Mashaan Alshammari | مشعان عواد الشمري

Email | YouTube | GitHub | LinkedIn | Website

An experienced Machine Learning Engineer with extensive experience in applied deep learning, computer vision, and MLOps. Expert in designing and deploying production-grade models like DETR and NeRF on cloud platforms using Docker and FastAPI. A proven contributor in technical education and content creation, with a track record of developing curricula and mentoring teams. Skilled at translating complex research into scalable, reproducible, and impactful solutions.

Education

Doctor of Philosophy - PhD, Computer Science, *The University of Sydney*, ***2017 — 2021***
Thesis: **Graph Filtering and Automatic Parameter Selection for Efficient Spectral Clustering**

Master of Science, Computer Science, *KFUPM*, ***2013 — 2016***
Thesis: **Human In-Place Action Recognition using Combination of Kinect Data Streams**

Technology Experience

Programming & Scripting:	Python, JAX, Linux Shell
Deep Learning Frameworks	PyTorch, Hugging Face Transformers, Lightning.AI, JAX, Flax
Cloud & MLOps Platforms	Google Cloud (TPU, Compute Engine), Docker, FastAPI
Computer Vision & ML Libraries	DETR, DINOv2, NeRF, scikit-learn
Databases	SQL Server, MySQL, Oracle
Operating Systems	Linux (Ubuntu), Windows Server
Version Control & Dev Tools	Git, Jupyter, Google Colab

Functional Skills

- Applied ML & Model Deployment
- Vision Transformers, GNNs & NeRF
- GCP, Docker & Cloud-Native Architectures
- ETL & Data Preprocessing
- Academic Research & Publication
- Project Management & Cross-functional Collaboration
- Technical Communication & Knowledge Sharing

Applied Machine Learning Projects

Object Detection Web API with DETR | FastAPI, Docker, PyTorch — Hugging Face | post

- Built and deployed an object detection API using Facebook's DETR model with Hugging Face Transformers and PyTorch for real-time inference.
- Developed a FastAPI backend with a /predict endpoint that returns annotated images with confidence-labeled bounding boxes.
- Used Pillow to dynamically draw labels and bounding boxes scaled to the uploaded image dimensions for professional-grade visualization.
- Containerized the app using Docker with optimized CPU-only PyTorch and Torchvision wheels for lightweight deployment.
- Deployed to Hugging Face Spaces using a custom Dockerfile.

3D Scene Reconstruction | PyTorch, Google Cloud TPU, Lightning.AI — video | post

- Captured and preprocessed custom data frames from video to structured image datasets for input into NeRF pipelines.
- Orchestrated training of NeRF models on Google Cloud TPUs, achieving high-fidelity reconstructions with peak PSNR ~45 using efficient bounding techniques from Mip-NeRF 360.
- Implemented automated resolution scaling and dataset preparation using parallelized ImageMagick

scripts to manage multi-resolution input data (images, images_2, images_4, images_8 directories).
- Executed training (train) and rendering (render) modules through dynamically configured .gin bindings to control data paths, checkpoint frequency, frame output, and experiment metadata.
- Rendered full 360° video sequences showing color paths, depth maps, and error metrics, facilitating qualitative and quantitative evaluation of model performance.

DINOv2 Architecture & Feature Evaluation | PyTorch, TorchVision, scikit-learn video | post
- Explored and annotated the internal architecture of the DINOv2 vision transformer (ViT) for self-supervised representation learning.
- Visualized key architecture components with custom diagrams to improve interpretability, highlighting patch token interactions across global and local views.
- Extracted frozen feature embeddings from pretrained DINOv2 models using TorchVision and Hugging Face APIs, integrating them into a downstream evaluation pipeline.
- Assessed representation quality by training a logistic regression classifier on CIFAR-10 features, confirming high performance without additional fine-tuning.
- Compared linear probe results and token representations across layers, showcasing DINOv2's effectiveness for general-purpose visual representation learning.

Professional Experience

Machine Learning Engineer | Independent Consultant & Educator *Sep 2023 — Present | Riyadh • Saudi Arabia*
Self-employed | PyTorch • JAX • TPU/GPU platforms • Open Source Code Sharing & Documentation
- Designed and implemented advanced deep learning models—including Vision Transformers, Swin Transformers, and TAPIR—across PyTorch, JAX, and TPU/GPU platforms for computer vision, GNNs, NeRF, and self-supervised learning.
- Produced 50+ technical tutorials on cutting-edge ML/AI topics for a global audience, combining theory, hands-on coding, and experimental results to accelerate practitioner learning.
- Managed end-to-end content creation, including scripting, recording, editing, and publishing ML tutorials and blog posts, ensuring professional quality and consistent audience engagement.
- Developed and benchmarked GNN architectures (GCN, GAT, LightGCN, SimGCL) with optimized graph sampling strategies for scalable recommendations and link prediction tasks.
- Researched and co-authored peer-reviewed papers with Sydney University and KFUPM on graph learning, spectral clustering, and random projection forests, resulting in multiple publications.
- Engineered reproducible ML pipelines integrating data preprocessing, model training, hyperparameter tuning, and visualization for both academic and production-grade experiments.

Sydney Polytechnic Institute | Higher Education *Sep 2020 — Nov 2024 | Sydney • Australia*
Educational Program Developer | Machine Learning • Data Science • Math & Statistics • Cloud Deployment
- Designed curricula for 11+ computing and data science courses in AI, cloud computing, and business intelligence, aligned with industry standards and the Australian Qualifications Framework (AQF).
- Developed and delivered full teaching materials—including lecture slides, practical labs, assignments, and exams—integrating real-world datasets, case studies, and industry tools for applied learning.
- Embedded mathematical, statistical, and algorithmic foundations into coursework to bridge academic theory with practical machine learning and data science applications.
- Engineered database and cloud computing modules with hands-on exercises in modern platforms, enabling students to build scalable, production-grade applications.
- Created AI and innovation course content covering search algorithms, classification models, and reasoning techniques, preparing students for cutting-edge research and applied ML roles.
- Incorporated professional practice and industry-relevant competencies into all programs, equipping graduates with technical, ethical, and collaborative skills for tech-driven environments.

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University of Hail | Higher Education *Jan 2021 — Sep 2023 | Hail • Saudi Arabia*

Assistant Professor | Machine Learning • Algorithm Design & Optimization • Technical Mentorship

- Taught graduate-level Machine Learning for Big Data, covering scalable ML algorithms, distributed processing, and real-world analytics applications.
- Delivered Advanced Database Systems instruction, emphasizing transaction management, concurrency control, and optimization for large-scale data.
- Led Data Structures & Algorithms courses for large cohorts (100+ students/semester), focusing on algorithm design, complexity analysis, and OOP integration.
- Redesigned and taught Principles of AI, introducing search algorithms, constraint satisfaction, and adversarial problem-solving.
- Integrated practical labs and case studies into all courses, aligning theory with modern ML and data engineering workflows.
- Mentored students on applied AI and data projects, fostering skills in model development, evaluation, and deployment.

SABIC | Energy & Petrochemicals *Aug 2010–May 2012 | Jubail • Saudi Arabia*

System Engineer | Systems Integration • Deployment Readiness • On Premises Infrastructure

- Monitored and maintained the plant's isolated, firewall-protected network to ensure uninterrupted and secure operations.
- Supervised the procurement and deployment of new server infrastructure, upgrading the data center from Windows 2000 to Windows Server 2008.
- Led the evaluation and acquisition of networking and storage solutions to enhance the performance and scalability of a 12-server, 4-cabinet data center.
- Coordinated cross-functional efforts to migrate critical operational applications to new server environments with zero downtime.
- Ensured compliance with cybersecurity standards for an air-gapped network infrastructure in a high-security industrial setting.
- Collaborated with vendors and internal teams to deliver a reliable and cost-effective infrastructure upgrade project within budget and timeline.

Saudi Aramco | Energy & Petrochemicals *Jun 2009–Feb 2010 | Dhahran • Saudi Arabia*

Intern | Data Engineering • Database Design • Visualization Techniques

- Processed and organized large reservoir simulator output files for structured storage and easy access.
- Designed and implemented a custom database solution to manage high-volume simulation data efficiently.
- Developed a cross-platform GUI using Qt to enable engineers and researchers to interact with simulation results.
- Automated parsing and loading of large text-based simulation output into a relational database.
- Collaborated with reservoir engineers to tailor the interface and database schema to user needs.
- Improved data accessibility and usability, reducing manual handling of simulation output by technical staff.