

# Ryan Brennan

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<https://zerotolerance225.github.io/Portfolio-Website/>

## Education

### Penn State University

Bachelor of Science in Computer Science

GPA: 3.97 | Magna Cum Laude

Harrisburg, PA

Aug. 2021 – May 2025

## Experience

### Machine Learning Intern

Department of Homeland Security

May – August 2023 & 2024

Atlantic City, NJ

- Developed ML models to enhance threat detection accuracy using CNNs and data preprocessing.
- Optimized model performance, reducing false positives in real-world deployment tests.
- Presented findings to cross-functional teams to support security decision-making.
- Debugged and refactored legacy code to streamline model training and evaluation.
- Collaborated on scalable ML pipelines for future cloud integration.

## Projects

### Edge-Based Facial Recognition System / YOLO, ResNet, FAISS, Python

April – May 2024

- Developed a facial recognition system optimized for edge deployment using YOLO for detection and ResNet for feature extraction.
- Utilized FAISS for efficient facial vector indexing, enabling scalable and fast lookup for large datasets.
- Designed automated pipelines for data preprocessing and feature extraction using Python and OpenCV.
- Reduced inference latency by optimizing image input size and model architecture, improving processing time by ~25%.

### Chemical Analyte Detection via ML / Python, Random Forest, CNNs

May – Aug 2024

- Designed ML models to classify chemical analytes from using Random Forest and CNN architectures.
- Achieved up to 92% classification accuracy through iterative model tuning and cross-validation.
- Developed preprocessing scripts to clean, normalize, and balance input data for robust model training.

### Smart License Plate Recognition App / Android, YOLO, Microsoft SQL Server

Dec 2023 – May 2025

- Developed an Android app for real-time license plate recognition using YOLO and Google ML Kit, simulating core functionality of drone-based enforcement systems.
- Designed and integrated a REST API and Microsoft SQL Server backend for real-time communication.
- Built web admin interface with full CRUD capabilities for remote permit management.
- Designed the system for future cloud-based deployment with scalability in mind.

### Three-Dimensional Autoencoder / Python, TensorFlow, TFRecords

May – August 2023

- Designed a 3D autoencoder to extract latent features from CT luggage scans for threat detection applications.
- Optimized data storage by converting large image sets into compressed TFRecord formats for efficient storage.
- Evaluated multiple neural architectures and loss functions to improve reconstruction accuracy and reduce memory overhead.

### Spring Boot Web App Bookstore / Spring Boot, Spring Data JPA, Spring Security

Nov 2022

- Developed a Spring Boot MVC web app for an online bookstore.
- Secured user authentication with Spring Security and managed data with Spring Data JPA.
- Researched potential cloud deployment strategies using AWS EC2 and RDS.

## Technical Skills

**Languages:** Python, Java, C++, C#, SQL, JavaScript, TypeScript, HTML/CSS, MIPS Assembly

**ML / Data:** TensorFlow, PyTorch, scikit-learn, Keras, OpenCV, pandas, NumPy, Matplotlib, SciPy, FAISS

**Frameworks:** Django, Flask, Spring Boot, React, Node.js, Android SDK

**Tools:** Git, GitHub, GitLab, VS Code, Visual Studio, PyCharm, IntelliJ, Jupyter, Docker, Anaconda, Terraform, AWS CLI

**Cloud / Database:** AWS (S3, EC2, SageMaker, DynamoDB, RDS), Microsoft SQL Server, Firebase, MongoDB