# Harrison Bounds

github.com/HarrisonBounds | harrisonbounds2025@u.northwestern.edu | linkedin.com/in/harrison-bounds
**PORTFOLIO:** harrisonbounds.github.io

## Education

**Northwestern University** **Sep. 2024-Present**
*M.S. in Robotics (Expected Dec. 2025)* *Chicago, IL*

**University of Central Arkansas** **Aug. 2020-Dec 2023**
*Bachelor of Science in Computer Science* *Conway, AR*

## Skills

**Programming Languages**: C++, Python, C, Java, SQL, LaTeX, Node.js
**Software**: ROS/ROS2, Gazebo, Linux, PyTorch, OpenCV, Git, Bash, CoppeliaSim, Unit testing
**Hardware**: Raspberry Pi, Arduino, NVIDIA Jetson, Soldering, 3d-printing

## Experience

**Clustering Algorithm Research** | *Research Assistant* | *University of Central Arkansas* **Jun 2023-May 2024**
- Collaborated with a research team to publish a comparative study on the Jancey K-Means algorithm in C++
- Built an Online K-Means algorithm from scratch using C

**Machine Learning and Text-Based GANs** | *Research Assistant* | *University of Central Arkansas* **Sep 2023-May 2024**
- Classified malware anomalies using random forest models
- Produced a synthetic dataset with text-based Generative Adversarial Networks

**Windstream Communications** | *Software Engineer Intern* | *Little Rock, AR* **May 2022-Dec 2022**
- Developed enterprise-level chatbots using BotPress and Python
- Designed and deployed APIs and microservices following Domain Driven Design principles
- Performed continuous integration/deployment pipeline integration, pull requests, and user acceptance testing

**UCA Makerspace** | *Ambassador Maker* | *Conway, AR* **Jun 2021 – May 2022**
- Prototyped robotics projects for engineers with Python, 3D Printing, and AutoCAD

## Publications

- **Harrison Bounds**, M. Emre Celebi, Jordan Maxwell, Color quantization using an accelerated Jancey k-means clustering algorithm, J. Electron. Imaging 33(5), 053052 (2024)

## Projects

**Doodle Droid** | *ROS 2, Image Processing, Computer Vision* **Nov 2024**
- Detected and processed an image using OpenCV for a 7-DoF arm to draw a live portrait
- Calibrated the arm using April tags to move to the correct z height
- Used ROS 2 and the Move It API to create a motion planner, including a cartesian path to execute trajectories

**Autonomous RC Car** | *Convolutional Neural Networks, Behavioral Cloning, Imitation Learning* **Jan 2023**
- Led the development of an open-source autonomous RC car project using a Raspberry Pi, and custom hardware
- Created a custom Convolutional Neural Network that predicts the steering and throttle based on an input image
- Constructed a controller mapping using PyGame to control the RC car
- Set up the electronics using a Raspberry Pi, motor driver, servo controller, voltage regulator, and on-board power source

**Sketch Prediciton** | *Python, Deep Learning, PyTorch, Convolutional Neural Networks* **Jun 2023**
- Created a Neural Network that recognized a sketch that belonged to 1 of 250 categories
- Produce user sketches using a gui interface as input to the model

**Mobile Manipulation Simulation** | *Motion Planning, PI Control, Controls* **Dec 2024**
- Implemented PI Control, and generated trajectories to have a YouBot retriecve and object and bring it to a goal

**Robot Pen Grabber** | *Computer Vision, Manipulation* **Sep 2024**
- Engineered a solution for robotic manipulation by programming a 4-DoF arm to detect and retrieve objects
- Detected a pen using computer vision with OpenCV

**NotesAI** | *API, Large Language Models, Python* **Sep 2024**
- Programmed an application to record audio, transcribe it, and summarize it into a notes format
- Interfaced with the Llama api, leveraging the power of a large language model