

Aditya Milind Deshpande

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Experience

Procter & Gamble

SENIOR SCIENTIST

- Research and development of consumer facing smart products using cutting edge technologies.

Cincinnati, Ohio, USA

Nov. 2021 - Present

University of Cincinnati - Simulation Center

GRADUATE RESEARCH ASSISTANT

- Collaborated with Procter & Gamble for developing indoor robotics and smart product technologies.
- Developed novel computer vision algorithms for smart consumer products at P&G.

Cincinnati, Ohio, USA

Jan. 2021 - Oct. 2021

Procter & Gamble

ROBOTICS RESEARCH INTERN

- Implemented target driven navigation in indoor robots using computer vision and deep reinforcement learning.
- Developed ROS-based SLAM algorithms for indoor-robots using RGB and RGB-Depth cameras, and LiDAR sensor.

Cincinnati, Ohio, USA

May 2020 - Dec. 2020

University of Cincinnati - Cooperative Distributed Systems Lab

GRADUATE RESEARCHER

- Robotics**
 - Researched approaches to expedite embodied learning in modular robots using deep reinforcement learning and evolutionary strategies.
 - Automated quadcopter for indoor and outdoor flights using PX4-firmware, C++ and Python to assist firefighters in search and rescue; Used YOLO object detection model to identify objects of interest in robot's field-of-view.
 - Created computer vision algorithms for drone assisted road traffic monitoring using TensorFlow-based fine-tuned Faster-RCNN model and OpenCV.
- Deep learning**
 - Led the development of the non-invasive Computer Vision Toolkit (CVT) to enable digitization of legacy machines; Used Python and OpenCV; Software deployed in Faurecia and Raytheon.
 - Implemented Natural Language Processing (NLP) based image captioning model (VGG-net+LSTM-net) trained on COCO-dataset in PyTorch.
 - Developed PyTorch-based one-shot recognition deep-learning module to identify manufacturing defects on steel surfaces using computer vision.

Cincinnati, Ohio, USA

May. 2017 - Oct. 2021

University of Cincinnati - CEAS

INSTRUCTOR

- Taught the large enrollment (60 students) course of MECH6032/5132 Robot Control and Design as a primary instructor.
- Revamped the course material and incorporated open-source hardware and software projects in the curriculum.
- Supervised students in the development of autonomous mobile robots and robot arms as class projects; robots were built using Arduino Uno and ROS.

Cincinnati, Ohio, USA

Jan. 2019 - Apr. 2019

Viaan, Inc.

ENGINEERING INTERN

- Designed sensor fusion algorithm for wearable IMU sensors using MATLAB to enable human motion tracking in real-time.
- Presented wearable device design solution as per the customer/chiropractor requirements and budgets.
- Collaborated with design and firmware teams for hardware-software interface testing of wearable motion tracking device.

Wichita, Kansas, USA

Jun. 2016 - Jul. 2016

Dassault Systèmes (SIMULIA)

SOFTWARE ENGINEER

- Collaborated with the front-end team to develop the graphical user interface for the SIMULIA products using PolymerJS and JavaScript
- Focused on website rendering time minimization and usability to improve the user experience of SIMULIA products.

Pune, Maharashtra, India

Jul. 2014 - Jul. 2015

Education

University of Cincinnati

PH.D. IN MECHANICAL ENGINEERING

- Dissertation: Developmental Learning of Control in Modular Robotic Systems with Increasing Complexification [\[Link\]](#); Advisors: Prof. Manish Kumar and Prof. Ali A. Minai

Cincinnati, Ohio, USA

Aug. 2017 - Oct. 2021

University of Cincinnati

M.S. IN MECHANICAL ENGINEERING

- Thesis: Robot Swarm Based On Ant Foraging Hypothesis With Adaptive Lévy Flights [\[Link\]](#); Advisor: Prof. Manish Kumar.

Cincinnati, Ohio, USA

Aug. 2015 - Jul. 2017

Maharashtra Institute of Technology

B.E. IN MECHANICAL ENGINEERING

- Senior Design Projects: (1) Design Optimization of Heat Exchanger; (2) Development of Remote Controlled Fixed-wing Drone.

Pune, India

Aug. 2010 - Jul. 2014

Skills

Robotics and Computer Vision	Robot Operating System (ROS), Pybullet, MuJoCo, OpenCV
Artificial Intelligence	Pytorch, TensorFlow
Embedded systems	STM32, NVIDIA Jetson TX2/Nano, Arduino, Raspberry Pi, PixHawk Autopilot
Software	Python, C++, Embedded C, Julia, MATLAB, SolidWorks, NetworkX, Git

Honors, Awards & Professional Activities

2021	Media Coverage: “UC students make app that prints custom face masks” [UC News] [WLWT Channel 5 News][Local 12 News][Spectrum News 1]
Oct. 2020	People’s Choice Best Presentation Award , 21th Annual Pilot Research Project Symposium. “IoT based AI Application for Posture Recognition to reduce Workplace Injuries”.
Oct. 2019	People’s Choice Best Poster Award , 20th Annual Pilot Research Project Symposium. “IoT based AI Application for Posture Recognition to reduce Workplace Injuries”.
2019	Pilot Research Project Award, \$7000 , IoT based AI Application for Posture Recognition to reduce Workplace Injuries. University of Cincinnati’s Education and Research Center
2019	Video in Science Award , 44th Dayton-Cincinnati Aerospace Sciences Symposium, presented the implementation of Style transfer on the scenic video from quadcopter.
2018	Media Coverage: “UC researchers team up with ODOT to study traffic with drones” [WCPO Channel 9 Cincinnati]
2018	University Research Council (URC) Award, \$5000 , Principal Investigator (PI) for the research on “Deep Intelligence for Complex Learning in Robots”
2017-2025	Reviewer , Various conferences and journals including ICRA, ACC, DSCC, CDC, ICUAS, ISA Transactions, The Visual Computers, ALIFE, IEEE TCDS, IEEE RAL
2025	Procter & Gamble CEO Award (FY 2024/25) for outstanding contributions to product development.
2025	Selected as 1 of 74 Outstanding early-career U.S. engineers for The Grainger Foundation Frontiers of Engineering 2025 Symposium, U.S. National Academy of Engineering [link]

Publications, Patents & Presentations

Publications

- **Deshpande, A. M.**, Hurd, E., Minai, A. A., Kumar, M. (2023). “DeepCPG policies for robot locomotion.” IEEE Transactions on Cognitive and Developmental Systems, 15(4), 2108-2121.
- **Deshpande, A. M.**, Minai, A. A. “Robust Deep Reinforcement Learning for Quadcopter Control.” IFAC-PapersOnLine 54.20 (2021): 90-95, doi:10.1016/j.ifacol.2021.11.158.
- Majid, F., **Deshpande, A. M.**, Ramakrishnan, S., Ehrlich, S. and Kumar, M. “Analysis of epidemic spread dynamics using a PDE model and COVID-19 data from Hamilton County OH USA.” Ifac-papersonline, 54.20 (2021): 322-327.
- Majid, F., Gray, M., **Deshpande, A. M.**, Ramakrishnan, S., Kumar, M., Ehrlich, S. (2021) “Non-Pharmaceutical Interventions as Controls to mitigate the spread of epidemics: An analysis using a spatiotemporal PDE model and COVID–19 data.” ISA Transactions. [[link](#)].
- **Deshpande, A. M.**, Kumar, R., Minai, A. A., Kumar, M. (2020). Developmental Reinforcement Learning of Control Policy of a Quadcopter UAV With Thrust Vectoring Rotors. In ASME 2020 Dynamic Systems and Control Conference, doi:10.1115/DSCC2020-3319.
- Kumar, R., **Deshpande, A. M.**, Wells, J. Z., Kumar, M. (2020). Flight Control of Sliding Arm Quadcopter with Dynamic Structural Parameters. 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Las Vegas, NV, USA, 2020, pp. 1358-1363, doi:10.1109/IROS45743.2020.9340694.
- **Deshpande, A. M.**, Minai, Ali A., Kumar, M. “One-Shot Recognition of Manufacturing Defects in Steel Surfaces.” In 48th SME North American Manufacturing Research Conference (2020).
- **Deshpande, A. M.**, Telikicherla, A. K., Jakkali, V., Wickelhaus, D., Kumar, M., Anand, S., “CV Toolkit: Computer Vision Toolkit for Non-invasive Monitoring of Factory Floor Artifacts.” In 48th SME North American Manufacturing Research Conference (2020).
- Kumar, R., Bhargavapuri, M., **Deshpande, A. M.**, Sridhar, S., Cohen, K., Kumar, M. “Quaternion Feedback Based Autonomous Control of a Quadcopter UAV with Thrust Vectoring Rotors.” In 2020 American Control Conference.
- **Deshpande, A. M.**, Kumar, R., Radmanesh, M., Veerabhadrappe, N., Kumar, M., Minai, A. A. (2018, June). “Self-Organized Circle Formation around an Unknown Target by a Multi-Robot Swarm using a Local Communication Strategy.” In 2018 Annual American Control Conference (ACC) (pp. 4409-4413). IEEE.
- **Deshpande, A.**, Kumar, M., Ramakrishnan, S. (2017, October). “Robot swarm for efficient area coverage inspired by ant foraging: The case of adaptive switching between Brownian motion and Lévy flight.” In ASME 2017 Dynamic Systems and Control Conference (pp. V002T14A009-V002T14A009). American Society of Mechanical Engineers.
- **Deshpande, A. M.**, Phatnani, G. M., Kulkarni, A. J. (2013, June). “Constraint handling in firefly algorithm.” In 2013 IEEE international conference on cybernetics (CYBCO) (pp. 186-190). IEEE.

Patents

- **Deshpande, Aditya Milind**, Eduardo Romo Escalante, Faiz Feisal Sherman, and Ian Anthony Good. "Hair cutting appliance and associated power transform module." U.S. Patent Application 18/479,340, filed October 02, 2023.
- **Deshpande, Aditya Milind**, Eduardo Romo Escalante, Faiz Feisal Sherman, and Ian Anthony Good. "Method for assembling a hair cutting appliance." U.S. Patent Application 18/479,424, filed October 02, 2023.
- **Deshpande, Aditya Milind**, Eduardo Romo Escalante, Faiz Feisal Sherman, and Ian Anthony Good. "Devices and methods for smart personal grooming." U.S. Patent Application 18/479,369, filed October 02, 2023.

Book Chapter

- Kumar R., **Deshpande, A. M.**, Scott D., Wells J. Z., Kumar, M. "Special Transportation Modes." in "Disruptive Emerging Transportation Primer". American Society of Civil Engineers (ASCE).

Posters and Presentations

- **Deshpande, A. M.**, Kumar, R., Kumar, M. "IoT based AI Application for Posture Recognition to Reduce Workplace Injuries." 20th Annual 2019 Pilot Research Project (PRP) Symposium, University of Cincinnati Education and Research Center, October 2019.
- Kumar, A., Omotuyi, O., **Deshpande, A. M.**, Calabrese, N., Kumar, M. "Autonomous Mobile Robot Localization and Navigation system using Camera and Inertial Measurement Unit (IMU) in indoor environment." 2019 AIAA Intelligent Systems Workshop, July 2019.
- Anand, S., Kumar, M., **Deshpande, A.**, Jakkali, V., Telikicherla, A. K. "Non-Invasive Computer Vision Toolkit (CVT) using MTConnect®." Future Factory Technology Showcase, UI Labs, Chicago, Illinois, Nov. 13, 2018.
- **Deshpande, A. M.**, Kumar, M., Minai A. A. "Teaching Quadruped Robot to Walk using Reinforcement Learning and Central Pattern Generators." 2019 AIAA Intelligent Systems Workshop. July 2019.
- Wells, J., **Deshpande, A. M.**, Kumar, R., Ssaxena, A., Brown, B., Vanderelst, D., and Kumar, M. "Autonomous Indoor Flight in GPS Denied, Degraded Environments." 44th Dayton-Cincinnati Aerospace Sciences Symposium. March 2019.
- Kumar, R., **Deshpande, A. M.**, Sridhar, S., Cohen, K., Kumar, M. "Quaternion Feedback Based Full Pose Control of a Quadcopter UAV with Thrust Vectoring Capabilities." 44th Dayton-Cincinnati Aerospace Sciences Symposium. March 2019.
- Omotuyi, O., Wells, J., **Deshpande, A. M.**, Kumar, R., Kumar, M. "Laser Based EKF Localization on TurtleBot3 Robot." 44th Dayton-Cincinnati Aerospace Sciences Symposium. March 2019.
- **Deshpande, A. M.**, Kumar, M., Ramakrishnan, S. "Robot Swarm inspired by Ant Colony for Augmented Search and Retrieval." 43rd Dayton-Cincinnati Aerospace Sciences Symposium. February 2018
- **Deshpande, A. M.**, Kumar, M., Minai, A. A. "Self-Organized Circle Formation around an Unknown Target by a Multi-Robot Swarm using a Local Communication Strategy." 43rd Dayton-Cincinnati Aerospace Sciences Symposium. February 2018.
- **Deshpande, A. M.**, Kumar, M., Ramakrishnan, S. "Area Coverage Based On Lévy Foraging Hypothesis Applied to Robot Swarm Emulating Ant Foraging Behavior." 42nd Dayton-Cincinnati Aerospace Sciences Symposium. March 2017.