# Pawan Wadhwani

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## Education

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|---|---|
| Jun 2018 - May 2022 | **SRM Institute of Science and Technology**, Chennai, TN, India<br>*Bachelor of Technology* in Computer Science with spec. in AI and ML     **CGPA: 9.66/10.0**<br>*Minor* in Robotics |

## Research Experience

**Feb 2024 - Present**

**Robotics Research Center**, IIIT Hyderabad, TG, India
*Research Associate*
- Developed GPD (Guided Polynomial Diffusion), enhancing motion planners by learning priors over Bernstein polynomial coefficients
  – *Links:* Project ↗ [5], Demo ↗ [6]
- Developing novel techniques to improve robustness of Imitation Learning algorithms against environmental perturbations without relying on data augmentation

*System Administrator*
- Managing seven high-performance GPU servers (RTX3090/A6000) and research workstations
- Maintaining network infrastructure, server configurations, user access, and backup systems for 30+ lab members

**Aug 2020 - Dec 2020**

**Samsung R&D Institute**, Bangalore, KA, India (REMOTE)
*Research Intern,* Samsung PRISM Program
- Analyzed and benchmarked adversarial attacks (FGSM, PGD, C&W) against state-of-the-art defense methods on CIFAR-10 and Open Image datasets
- Implemented and evaluated defense strategies across ResNet and VGG architectures

## Professional Experience

**Jan 2022 - Jan 2024**

**Cradlepoint (Part of Ericsson)**, Bangalore, KA, India (REMOTE)
*Software Development Engineer*
- Contributed to Linux kernel upgrade (4.4 to 5.4), focusing on driver compatibility and performance optimization
- Resolved critical firmware upgrade issues in NCM (NetCloud Manager), enhancing system upgrade reliability
*Software Development Engineer Intern*
- Led development of LLDP-based power negotiation system for Cradlepoint routers, implementing IEEE 802.3bt standards to support high-power PoE devices
- Enhanced IP Passthrough system performance through systematic benchmarking and optimization

**May 2023 - Present**

**Google Summer of Code - JdeRobot** (REMOTE)
*Mentor (GSoC 2024)*
- Mentored BT-Studio project development for visual programming of robot behaviors using behavior trees
- Guided migration of Robotics Academy exercises from Gazebo11 to Gazebo Harmonic and ROS2
*Open Source Contributor (GSoC 2023)*
- Led migration of Robotics Academy docker image (RADI) from ROS Noetic to ROS2 Humble for enhanced longevity
- Successfully transitioned drone exercises to ROS2 utilizing the Aerostack2 framework
- Optimized Docker image size and explored hardware acceleration for improved performance
- *Links:* Project ↗ [7], Report ↗ [8], Demo ↗ [9]

**Aug 2020 - Mar 2021**

**Green Quest Solutions**, PTE LTD, Singapore
*ROS Developer*
- Contributed to the design and manufacturing of a 3-degree-of-freedom delta robotic arm
- Integrated YOLO v4 model for real-time waste classification, achieving 3-second cycle time per object
- Developed complete automation pipeline integrating robotic arm control, 3D vision system, and conveyor system
- *Links:* Demo ↗ [10]

## Technical Leadership

Jul 2018 -
May 2022

**Team RUDRA - SRM Mars Rover**, Chennai, TN, India
*Systems Developer and **Technical Director (2021-22)***
- Spearheaded migration from socket programming to ROS Melodic, enhancing system reliability and modularity
- Led transition from Arduino to STM32 microcontrollers for improved real-time control and industrial robustness
- Developed full-stack solution integrating 6-DOF robotic arm control and autonomous navigation (1 km range)
- *Links:* Demo [↗] [11]

## Technical Projects

2022

**Zutu: Swarm Robots Platform**, SRM Institute of Science and Technology, Chennai, TN, India
- Developed low-cost, modular platform for swarm robot research using ESP32 and ROS Melodic
- Implemented novel monocular camera-based localization technique for swarm coordination
- Validated system resilience to visual obstructions in CoppeliaSim simulation environment
- *Links:* Demo [↗] [12]

## Publications

1. Srikanth, A., Mahajan, P., Saha, K., Mandadi, V., Paul, P., **Wadhwani, P.**, Bhowmick, B., Singh, A. & Krishna, M. (2025). GPD: Guided Polynomial Diffusion for Motion Planning. *International Conference on Robotics and Automation*. *(Under Review)*.

2. García-Pérez, L., Roldán, D., Cervera, E., **Wadhwani, P.** & Cañas, J. M. (2024). Improving Usability of a Web-Based Platform for Teaching Robotics Engineering. *Robotics in Education*. DOI: `10.1007/978-3-031-67059-6_28` [↗] [13].

3. Prateek, **Wadhwani, P.**, Kumar Pathak, R., Bhosale, M. & Victoria, A. H. (2022). Zutu: A Platform for Localization and Navigation of Swarm Robots Using Virtual Grids. *International Conference on Robotics and Automation Engineering*. DOI: `10.1109/ICRAE56463.2022.10056169` [↗] [14].

## Patents

- **Smart Watch for COVID-19 Detection** (Team of 6)
  Patent App. No: 202021032594, Filed: July 2020
  – Designed smart watch for industrial health monitoring using proprietary algorithm

- **Social Distancing Pendant** (Team of 6)
  Patent App. No: 202021032595, Filed: July 2020
  – Developed Bluetooth-enabled distance calculation system using RSSI values

## Honors & Achievements

- Three-time recipient of SRM Academic Excellence Scholarship
- Technology Infusion Grand Challenge Asia: People's Choice award and a grant of $500
- International Rover Challenge 2020: Asia Rank 1 and World Rank 3 (Team RUDRA, awarded $300)
- University Rover Challenge 2019: Asia Rank 2 and World Rank 11 (Team RUDRA)
- International Robotics Competition:
  – Led 4-member team to International Championship victory in Beijing, China (2017)
  – Won National Championship with team and qualified for International Finals in Beijing (2016)

## Technical Skills

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|---|---|
| **Programming:** | C/C++, Python, Lua, Bash/shell, CMake |
| **Development Tools:** | Docker, Jira, Vim, Jenkins, Git, LaTeX, Qemu, GDB |
| **Robotics Stack:** | ROS/ROS2, Robocomp, Aerostack2, Rviz, Gazebo, CoppeliaSim, PX4, ArduPilot, MoveIt, BehaviourTrees |
| **AI/ML Frameworks:** | TensorFlow, PyTorch, Darknet, NumPy, OpenCV, YOLO |
| **Embedded Systems:** | Linux Kernel Development, STM32, ESP32, Jetson TX2/Nano, Arduino, Communication Protocols (I2C, SPI, UART, CAN, TCP/IP, UDP, LLDP) |

## Links & Resources

[1] Email: pawanw17@gmail.com
[2] LinkedIn: https://www.linkedin.com/in/pawan-wadhwani/
[3] GitHub: https://github.com/pawanw17
[4] Website: https://pawanw17.github.io
[5] GPD Project: https://guided-polynomial-diffusion.github.io/
[6] GPD Demo: https://youtu.be/ATf4-c40dwY
[7] GSoC 2023 Project: https://summerofcode.withgoogle.com/programs/2023/projects/4YgccDJg
[8] GSoC Report: https://bit.ly/GSoC-Report-Pawan-Wadhwani
[9] GSoC Demo: https://youtu.be/O8atiuEamp4
[10] Green Quest Demo: https://youtu.be/AU81uavVSzE
[11] Team RUDRA Demo: https://youtu.be/2gt8fW8TD7c
[12] Zutu Demo: https://youtu.be/ESO9nx7IlDA
[13] RiE Paper DOI: https://doi.org/10.1007/978-3-031-67059-6_28
[14] ICRAE Paper DOI: https://doi.org/10.1109/ICRAE56463.2022.10056169