Ryan Brennan

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|https://zerotolerance225.github.io/Portfolio-Website/

Education

Penn State University — Harrisburg, PA
Bachelor of Science in Computer Science — *Aug. 2021 – May 2025*
GPA: 3.97 | Magna Cum Laude

Experience

Machine Learning Intern — May – August 2023 & 2024
Department of Homeland Security — *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 2024 – 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.

Three-Dimensional Autoencoder | *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