Kn.khayam@outlook.com
+44-745-9025843
Derby, United Kingdom

KHURAM NAWAZ KHAYAM

linkedin.com/in/knkhayam
github.com/knkhayam

Lead AI Engineer | Edge AI & Computer Vision | Deep Learning | AI Infrastructure | Multi-Agent Systems | Data Lake & Microservices Architecture | DevOps | MLOps | PyTorch | AWS | Azure

SUMMARY

Lead AI Engineer and Computer Vision Specialist with expertise in building end-to-end AI systems, from model training to edge deployment, skilled in real-time vision (PyTorch, YOLO, OpenCV) and microservices-based data architectures for intelligent analytics. Experienced in driving innovation across autonomous and Edge AI systems.

EMPLOYMENT

Lead Full Stack Engineer — **AddQual, Derby, United Kingdom** — **March 2023 – Till Date**

- Led development of **Vision System with BridgeAI**, building an **AI architecture** that combined **Azure Document Intelligence** and **custom Python ML modules** for serial-number recognition on metal surfaces, achieving **near-zero OCR errors** with seamless integration.
- Developed an **Advanced Computer Vision system "Vortex"** integrated with a **robotic automation** workflow to identify, **classify**, and validate aerospace parts using **YOLOv8**, ensuring robust error detection in shelf and fixture positions, significantly reducing human error in the quality inspection pipeline.
- Built a **Single-Agent AI system** using a **large language model** to analyze complex aerospace quality reports, autonomously extracting key analytics and insights, showcasing expertise in **AI architecture**, **deep learning**, and **model-based reasoning**. Transformed raw data into an **AI-ready layer** to enable seamless communication.
- **Architected and deployed the Traceability platform**, a **microservices-based system** enabling seamless data flow across vision, robotics, and QA modules. Built optimized REST services and CI/CD pipelines to ensure **scalability, reliability**, and **secure integrations**, reducing manual errors by **90%**.
- Designed and deployed "**MotionSense**" (GitHub) **a real-time motion detection system using OpenCV** and optical flow to visualize motion intensity in space via colormaps, optimized for **edge deployment**.
- Explored **Deep SORT + YOLO** integration in hobby tracking systems for **real-time object tracking/counting**, applying multi-object tracking logic for future scalable deployments.
- Trained and fine-tuned **custom object detection models** using **PyTorch** and **Ultralytics YOLOv8** with proprietary aerospace datasets — achieved **98% detection accuracy**.
- Integrated **Cognex vision systems** to extract machine-etched serial numbers from aerospace parts; built a high-speed local data pipeline to Excel for trace and compliance reporting.
- Experienced with edge deployments including **Jetson Nano**, **Raspberry Pi**, and **SSH-controlled** robotic arms; **command-line proficiency** across **Linux**, **Git CLI**, and **Windows shells**.
- Collaborated with **academic and industry teams**, building strong relationships that led to a Springer-published paper on aerospace UI/UX, and applied **analytical, lateral thinking** to drive innovation in a **follow-up study on context-aware visual inspection**.
- Built **analytical dashboard interfaces** using **React** and **Next.js** for **real-time tracking** of inspection progress, QA stages, and delivery timelines improving stakeholder visibility.
- Developed and deployed **cloud-based applications** across **AWS (S3, EC2)**, **Azure**, and **Oracle Cloud**, implementing **GitHub Actions CI/CD pipelines** for automated builds and deployments. Maintained **secure, versioned staging and production environments** with rollback and scalability controls.

Research Associate — **CAR LAB, Must Mirpur AJK, Pakistan** — **October 2019 – Aug 2022**

- Designed and deployed an autonomous loader system on **Jetson Nano**, integrating **lane detection, YOLOv3, sonar safety**, and **heartbeat monitoring agents:** A **multi-agent edge AI architecture** demonstrating **deep learning, model-based control**, and **cooperative decision-making** for autonomous navigation.
- Integrated high-resolution **GoPro8 camera** and Time-of-Flight (**ToF**) **depth sensor** to capture front-road scenes and measure object distances for precise **navigation** and **obstacle avoidance**.
- Achieved stable CV inference at **6 FPS** on **Jetson Nano** for loader control, using OpenCV and **PyTorch** for image acquisition, preprocessing, and model execution on edge devices.
- Created a **wireless LAN-based Android application** to remotely control the loader, stream **multi-camera video feeds**, and visualize detections — enhancing user feedback and remote operations.
- Built detection dashboards showing **real-time statistics** and **insights** for **autonomous navigation**, supporting **data-driven performance evaluation**.

- Used **ESP32** microcontroller for **real-time sensing** and **actuator control**, converting to **Smart Sensors**, enabling responsive actions based on **visual detections** and **environmental sensors**.
- **Trained YOLO models** using custom road data collected across Pakistani environments; used an **NVIDIA RTX 2080 Ti** and **PyTorch** for model training, testing, and validation.

EDUCATION

Derby, United Kingdom **University of Derby** **Sept 2022 – Sep 2023**

- MSc in Information Technology, Research in Data Visualization. Graduated with Distinction.

Taxila, Pakistan **University of Engineering and Technology** **Sept 2017 – Sep 2022**

- MS in Software Engineering. CGPA: 3.2, Research in Face Recognition using Image Processing.

Mirpur AJK, Pakistan **Mirpur University of Science and Technology** **Fall 2012 - 2016**

- BS in Software Engineering. CGPA: 3.2, Research in IoT based Home Automation System.

Publications

Khayam, Khuram Nawaz, et al. "Local-Tetra-Patterns for Face Recognition Encoded on Spatial Pyramid Matching." CMC-COMPUTERS MATERIALS & CONTINUA 70.3 (2022): 5039-5058. (IF 3.72)
https://www.techscience.com/cmc/v70n3/44950

Hamza, A., Faisal, R. İ. A. Z., Samia, A. B. İ. D., ATALI, G., & NAWAZ, K. An Economically Efficient Agent-based Autonomous Road Cleaner for Asian Cities. *International Journal of Automotive Science and Technology*, *5*(4), 419-423.
https://dergipark.org.tr/en/pub/ijastech/issue/66185/997185

Eyisi, K., Khayam, K.N., Khan, W.A., Hussain, M., Zada, M.S.H., Anderson, B. (2024). UI/UX for Aerospace Qualification Business Processes. In: Santosh, K., et al. Recent Trends in Image Processing and Pattern Recognition. RTIP2R 2023. Communications in Computer and Information Science, vol 2027. Springer, Cham. https://doi.org/10.1007/978-3-031-53085-2_29
https://link.springer.com/chapter/10.1007/978-3-031-53085-2_29

Context-Aware Visual Inspection Framework for Aerospace Engine Parts: An Actionable Knowledge Graph Approach for Automated Quality Assessment and Operational Intelligence (**Upcoming**)

OTHER

- Licensed to Drive in the UK