Priyam Panchal

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EDUCATION

Carleton University, *Master of Electrical and Computer Engineering* Sep 2022 – Dec 2023 | Ottawa, Canada
- Related Coursework: Robotic Surgery (ELG7113), Mobile Robotics (ELG 5228), RFIC Design (ELEC5503)
- Related projects: Python Sight-to-Sound Application for accessibility, Smart Autoinjector for Mantoux Test, ROS packages for Husky and Turtlebot3 simulation in Gazebo, Load Forecasting using Machine Learning Methods for city of Ottawa, RF Communication SoC in TSMC 65nm process.

Gujarat Technological University, Aug 2017 – May 2021 | Ahmedabad, India
Bachelor of Electronics and Computer Engineering (CGPA: 9.2/10)

TECHNICAL EXPERTISE

Embedded Software Development
C++, Python, Linux CLI, Docker

Sensor Stack
Intel Realsense (RGBD), Lidar, MPU6050 IMU

Web Development
HTML, CSS, Python | Figma, Illustrator

Research and Simulation
MATLAB, Latex

Creative
Unreal Engine, Blender, Keyshot, Illustrator, Photoshop

Robotics Development
ROS1, ROS2, Gazebo, Python, C++, KUKA Sunrise OS, ABB Robot Studio

Microcontroller and SBCs
Nvidia Jetson, Arduino, Raspberry Pi, OctoPi, ARMv5 (Keil)

Computer Vision
VISP, ORBSLAM, YOLO, OpenCV

Electromechanical
Additive Manufacturing, Engineering Design and Analyses (Fusion 360)

PROFESSIONAL EXPERIENCE

Robotics Research Assistant, *Autonomous Space Robotics and Mechatronics (ASRoM) Laboratory, Carleton University* Apr 2023 – present | Ottawa, Canada

Robotics Development
- Created simulation environment for spacecraft-mounted 7DOF manipulator using ROS Gazebo simulation environment.
- Implemented real-time Lie-group-based dynamic controller using Python to control 7DOF Kuka robotic arms over Ethernet connection in real-time using Python and C++ ROS nodes and using KUKA FRI Real-time torque control interface.
- Conducted weekly knowledge exchange sessions with the research and development team for smooth collaboration.

Computer Vision
- Developed distributed localization algorithm using Matlab & Python and implemented on a swarm of 3 mobile platforms on a ROS2 network using OpenCV on Nvidia Jetson board.
- Implemented Intel Realsense LiDAR pointcloud streaming and processing algorithm for landmark tracking using Python.

Networking and Embedded
- Developed embedded software using C++ and Python to establish wireless communication for sensor data between ROS Master system and Embedded Linux system running on NVIDIA Jetson board.
- Performing packet inspection using Wireshark to troubleshoot ethernet connection and monitor network performance.
- Networking a swarm of 3 independent rovers and 1 quadruped together to a central control PC via ROS for experimentation and R&D.

Mentoring and Leadership
- Mentored and managed undergraduate research students at the lab, delegated tasks and provided support and feedback.

Engineering Intern, *Boson Machines 3D Printing* Oct 2020 – Mar 2021 | Mumbai, India

Embedded Development
- Created a touch-friendly operating system with File browser, Calibration, Print Progress etc. features for 3D printer using Python and Qt.
- Created firmware configuration files and proprietary plugins for Core-XY FDM 3D printers using C++ and Marlin framework
- Performing networking setup of 3D printers with local network to enable remote control over ethernet using OctoPrint.
- AI-enabled failure detection using Raspberry Pi camera using OpenCV and Python.

Mechatronics
- Designed and built a custom FDM 3D printer from scratch using Fusion 360 (CAD), C++ and Python (Firmware and Raspberry Pi scripts).

Technical Support Agent, *Geek Squad - Best Buy Canada* May 2023 – present | Ottawa, Canada
- Troubleshooting and maintenance of Windows, macOS and Linux systems using internal company tools and OS command-line tools.
- Maintaining team virtual environments and ensuring company communication SOPs are followed.
- Monitoring performance metrics and conducting weekly communication sessions with the team for discussing solutions.
- Providing excellent customer service consistently.

Graduate Teaching Assistant, *Department of Electronics, Carleton University* Sep 2022 – May 2023 | Ottawa, Canada
- Conducting Digital Circuits and Verilog labs, creating instructional material and training students in FPGAs and digital electronics.
- Mentoring and training students in laboratory sessions and assisting them in interfacing laboratory hardware such as microcontroller boards and logic trainers with lab PCs to flash embedded C code onto them.
- Setting up remote desktops and virtualisation environments for remote lab access off-campus, and setting up rules for time-bound restricted access for lab sessions.

PROJECTS

3D Printable Quadruped Platform Mar 2022 – Aug 2022
- Designed a cost-effective, user-friendly platform for a quadruped robot using Fusion 360 to reduce the cost barrier associated with working with such platforms.
- Developed an embedded C++ package for controlling servos with Arduino and defining various gait patterns for quadruped from scratch.

Automation of FDM 3D printers for batch manufacturing Oct 2020 – Mar 2021
- Developed an add-in consisting of firmware plugin using embedded C++ and software script using Python to automate generation of Gcode for 3D printer.
- Designed and assembled a electromechanical modification enabling uninterrupted printing on conventional 3D printer by automating bed-cleaning, and nozzle cleaning procedure.
- Implemented print monitoring using raspberry pi and camera to detect print failures using AI model.
- Achieved 90% reduction in downtime, doubling time efficiency of 3D printers.

FDM 3D Printer Mar 2019 – Nov 2019
- Designed and manufactured a CoreXY FDM 3D Printer from scratch, from CAD design, BoM, parts sourcing, frame assembly, controller selection, firmware (C++, Marlin), wiring actuators, heaters and switches, soldering and crimping connectors, and internet-enabled control and AI-enabled failure detection webcam monitoring with Raspberry Pi (Octopi, Python, OpenCV).

65nm RF SoC Design in Cadence (Course Project) Jan 2023 – May 2023
- Designed and simulated a 65nm RF SoC, consisting of LNA, Mixer, PA and VCO, designed to operate at 12GHz.
- Designed layout of the SoC using TSMC 65nm process keeping with good layout design guidelines.

Machine Learning Based Load Prediction Using LSTM, GRU, CNN1d Sep 2022 – Dec 2022
- Implemented three methods for Load Forecasting, namely Long Short-term Memory (LSTM), Gated Recurrent Unit (GRU), and Convolutional Neural Network (CNN) as coursework for graduate course ELEC5200 Advanced Methods in ICs.

Research Project: Evaluating SLAM methods for Legged Robots Sep 2022 – Dec 2022
- Conducted extensive literature review on state-of-art SLAM methods used in the industry and prepared a detailed report in IEEE style, evaluating two such methods.
- Prepared a detailed presentation on the same report, with a focus on highlighting the problems in SLAM in an easily digestible manner.

VOLUNTEERING

Ottawa Robotics Competition, *Techincal Executive* Aug 2023 – present | Ottawa, Ontario
- Creating rules and procedures for the competition, and guiding on technical decisions related to the hardware kits and components to be made available to the teams in the competition.

IEEE YP Ottawa, *Social Media Officer* Apr 2023 – present | Ottawa, Canada
- Creating social media content using Illustrator and Figma and planning events and conferences, and managing social media strategies for the organization.

AFS International, *Volunteer Trainer* Aug 2018 – Sep 2022 | Delhi, India
- Served as a volunteer trainer and conducted workshops, seminars, and training sessions with AFS, which works towards peace through greater cultural understanding and global citizenship.

AIESEC, *Corporate Relations Team Member* Sep 2021 – Mar 2022 | Ahmedabad, India
- Created well-researched pitches and onboarded 2 major international corporate clients onto the organisation's programs