

Patrick Halim

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EDUCATION

University of Michigan | B.S. COMPUTER SCIENCE

Ann Arbor, MI | May 2025

- **GPA:** 4.0/4.0
- **Coursework:** Data Structures and Algorithms, Machine Learning, Foundations of Computer Science, Discrete Mathematics, Computer Organization, Linear Algebra, Computer Science Pragmatics
- **Instructional Aide** for EECS 498 (XR Development Capstone)

EXPERIENCE

BOSCH | SOFTWARE ENGINEER INTERN

Plymouth, MI | May 2022 - Aug 2022, May 2023 - Present

- Built a **WebSocket** gateway to achieve real-time car sensor visualizations from ECU to Python server, now used by autonomous parking teams in Bosch NA and Germany; leveraged **C++**, **Python**, **Conan**, **Docker**, **Bash**, and **CMake**.
- Developed a sleek and efficient automation GUI to flash SW to Bosch microcontrollers, resulting in 4x increased vehicle testing capacity; utilized **Python**, **Tkinter**, **Bash**, and microcontroller-specific CLI.
- Investigated and tested 6 years' worth of SW binaries utilizing a Bosch debugging IDE, CAN bus simulator, and hex viewer to uncover cybersecurity module incompatibilities that caused microcontroller flashing errors.
- Initiated a team-wide project to overhaul the onboarding process, resulting in 3 new onboarding guides.

NASA, CLAWS-UM | PRESIDENT, SOFTWARE DEVELOPMENT LEAD

Ann Arbor, MI | Sept 2021 - Present

- Led a 60-member development team selected by NASA to develop 2 complete **augmented reality** projects for astronaut exploration, using a scrum-of-scrums workflow to manage 5 cross-functional teams ([video](#), [video](#)).
- Designed, developed, and tested 15 unique AR screens for lunar pathfinding, mission task list, vitals tracking, emergency rescue, and astronaut messaging with **Unity Engine (C#)** and **Microsoft MRTK**.
- Pioneered a complete-system **state machine** utilizing a **publisher-subscriber** event system to enable context-aware voice command processing for over 70 voice commands and to support smoother and more efficient UI navigation.
- Built foundational **back-end** SW to support 16 AR developers by designing the software architecture, creating a clear back-end interface with singleton pattern, and establishing telemetry stream connectivity via WebSockets.

PROJECTS

EXERCISE MOBILE APP 

C#, UNITY ENGINE, AR FOUNDATION, GITHUB, BLENDER, SHOGUN

- A polished **Android/iOS** app to teach proper exercise form via **augmented reality** and **3D motion capture**. Created by 5 developers in 4 weeks and presented at the XR at Michigan Summit.
- Personally implemented whole app UI, exercise database back end, persistent user data storage, favorites feature, and exercise info screens.

DOG BREED ML CLASSIFIER

PYTHON, PYTORCH, NUMPY, PANDAS, JUPYTER NOTEBOOK

- A 3-layer convolutional neural network constructed with **PyTorch**, including freeze layers, data augmentation, and transfer learning to classify 6 dog breeds with 80% accuracy.

LINKEDIN FOR FOODIES 

REACT, REDUX, FIREBASE, JAVASCRIPT, HTML, TAILWIND CSS

- A stylish, mobile-responsive social media web app based on the LinkedIn UI built in 5 days. Utilized **Firebase Auth** for user authentication and a **NoSQL** database for persistent data storage of users and messages.

PIANO LEARNING APP 

PYTHON, TKINTER, PYGAME, MIDO

- A piano app based on Simply Piano to teach beginners notes and rhythm. Incorporated scrolling sheet music display, virtual piano simulation, audio feedback, song database, and midi file processing via a self-created Python library.

SKILLS

Skills: C, C++, C#, Python, Java, Bash, R, HTML/CSS, JavaScript, React, Git, Unix, Linux, WSL, Docker, Conan, Unity, Unreal Engine

Knowledge: Software Engineering, Object-Oriented Design, Project Management, UX, Agile, CI/CD, DevOps

Soft Skills: Self-Initiative, Leadership, Creativity, Curiosity, Desire to Learn

Awards: Eagle Scout, Cisco Design Competition - 1st Place, Southeast Asian Studies - Best Language Award