V mobile robot platform

Retrofit Home Automation controller as low-cost Home automation substitute

September-October 2017

- Invented a retrofit device capable of toggling electric switches manually without use of relays
- Control of system using Ai chat assistant like Google Assistant, with basic setup

The Scripting Arm – Robotic arm to write text in handwritten form

January-March 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 images using pre-decided pattern to be sent as G-code

Automated robotic arm for collecting and dumping objects in given workspace

April-May 2016

- Built robotic arm with 3 rotational degrees of freedom with a semi-sphere workspace
- Detect object using an ultrasonic sonic sensor mounted to the base
- Calculated joint angles using basic inverse kinematic solutions for 2-link robot arm

Hexapod robot based on tripod gait

March 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
- Achieve occupancy grid mapping using inputs from sensor array on an Arduino microcontroller.

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

January-May 2015

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

MINI PROJECTS

Implementation of a Basic 12-bit Microcontroller using Verilog

May 2018

- Designed and Implemented a 12-bit microcontroller with 16 OP codes, 2 registers with ALU using Verilog

Implementation of 'FREE' command in XV6 Operating system

December 2017

- Implemented the linux 'free' command on XV6 (vanilla OS made by MIT) to show status of free memory.

Command Line Music player using C

December 2016

- Designed and implemented a command line music player using concepts of doubly linked lists and the winmm api to play music, create playlists etc.

EXTRACURRICULARS

- Astronomy and Astrophotography hobbyist and conducted eclipse watch parties for regional science center.
 - Participated in 'Life in Space workshop' conducted by Indian Astrobiology Research Center, Mumbai - 2019.
 - Completed three 10km marathons in 2016, 2017 and 2018 for social cause and upliftment of martyr families.
 - Organized ideathons and hackathons like #code and Incito as part of the Microsoft Innovation Lab
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