Zhan Brown

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Education

Boston University Expected May'26
Bachelor in Applied Mathematics *Boston, MA*

Experience

Mobile Engineer Intern, iOS | *Swift, Java, GraphQL, REST APIs* Jun'25 – Aug'25
Fidelity Investments *Merrimack, NH*

- Refactored legacy monolithic iOS document-rendering engine into modular **SwiftUI** components, improving code maintainability and enabling **40% faster development cycles** through declarative UI architecture
- Optimized content retrieval and rendering pipelines, achieving **70% latency reduction (300ms to 90ms)** and improving user experience across **100K+ daily active sessions**
- Implemented API migration components from **GraphQL to REST**, reducing query complexity and improving document export reliability in offline/low-bandwidth scenarios

Machine Learning Engineer, Robotics | *ROS 2, PyTorch, YOLO, PCL, Open3D* Jun'23 – May'25
80edays *- Autonomous Drone Systems Team* *Boston, MA*

- Contributed to autonomous road assessment system implementing **PyTorch**-based deep learning models and **YOLO** object detection, achieving **94% accuracy** in road defect identification across drone survey operations
- Developed **SLAM**-based reconstruction system using **PCL and Open3D** libraries, contributing to **sub-centimeter accurate 3D** road surface modeling and polygon mesh optimization for EV navigation systems
- Architected **ROS 2**-based multi-drone coordination system processing **500GB+ daily sensor streams** with **NVIDIA Jetson** edge computing, supporting **AWS** deployment across **15+ metropolitan coverage areas**

Software Developer, Backend & ML | *PyTorch, XGBoost, DQN, TensorFlow* Jan'24 – May'24
Spark! Innovation Apprenticeship *Boston, MA*

- Built **DNN-based ETA prediction service** on **100K+ samples**, reducing arrival error by **72%**
- Implemented **XGBoost** dynamic pricing engine analyzing supply-demand across 12 zones, optimizing driver utilization and rider balance
- Developed **reinforcement learning** route optimization using **DQN** trained on 20K trip records, achieving **3-minute average trip duration reduction** through traffic-aware pathfinding

Projects

NavBot - Autonomous Indoor Robot | *ROS 2, PyTorch, SLAM, Computer Vision*

- Designed **autonomous mobile robot** for indoor navigation, mapping, and object manipulation using **multi-sensor fusion** at **BU's RASTIC facility**
- Developed **multi-modal SLAM pipeline** using **ROS 2**, RGB-D cameras, and IMU sensors, achieving **sub-10cm localization accuracy** validated against motion capture ground truth system across 2,000 sq ft facility
- Implemented **YOLOv8** object detection with **MoveIt2** robotic arm control for autonomous pick-and-place operations, achieving **92% success rate** using Extended Kalman Filter sensor fusion on **TurtleBot4** platform

Muscle Intelligence - AI Fitness Coach | *TensorFlow, OpenCV, React Native, Python, JavaScript*

- Developed **computer vision**-based fitness form analyzer using **TensorFlow** pose estimation and **OpenCV**, achieving **<200ms latency and 92% accuracy** in detecting posture deviations across 15+ workout exercises
- Built **React Native** mobile application enabling users to upload workout videos for **real-time biomechanical** analysis, highlighting incorrect body positioning with visual overlays and corrective feedback
- Implemented custom pose detection pipeline processing video frames to extract **33 3D body landmarks**, comparing user movements against optimal exercise form templates using **geometric angle analysis**

Technical Skills

Languages: Python, Swift, Java, C++, JavaScript, TypeScript, Go
Machine Learning: PyTorch, TensorFlow, YOLO, OpenCV, Scikit-learn, XGBoost, NumPy, Pandas, CUDA
Frameworks and Libraries: ROS 2, React Native, SwiftUI, PCL, Open3D, MoveIt2, FastAPI, Node.js
Developer Tools: Git, AWS, Docker, PostgreSQL, PostGIS, GraphQL, Apache Kafka, TravisCI