# Akshun Kalra

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## Education

**Carleton University** Ottawa, ON
*Bachelor of Engineering in Software Engineering* *Sep. 2021 – May 2026*

## Experience

**Application Developer** January 2024 – December 2024
*National Research Council Canada* *Ottawa,ON*

- Develooped a Python-based orchestration system using Tkinter and subprocess to manage the lifecycle and automated execution of modular experimental tasks.
- Built a configurable survey engine that dynamically generates complex UI components from .ini files, including custom image-based data collection tools for human factors research.
- Designed high-fidelity cognitive tasks using Pygame, achieving millisecond-level accuracy with integrated support for both keyboard and hardware controller inputs.
- Engineered real-time statistical pipelines to process experimental data, calculating performance metrics such as standard deviation, reaction-time lapses, and percentile based rankings.
- Authored detailed user manuals and technical documentation, facilitating ease of use for both technical and non-technical users.

## Projects

**Perk Manager** | *Java, SpringBoot, HTMX, Azure*

- Built full-stack Spring Boot web application with RESTful APIs, JPA/Hibernate ORM, Spring Security authentication, and Thymeleaf templating for managing membership perks across 10+ reward programs
- Implemented CI/CD pipeline using GitHub Actions for automated testing and deployment to Azure Web Services, enabling continuous integration with pull request workflows and automated build verification
- Developed dynamic user interface with HTMX for real-time search/filtering and voting functionality, eliminating full page reloads and improving user experience with seamless partial updates
- Achieved proper test coverage across 15+ JUnit test classes using Mockito framework, validating business logic for authentication, CRUD operations, and voting system with comprehensive unit testing

**Firefighting Drone Swarm** | *Java, UDP Sockets, Multithreading, Swing*

- Designed and implemented a distributed firefighting drone simulation in Java, composed of multiple concurrent subsystems communicating via UDP sockets and custom message protocols.
- Built an event-driven, client–server architecture with acknowledgment and timeout handling to ensure reliable inter-subsystem communication.
- Implemented multithreading, scheduling, and fault-injection mechanisms to coordinate drones and test system robustness under failure conditions.
- Developed a real-time Java Swing visualization and used UML modeling to guide system design and integration.

**CIFAR-10 Object Recognition AI** | *Python, TensorFlow, CNNs, NumPy/Matplotlib*

- Designed and trained a convolutional neural network (CNN) for object classification on the CIFAR-10 dataset, achieving 87% test accuracy.
- Implemented data preprocessing, normalization, and augmentation to improve model robustness.
- Optimized CNN architecture and hyperparameters to enhance classification performance.
- Used NumPy and Matplotlib for data handling, analysis, and performance visualization.

## Technical Skills

**Languages**: Java, Python, C/C++, C#, Go, SQL, JavaScript, HTML/CSS
**Frameworks**:Flask, React, Node.js, JUnit, Swing, Tkinter, SpringBoot, TensorFlow
**Developer Tools**:Git, Jira, PostgreSQL, Docker, kubernetes, Maven, AWS, Azure
**Libraries**:Pandas, Numpy, Matplotlib, Seaborn, Scipy