Akshat Pandey

akshatpandeyplus41@gmail.com • linkedin.com/in/pandeyaks • github.com/akshatowl • http://www.akshatpandey.net

EDUCATION

Texas A&M University — *Master of Science in Computer Engineering* *College Station, Texas | Aug 2023 - May 2025*

• GPA: 3.89 / 4.0 | Coursework: Deep Reinforcement Learning, Software Engineering, Distributed Systems, Machine Learning

TECHNICAL SKILLS

Programming: C++ (C++17/20), C#, Python, Java, MATLAB

Software Stacks: ROS, ROS-2, Ardupilot, OpenCV, OpenAI, PyTorch, React

Databases: PostgreSQL, SQL

Tooling: Clang-LLVM, perf, PVS, Linux, Bash, Git, Docker, Kubernetes, CMake, Multithreading

Hardware Embedded: NVIDIA Jetson, Raspberry Pi, Pixhawk, UART, SPI, I2C, CAN

EXPERIENCE

Applied Materials — *Software Engineer* *Sunnyvale, California | July 2025 - Present*

• Working on real-time control systems algorithms and infrastructure for Opta CMP and Endura PVD in C++.

• Optimized a multi-product configuration parsing mechanism deployed across 100+ semiconductor manufacturing tools, reducing average lookup parsing latency from 250ms to 40ms (~84% speedup).

• Designed and led a real-time throughput simulation framework on a deterministic RTOS to model chamber scheduling and wafer processing pipelines for semiconductor manufacturing systems.

• Implemented a lock-free dynamic resource arbitration mechanism using a thread-safe queuing system to safely coordinate shared hardware subsystems under concurrent control flows using C++20.

• Designed a trapezoidal speed motion profile for an R-R robotic arm in simulation, replicating real kinematic behavior to enable fully hardware-independent validation of motion control algorithms.

• Built and deployed an interactive C# Hardware-in-the-Loop (HIL) simulation GUI, subscribing to C++ telemetry and state variables to visualize live robot kinematics.

Applied Materials — *Software Engineering Intern* *Sunnyvale, California | May 2024 - Aug 2024*

• Developed the real-time control flow of a multi-setpoint generator for Endura PVD in C++20.

• Optimized the system architecture to reduce the size of compiled binaries by 25% for x32 and x64 architectures.

• Integrated hardware IOs via XML config files with a Pub-Sub architecture in C++, reducing IO latency by 95%.

Analog Devices — *Software Engineering Intern* *Bengaluru, India | Jan 2023 - May 2023*

• Implemented a streaming node for a ToF sensor on NVIDIA Jetson using ROS-2 Humble and OpenCV C++, reducing the latency by 66.7%.

• Deployed obstacle detection in Gazebo with a skid-steer robot and ToF sensor data using ROS and C++.

• Adapted robotic arms for robust pick-and-place algorithms using MoveIt! framework and Gazebo.

Mechatronic and Robotic Systems Lab, Ontario Tech University — *Research Intern* *Oshawa, Canada | May 2022 - Jul 2022*

• Worked on an autonomous wheelchair for children with physical disabilities as part of the MITACS Fellowship.

• Integrated slope detection using OpenCV and Intel D435i depth-cameras in ROS with 98% accuracy.

• Implemented collision-free navigation with RRT* and a PD controller as the local planner on Gazebo and a Raspberry Pi-4 Turtlebot3 prototype.

AEREO — *Embedded Software Intern* *Bengaluru, India | Aug 2021 - Nov 2021*

• Engineered an end-to-end SITL simulation framework in ROS Noetic and Gazebo to test autonomous drone path planning algorithms for terrestrial mapping, integrating MavROS and MissionPlanner on the Ardupilot flight stack.

PROJECTS & TECHNICAL CONTRIBUTIONS

Memory Optimization in Newton Raphson Power Flow (https://github.com/PowerGridModel/power-grid-model/pull/1433)

• Optimized sparse factorization for Newton-Raphson Power Flow in the Power Grid Model C++ library by localizing the Jacobian matrix to L3 cache, reducing cache misses by 0.8% and eliminating per-solver-instance working set overhead, removing transient peak memory growth entirely.

Neural Architecture Search using Reinforcement Learning (https://github.com/akshatowl/GraphNAS)

• Built an RL-driven neural architecture search pipeline (TRPO and PPO training a recurrent controller) to automatically design GNN architectures for the CiteSeer dataset, matching the original hand-designed method's 73.6% mean validation accuracy without manual tuning.

Autonomous Drone & Driverless Control Systems (Project MANAS) (https://github.com/Project-MANAS)

• Engineered control systems and sensor integration (ROS, CAN Bus, PX4, and Ardupilot) for autonomous ground and aerial vehicles competing in the AUVSI SUAS international robotics challenge.