SHUBHAM SONAWANI

Ph.D.
Interactive Robotics Laboratory
Arizona State University

🌐 www.sdsonawani.com
📞 480 930 2903
📍 OH, USA

✉ shubhamsonawani@gmail.com
⭕ www.github.com/sdsonawani
in www.linkedin.com/in/sdsonawani

SUMMARY

As a Ph.D. in Robotics and AI, my expertise lies at the intersection of Mixed Reality, Computer Vision, Grasping and Manipulation, and Large Language Models, with a strong emphasis on enhancing human-robot interaction. My interdisciplinary approach is demonstrated through contributions to esteemed international conferences such as IROS, ICRA, and CoRL.

SKILLS

Languages: Python, C++, C, C#, Java, R, JavaScript.

Frameworks: Pytorch, ROS, ROS2, OpenCV, Unity, MuJoCo, Gazebo, Docker

EDUCATION

08/19 - 07/24	**Ph.D. in Electrical Engineering** Thesis: Intelligent Visual Signaling for Mixed Reality based Human Robot Interaction	**Arizona State University**
08/16 - 05/19	**M.S. in Electrical Engineering** Thesis: Towards Next-Generation Mobile Manipulation and Grasping	**Arizona State University**
08/12 - 05/16	**B.Tech. in Electrical Engineering** Thesis: Passive localization and path planning for ackermann drive robot	**Veermata Jijabai Technological Institute**

PROFESSIONAL EXPERIENCE

03/25 - Now

Robotics Deep Learning Scientist
Apricity Robotics
Research and development in autonomous robotic manipulation for medical applications. (Pytorch, ROS2, OpenCV, Python, C++)

08/24 - 02/25

Robotics Vision R&D Scientist
Erthos
Conducted research on deep learning-based image segmentation and lane detection techniques for robotic traversal on solar panels. (Pytorch, ROS2, OpenCV, Python, C++)

06/23 - 08/23

R&D Intern in AI and Robotics
Erthos
Implemented robot docking method using Vision and GPS at production level. (Pytorch, ROS, ROS2, OpenCV, Gazebo, Python, C++ and C#)

08/20 - 12/20

Visiting Student Researcher
NASA-JPL
Investigated and developed pose estimation methods for Mars-Sample-Return-Tubes, (ROS, Gazebo, C++, Python, Opencv, Tensorflow)

ACADEMIC EXPERIENCE

08/21 - 07/24

Research Associate: Robotic Solutions for Earth-Mounted Solar
ASU and Erthos
· Developed a ROS-Gazebo simulation environment for the testing and verification of robotic systems.
· Implemented semantic segmentation and lane detection models to improve robot navigation stack.

01/19 - 12/19

Research Assistant: Autonomous In-Space Assembly using Arm Augmented CubeSATS
ASU and NASA-JPL
· Implemented an optimized monocular vision-based tracking algorithm for object detection and tracking.
· Demonstrated a successful real-world assembly task using the developed robotic system.

07/18 - 12/18

Research Assistant: Realtime robotic inventory system for intelligent planograms in retail
ASU and Intel
· Developed a software stack enabling seamless communication between the custom-made robotic arm and the Jackal mobile robotic platform.
· Improved simultaneous localization and mapping (SLAM) algorithm accuracy.

07/17 - 06/18

Teaching Assistant: Circuits I and Circuits II
ASU
· Delivered lectures on key topics including operational amplifiers (Op-Amps), PN junction diodes and metal-oxide-semiconductor field-effect transistors (MOSFETs).
· Employed LTspice as a teaching tool to introduce students to circuit design and simulation techniques.

PUBLICATIONS

JOURNALS

J1. Learning Modular Language-Conditioned Robot Policies through Attention, *Autonomous Robots Journal, 2023*
Y. Zhou, **S. Sonawani**, M Phielipp, et al.

CONFERENCE PAPERS

C10. SiSCo: Signal Synthesis for Effective Human-Robot Communication via Large Language Models, *IROS, 2024*
S. Sonawani, F. Weigend and H. B. Amor

C9. Diff-Control: A Stateful Diffusion-based Policy for Imitation Learning, *IROS, 2024*
X. Liu, Y. Zhou, F. Weigend, **S. Sonawani**, et al.

C8. iRoCo: Intuitive Robot Control from Anywhere using a Smartwatch, *ICRA, 2024*
F. Weigend, X. Liu, **S. Sonawani**, et al.

C7. Open X-Embodiment: Robotic Learning Datasets and RT-X Models, *ICRA, 2024*
Quan Vuong, ..., **S. Sonawani**, et al.

C6. Projecting Robot Intentions Through Visual Cues: Static vs. Dynamic Signaling, *IROS, 2023*
S. Sonawani, Y. Zhou and H. B. Amor

C5. Anytime, Anywhere: Human Arm Pose from Smartwatch Data for Ubiquitous Robot Control and Teleoperation, *IROS, 2023*
F. Weigend, **S. Sonawani**, M. Drolet, H. B. Amor
(Best Robocup Paper Award Finalist)

C4. Modularity through Attention: Efficient Training and Transfer of Language-Conditioned Policies for Robot Manipulation, *CoRL, 2022*
Y. Zhou, **S. Sonawani**, et al.

C3. Assistive Relative Pose Estimation for On-orbit Assembly using Convolutional Neural Networks, *AIAA, 2020*
S. Sonawani, R. Alimo, R. Detry, et al.

C2. Modeling, Design, and Control of Low-cost Differential-drive Robotic Ground Vehicles: Part I—Single Vehicle Study, *CCTA, 2017*
A. Rodriguez, K. Puttannaiah, ..., **S. Sonawani**, et al.

C1. Modeling, Design, and Control of Low-cost Differential-drive Robotic Ground Vehicles: Part II—Multiple Vehicle Study, *CCTA, 2017*
A. Rodriguez, K. Puttannaiah, ..., **S. Sonawani**, et al.

WORKSHOP PAPERS

W6. IMMRSY: Immersive Mixed Reality System for Bidirectional Human Robot Interaction, *IROS 2023, XR-ROB Workshop*
S. Sonawani, Y. Zhou and H. B. Amor

W5. Comparing Static and Dynamic Signals for Effective Human-Robot Collaboration, *IROS 2023, XR-ROB Workshop* (**Best Poster Award**)
S. Sonawani, Y. Zhou and H. B. Amor

W4. Imitation Learning based Auto-Correction of Extrinsic Parameters for A Mixed-Reality Setup, *IROS 2022, XR-ROB Workshop*
S. Sonawani, Y. Zhou and H. B. Amor

W3. When and Where Are You Going? A Mixed-Reality Framework for Human Robot Collaboration, *VAM-HRI 2022*
S. Sonawani and H. B. Amor

W2. Multimodal Data Fusion for Power-On-and-Go Robotic Systems in Retail, *RSS 2020, Power On and Go Workshop*
S. Sonawani, K. Maneparambil and H. B. Amor

W1. Robotic In-Space Assembly with Arm-Augmented Cubesats, *ICRA 2020, Opportunities and Challenges in Space Robotics Workshop* (**Best Poster Award**)
S. Sonawani, S. Kailas, R. Detry, et al.

ACADEMIC SERVICES

- Reviewer for ICRA 2024 Workshop Proposal
- Reviewer for IROS 2022 Conference Paper
- Student Organizer for ICRA 2021 workshop on Curiosity in Robots

AWARDS AND HONORS

- Best Robocup Paper Award Finalist at IROS 2023
- Best Poster Award at IROS 2023, 2nd workshop on Horizon of An Extended Robotics Reality
- Best Poster Award at ICRA 2020, Workshop on Opportunities and Challenges in Space Robotics
- Keen Research Grant