

Maithili J. Shetty

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Education

- April 2023 **University of Michigan, Ann Arbor, MI.**
Master of Science in Electrical and Computer Engineering
Ongoing Coursework: Linear Systems Theory, Self-Driving Cars, Directed Study (Intelligent Robotics and Autonomy Lab), Mobile Robotics, Design of Digital Control Systems, Techlab @ MCity
- June 2021 **PES University, Bengaluru, India.**
Bachelor of Technology in Electronics and Communication Engineering, GPA: 9.27/10.00
Minor in Computer Science and Engineering
Relevant Coursework: Control Systems, Linear Systems, Adaptive Systems, Signals & Systems, Practical Applications to Deep Learning, Machine Learning, Artificial Neural Networks, Linear Algebra, Engineering Mathematics (I, II & III), Data Structures, Algorithms, Database Management Systems, Operating Systems

Experience

- Jan 2022 - **University of Michigan, Ann Arbor, MI.**
Present *Graduate Student Instructor* | LSA Physics
○ In-charge of handling 3 lab sections, holding office hours and make-up labs for PHYSICS 251 (Physics for the Life Science II)
- Sept 2021 - **University of Michigan, Ann Arbor, MI.**
Present *Research Intern* | PI: Dr. Vasileios Tzoumas
○ Working on the design of an online learning-based controller for stable drone landing
- Jun 2021 - **AI and Robotics Technology Park, Indian Institute of Science, India.**
Jul 2021 *Robotics Intern* | Supervisor: Dr. Mukunda Bharatheesha
○ Implemented coverage path planning algorithm in robot operating system (ROS) for a robot performing janitorial tasks in a confined washroom environment
○ Created a ROS service for the coverage path planning module to work with the navigation stack
○ Worked on using Moveit! ROS package to perform manipulation for various tasks such as pick-and-place and cartesian planning over a counter top
- Jan 2021 - **Integrated Control, Guidance and Estimation Lab, Indian Institute of Science, India.**
Jun 2021 *Research Intern* | PI: Dr. Radhakant Padhi
○ Designed a controller to predict optimal radiation dosages for effective radiotherapy
○ Extended this to design a novel optimal controller which accounts for uncertainties in the system parameters in impulsive systems
○ Applied and verified this technique on the popular Lotka-Volterra Model
- Jun 2019 - **Centre for Intelligent Systems, PES University, India.**
Jul 2020 *Research Intern* | PI: Dr. Koshy George
○ Designed neural network controllers for the identification and control of multiple nonlinear dynamical systems using BPA and OSLA algorithms on MATLAB
○ Tabulated the results to compare the performance in terms of mean square error and variance accounted for
○ Applied various reinforcement learning algorithms to control an inverted pendulum and compared their relative performances

Technical Skills

- Programming Python, C, MATLAB, C++, Embedded C, Scilab
Applications TensorFlow, PyTorch, ROS, Gazebo, OpenCV, Git, \LaTeX , MS Office, Simulink
Platforms Windows, Linux
Hardware Raspberry Pi, Arduino, 8051, ARM, AVR

Projects

- P1 **Path Planning and Manipulation of RoboJanitor**, | ROS, Gazebo, Python, C++.
- Designed coverage path planning and manipulation algorithms for the ARTPARK simulation challenge as a benchmark. [\[Challenge\]](#)
- P2 **Optimal Control for Effective Radiotherapy**, | MATLAB.
- Designed a novel model static predictive control (similar to MPC) to predict the optimal radiation dosages for uncertain impulsive systems.
- P3 **Reinforcement Learning Control in Uncertain Environments**, | Python, MATLAB.
- Applied several model free reinforcement learning algorithms to control a two degree-of-freedom robot manipulator in the presence of uncertainties and disturbances.
- P4 **Discrete-time Design of Uncertainty and Disturbance Estimator**, | MATLAB.
- Designed a novel uncertainty and disturbance estimator designed in discrete time for robust control. Currently working on the extension. [\[Code\]](#) [\[Paper\]](#)
- P5 **Acute Infarct Location Prediction using CNN**, | Python, Intel NCS2.
- Built an accurate CNN model to predict the location of acute infarcts on a very small data set of 100 images. [\[Code\]](#)
- P6 **Identification and Control of Nonlinear Dynamical Systems**, | MATLAB.
- Applied back propagation and online sequential learning algorithms for the identification and control of nonlinear systems. [\[Code\]](#)

Publications

Peer-Reviewed Journals

- J1 Padmanabhan, R., **Shetty, M.**, & Chandar, T. S. (2021). Discrete-time design and applications of uncertainty and disturbance estimator. *International Journal of Robust and Nonlinear Control*. [\[Article\]](#)

Conference Proceedings

- C1 **Shetty, M.**, Bhat, K. K., Narayana, A., & Miranda, M. (2020). A novel approach to design single-phase cycloconverter using SiC MOSFET and its performance analysis Over IGBT. *Lecture Notes in Electrical Engineering*, 285–296. [\[Article\]](#)
- C2 **Shetty, M.**, Vishista, B, Choragi, C., Subramanian, K., & George, K. Continuous control of robot manipulator using deep deterministic policy gradient. *Accepted at the Indian Control Conference, IIT Bombay, 2021*.

Awards and Honors

- 2021 Gold medal for securing 7th overall rank in ECE at PES University.
- 2020 Prof. MRD Merit Scholarship Awardee for the 5th, 6th, 7th and 8th semesters of bachelors.
- 2017 - 2020 Distinction Award for all semesters of bachelors.
- 2017 - 2019 Prof. CNR Rao Merit Scholarship Awardee for the 1st, 2nd, 3rd and 4th semesters.
- 2015 International Award for Young People (IAYP) - Bronze.

Talks

- 2021 **Discrete-time design and applications of uncertainty and disturbance estimator**, Research @ ECE, PES University [\[Video\]](#)

Certifications and Workshops

- 2021 *Motion planning and path tracking for wheeled robots*, by ARTPARK (IISc).
- 2020 *Fundamentals of Reinforcement Learning*, by University of Alberta (Coursera).
- 2019 *Machine Learning*, by Stanford University (Coursera).
- 2019 *Deep Learning Onramp*, by MathWorks.
- 2018 *Android Controlled Robotics*, by Indian Institute of Science.