# Ankit Khandelwal

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## EDUCATION

**CARNEGIE MELLON UNIVERSITY, B.S. + M.S.**
Electrical/Computer Eng.
Graduation: May 2025
GPA: 3.54/4.0

**THOMAS JEFFERSON HS FOR SCI/TECH**
GPA: 4.47/4.0
SAT: 1600

## COURSEWORK

**COLLEGE**
- Deep Learning (CS 11785)
- Computer Vision (ROBO 16785)
- Machine Learning (CS 10301)
- Parallel Comp. Prog. (CS 15418)
- Intro. Control Theory (ECE 18340)
- Embedded Software (ECE 18349)
- Digital Systems (ECE 18240)
- Signals & Systems (ECE 18290)
- Functional Prog. (CS 15210)
- Data Struct. + Algs (CS 15122)
- Linear Algebra (MATH 21254)
- Prob Theory (MATH 36219)
- Discrete Math (MATH 21127)

**HIGH SCHOOL**
AI • Robotics • Analog/Digital Electronics • Multivar Calc
Quantum Physics • AP CS

## SKILLS

**PROGRAMMING**
C/C++ - (4 Years)
Python - (4 Years)
PyTorch - (2 Years)
ROS1/ROS2 - (2 Years)
MatLab/SimuLink - (2 Years)
CUDA, TensorRT - (1 Year)
NumPy • SciPy • OpenCV
Eigen • PCL • Open3D • ONNX
SQL • Parquet • Protobuf
Linux (Ubuntu, Debian) • Docker
TensorFlow • TensorBoard • Keras
ArduPilot • BetaFlight
Bazel • CMake • Colcon

**ROBOTICS**
Arduino/Teensy - (5 Years)
Raspberry Pi - (4 Years)
Nvidia Jetson (Orin, Tx2) - (3 Years)
Fusion360 (CAD) - (3 Years)
Eagle, KiCAD (PCB Design) - (1 Year)
Embedded SW • I2C • Serial

## EXPERIENCE

### APPLIED INTUITION | Aug 2025 - Present

L4 Trucking, Perception Engineer - Offboard ML + Data
- Diagnosing modality collapse in DETR-style early-fusion camera–LiDAR model. Analyzing query birth, backbone support, per-modality gradients, aux. supervision
- Building agentic curation for long-tail mining from >10k drive hours (lidar + camera)
- Built visualization suite to introspect query birth + per-sensor support in fusion head

L4 Trucking, Perception Engineer - Onboard Execution
- Sole owner of onboard detection + segmentation, spanning preprocessing, inference
- Designed zero-copy GPU memory transport to pass device pointers across CPU processes, eliminating redundant D2H/H2D copies, accelerating stack by 37%
- Implemented performant CUDA kernels for point cloud motion-comp. + voxelization
- Built sensor-sync + TensorRT framework for 10 Hz inference on production trucks

### CARNEGIE MELLON RACING - DRIVERLESS | Sep 2021 - Jun 2024

VP of Driverless - Project Lead (Jun 2023 - Jun 2024)
- Led team of 30 students to develop autonomous racecar capable of racing at 40mph
- Pioneered inaugural Formula Student Driverless competition in North America
- Optimized LiDAR ground filtering + DBSCAN clustering for 120k points at 10Hz
- Led teamwide transition to C++/ROS2, improving full-stack runtime by 250%

Perception Captain (Sep 2021 - Jun 2023)
- Trained YOLOv8 cone-detection model to 0.92 mAP@0.5 through augmented dataset (gaussian blur, color jitter) + grid-search hyperparameter optimization
- Developed motion-comp., point-to-pixel mapping for lidar coloring via camera images

### VIAM ROBOTICS | Motion Planning Intern, May 2024 - August 2024
- Developed custom, time-optimal trajectory planner for 6-DOF robotic arm, capable of respecting joint velocity, acceleration constraints to produce smooth motion
- Implemented importance sampling to improve RRT smoothing runtime by 65%

### RIVIAN | Self-Driving Intern, May 2023 - Aug 2023
- Developed C++ camera provisioning and auth utility, cutting costs by $200k/yr
- Architected custom encryption + I2C comm functions to interface w/ cameras

### SPACEX | Starship Software Intern, May 2022 - Aug 2022
- Architected automated testing of PCBs, increasing daily testing output by 1000%
- Designed visualization tools to scrape 75+ test reports and graph 1000+ datapoints

## PERSONAL PROJECTS

### MULTI-CAMERA MOTION CAPTURE SYSTEM | May 2025 - July 2025
- Retrofitted PS3Eye cams w/ IR filters for 0.5mm-accurate 3D tracking in basement
- Implemented DLT + Bundle Adjustment for sub-pixel reconstruction error (< 0.7px)
- Recovered intrinsics + distort. params w/ OpenCV Zhang's (checkerboard detection)

### DIY QUADCOPTER | May 2025 – July 2025
- Built custom quad w/ 3D-printed frame + Arduino Teensy running C++ flight SW
- Fused MPU6050 gyro/accel via complementary filter, achieving angle error < 1.2°
- Implemented 3-axis rate/PID controller, hand-tuned for stable hover @ 250Hz

### VERTICAL TAKEOFF & LANDING ROCKET | Aug 2020 – Sep 2021
- Developed propeller-powered rocket to reach apogee of 3m and autonomously land
- Modeled vehicle dynamics and auto-tuning PID control in MATLAB & SimuLink