Bardiya (Brad)

AI/ML Engineer-Researcher

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PROFESSIONAL SUMMARY

AI/ML Engineer with **6+ years** of experience in machine learning, computer vision, and generative AI, with a focus on LLM and CV applications in the medical and industrial sectors. Led AI infrastructure development, cutting manual annotation time by **85%** and data preparation time by **90%**. As Principal Researcher, authored paper on medical imaging innovation, achieving **95.50%** accuracy. Master's in Computer Science (AI Stream) endorsed by the Vector Institute.

WORK EXPERIENCE

AI/ML Engineer (Part-Time) **Jun 2025 – Present**
Optimotive Canada

- **MLOps & Annotation Efficiency**: Developed a GUI-based Auto Annotation Application that streamlined the labeling process, achieving an **85%** reduction in manual annotation time, and integrated into the MLOps pipeline.
- **Data Management & Versioning**: Implemented a DVC-based Image Versioning System and Data Pre-Processor, **reduced** data preparation time by **90%** and ensuring **100%** dataset consistency.
- **LLM-Based Customer Support System:** Enhanced the customer support system by adapting an open-source LLM using LoRA, realizing a **92%** customer satisfaction rate and cutting down waiting periods by **80%**.
- **Autonomous Navigation**: Optimized robotic navigation with a real-time vision system (**43 FPS, >98% accuracy**) and satellite path planning (**under 5 seconds, 100% accuracy**) to minimize power and travel time.
- **Robotic Inspection & Fault Diagnosis**: Improved robotic inspection with a thermal vision system for solar panel hotspot detection and an automated barcode decoder, **reduced** identification and data collection time by **65%**.
- **Technical Pipeline Optimization**: Streamlined data processing with an MCAP-to-Frames converter and implemented image transformation pipeline, resulting in **43% improvement** in OCR accuracy.
- **Dataset Engineering**: Built a Dataset Splitter/Visualizer to automate YOLO-compatible directory structures and segmentation mask overlays, ensuring high-quality training and validation sets.
- **3D Perception & Spatial Awareness**: Developed a real-time 3D object detection system (YOLOv11 + Depth Anything v2) to generate pseudo-3D bounding boxes and bird's-eye view visualizations for enhanced spatial perception.

AI/ML Researcher **Jan 2025 – Present**
University of Windsor (**Bioinformatics** Lab) Canada

- **Medical Reasoning Large Language Model**: Fine-tuned a medical reasoning LLM for diagnostic/treatment support and patient summarization, improving domain-specific reasoning tasks by **10-15%**.
- **Principal Researcher & Author**: Authored the **paper** 'Hypergraph-Augmented **Vision Transformers** with Stratified K-Fold Validation and Ensemble Modeling for Fine-Grained Bone Tumor Subtype Classification'.
- **Medical Imaging Innovation**: Engineered a hybrid deep learning architectures, integrating Vision Transformers with Graph/Hypergraph Neural Networks, which increased accuracy by **17%** over current CNNs on the Bone Tumor X-ray Radiograph Dataset.
- **Advanced Feature Fusion**: Developed custom fusion layers, integrating global ViT patch embeddings with higher-order structural relationships, resulting in a **4-6%** performance increase.

AI/ML Engineer **Mar 2023 – Jan 2025**
Sadra Palayesh (SPJ) Iran

- **Intelligent Transportation Systems (ITS):** Engineered a computer vision pipeline for real-time heavy vehicle detection and OCR, leveraging OpenCV and TensorFlow, resulting in **98%** successful detection and **83%** reduction in violation rate.

- **Smart Traffic Optimization:** Developed an intelligent traffic management system that analyzed real-time vehicle flow and intersection load; implemented light-timing adjustments that **reduced** average vehicle wait times by an estimated **30%**.
- **Predictive Business Analytics:** Built a data science suite featuring Customer Churn Prediction and CLV models (XGBoost/LightGBM), generating **$500K-$700K** in incremental revenue through targeted retention incentives.
- **Safety & Industrial Surveillance**: Implemented a real-time Drowsiness and Fatigue Detection system using Haar cascades and CNNs, triggering automated audio alerts to reduce traffic accidents by **8%.**
- **Biometric Identity Verification:** Designed a Real-Time Face Recognition system utilizing One-Shot Learning and DeepFace, enabling secure identity verification and reduced system enrolment overhead by **80%**.
- **Emotion Analyzer:** Developed emotion analyzer to monitor user engagement, integrating vision results into parallel-synced SQL databases, ensuring **100%** data integrity for real-time reporting.
- **Optimized computer vision pipeline**: reduced model latency and increasing throughput while optimizing infrastructure costs.

AI/ML Researcher **Sep 2021 – Mar 2023**
Azad University (**Bioinformatics** Lab) Iran

- **Clinical Diagnostic Support:** Deployed AI-driven diagnostic platform integrating YOLO and CNN models, supporting rapid medical decision-making across **10+** clinics and impacting **2000+** patients.
- **Lung Cancer Tumor Segmentation:** Developed computer vision system for automated lung tumor segmentation, reduced manual measurement time for radiologists by **70%**.
- **Diabetes Type 2 Diagnosis:** Designed biomarker detector and segmenter for Type 2 Diabetes in medical imagery, improving early-stage detection rates by **76%** through automated image analysis.
- **Medical Imaging Pipeline:** Optimized medical imaging pipeline, enhancing pre-processing and segmentation of CT/MRI datasets, ensuring **23%** increase in high-fidelity mask generation for critical diagnostic applications.
- **Cross-Functional Collaboration:** Partnered with clinical staff to validate model outputs, achieving **92%** alignment with radiological assessments and reduced doctor errors by **12**%.
- **Athlete Posture Analyzer:** Engineered a pose-estimation tool to extract 2D joint positions and compute flexion angles, exporting data directly to OpenSim-compatible formats for research.

EDUCATION

Master of Science in Computer Science (AI-Stream) **2026**
University of Windsor Canada

Bachelor of Engineering in Computer Software Engineering **2024**
Azad University Iran

TECHNICAL SKILLS

Languages | Python, SQL, C++, Java**.**
AI & Machine Learning | Deep Learning, Transformers, Graph Neural Networks (GNN/AGNN), Hypergraph Neural Networks (HGNN).
NLP & GenAI | LLMs (LoRA/Fine-tuning), Retrieval-Augmented Generation (RAG), Hallucination Detection, Model Evaluation, Prompt Engineering.
Computer Vision | CNNs, Vision Transformers (ViT), OCR, Depth Estimation, Object Detection-Segmentation, Face Recognition, Pose Estimation, Thermal Vision.
Robotics & Autonomous Systems | Perception & Navigation, ROS2, Sensor Fusion.
Medical AI & Bioinformatics | Medical Reasoning, Differential Diagnosis Support, Tumor Segmentation (Lung, Bone, Diabetes biomarkers), Medical Imaging Modality.
MLOps & Infrastructure | MLflow, Data Management, Auto-Annotation, Dataset Engineering, Feature Engineering, Performance Metrics.
AI Deployment | End-to-end AI Pipelines, Parallel Database Sync, Cost Latency Analysis.
Frameworks & Libraries |PyTorch, TensorFlow/Keras, Lang Chain, Hugging Face, YOLO, OpenCV, Scikit-learn, OpenSim, Depth Anything v2.
Emerging Technologies | Federated Learning, Differential Privacy.
Developer Tools | Docker, Git, Linux/Ubuntu, PostgreSQL, MongoDB, Pinecone, Milvus.