Umar Faruk Abdullahi

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Research Interests

Reinforcement Learning, Robot Learning, Vision Language Models (& VLAs) and Distributed Machine Learning.

Education

Erasmus Mundus Master in Engineering of Intelligent Systems **Aug 2023 – Present**
M.Sc. Intelligent Systems [Computer Vision and Robotics]; University of Balearic Islands. *Palma, Spain*
M.Sc. Computer Engineering; Åbo Akademi University - ***GPA: 5.00/5.00*** *Turku, Finland*
Relevant Coursework: Machine Learning, Embedded AI, Data Science, Sensor Fusion, GPU Programming, Robot Sensorization & Control, Robot Navigation, Computer Vision & 3-D Reconstruction, Advanced Robot Perception, Autonomous Robots (Reinforcement Learning), Content-Based Image Retrieval

Ahmadu Bello University **Oct 2015 – Feb 2020**
B.Sc. Computer Science - ***CGPA: 4.72/5.00 (First Class Honours)***

Additional Education

Mediterranean Machine Learning Summer School (M2L School), Milan, Italy. **Sept 2024**
The Cornell, Maryland, Max Planck Pre-doctoral Research School (CMMRS), Saarbrucken, Germany. **Jul - Aug 2024**
Oxford Machine Learning Summer School (OxML), Oxford, England. **Jul 2024**

Research Experience

Turku BioScience Turku, Finland
Machine Learning Research Assistant *Oct 2023 – May 2024, Part-time*
- Developed a machine learning pipeline integrating models like LinearSVC, XGBoost, and MLP, achieving 90% accuracy in classifying Parkinson's disease using multi-omics data, with explainability via SHAP and LIME.
- Researched biomarker identification techniques and implemented novel feature representations, including using DeepInsight and IGTD, to generate images from omics data for CNN-based classification.

AILiveSim Helsinki, Finland
Computer Vision Intern *Oct 2023 – Jan 2024, Internship*
- Researched out-of-distribution detection for object detection models, curating real and simulated datasets with 10,000+ samples for robust model training.
- Trained custom YOLOv8 models in PyTorch for maritime out-of-distribution detection in maritime environments, achieving 92% mAP.

Work Experience

Fingletek Espoo, Finland
Machine Learning Engineer *Jun 2024 – Oct 2024, Internship*
- Developed a synthetic dataset for 5G network slicing using DistillGPT2 and designed a collaborative machine learning system with ensemble models and TabNet, achieving 90% accuracy in resource prediction.
- Built a reinforcement learning agent for dynamic resource allocation and deployed model APIs with FastAPI on Google Cloud alongside a Streamlit-based frontend for user interaction.

Mercurie Lagos, Nigeria
Software Engineer *Oct 2021 – Aug 2023, Full-time*
- Led the development of a multi-tier microservices application using Go, Python, and Vue.js, automating ad workflows across multi-national client eCommerce platforms.
- Designed and deployed scalable microservices with gRPC communication, API gateways, and event-driven architectures using Pub/Sub, Kafka and Kubernetes on Google Cloud.

Teaching Experience

Yusuf Maitama Sule University Kano, Nigeria

Teaching Assistant *Dec 2020 – Oct 2021, Full-time*

- Instructed and assessed 200+ undergraduate students in programming fundamentals and NetCentric Computing through lectures and hands-on experiments, demonstrating strong communication skills and teaching abilities.
- Developed an internal electronic library system for the Computer Science Department using PHP, MySQL, and JavaScript.

Skills

Programming Languages: Python, Go, Java, JavaScript, SQL

Machine Learning: PyTorch, Tensorflow, Keras, OpenCV, Scikit-Learn, Huggingface, OpenAI-APIs, LangChain

Frameworks and Tools: Flask, FastAPI, MySQL, MongoDB, Firebase, Git, Docker, Kubernetes, AWS, GCP, OpenMP/MPI

Robotics: ROS, C++, Arduino

Soft Skills: Research, Problem-Solving, Critical Thinking, Communication, Teamwork, Independence

Select Projects

ML-Base | *GitHub*

- Implemented machine learning projects with detailed reports across various tasks: regression (flight price prediction), classification (bank campaign prediction), clustering (human activity recognition), object classification (AlexNet CNN), semantic segmentation (UNet CNN), and sentiment analysis (Word2Vec, BERT). Demonstrated practical expertise in both traditional ML and deep learning techniques.

RobGarden | *GitHub*

- A robotic system for simulating, controlling, and navigating in structured environments, modeled after automated garden maintenance robots. Developed using ROS Noetic, Gazebo, and path planning algorithms. Integrated waypoint and path-following controls with a reactive control node for real-time operation.

AirWrite | *Video* | *GitHub*

- Developed a real-time handwriting recognition system using camera input, leveraging MediaPipe for finger tracking and Kalman Filter for trajectory correction, followed by OCR with Google Gemini Model for text extraction.

Bayani | *Live* | *GitHub*

- Developed a multilingual chat application for interactive discussions across multiple PDF documents. Utilized Retrieval-Augmented Generation (RAG) with FAISS Vector DB, LangChain, and GPT embeddings for efficient document retrieval and response generation.

Cosmic-Calc | *GitHub*

- Conducted spatial distribution analysis of galaxies using the two-point angular correlation function. Developed three versions: pure C, OpenMP for parallel processing, and a GPU-accelerated CUDA version, achieving a significant performance boost of 58x.

Crowd Counting | *Report* | *GitHub*

- Developed a crowd counting system using image processing techniques like CLAHE, contour detection, and connected components, and evaluated its performance against deep learning models like YOLO. Achieved optimal performance in complex scenes using traditional computer vision methods.

Udagram | *GitHub*

- Developed a cloud-native image-sharing application leveraging microservices architecture on AWS, utilizing Elastic Kubernetes Service, DynamoDB, and API Gateway. Implemented a serverless version using the Serverless Framework and AWS CloudFormation for scalable and cost-efficient deployment.

Selected Honors, Awards & Achievements

AI Fellow, Pi School: Selected as one of 10 engineers for the Pi School of AI accelerator program. (Dec 2024)

CMMRS 2024 Scholarship: Fully-funded scholarship for the Cornell, Maryland and Max-Planck Pre-doctoral Research School. (Feb 2024)

Grand Prize, Nokia Challenge Finland: First place in the Nokia hackathon for AI-based network optimization. (Oct 2023)

EU Erasmus Mundus Scholar: Fully funded scholarship awarded to top 3% of students for masters study in top European institutions. (Aug 2023 – Jul 2025)

MasterCard Foundation Scholarship: Fully funded scholarship for master's study in select African institutions. (Apr 2023)

BlackAndBrilliant AI Accelerator: Selected for the AI accelerator program featuring global mentors for leading tech companies and academic institutions. (Mar 2022)

Best Graduating Computer Science Student: Awarded to the graduating student with the highest CGPA. (Feb 2020)

Service Award, NACOS: For service as tutor and software director of the association. (Nov 2019)

Best Graduating Student, GT Bank, Crescent International: Awarded as the best overall graduating student. (Jul 2015)

Best Graduating Student, Macmillan Publishers, Lufaloy Schools: Awarded as the best overall graduating student. (Aug 2009)

Relevant Certificates

Deep Learning Specialization *Oct 2024*
DeepLearning.AI

Cloud Developer Nanodegree *Jul 2022*
Udacity/AWS

Volunteering

Software Director, National Association of Computing Students (NACOS): Developed software solutions for the association and mentored students in web and mobile app development. (Jan 2019 – Jan 2020)

Academic Tutor, Computer Science, Ahmadu Bello University: Voluntarily tutored fellow and junior students in core computer science subjects. (Apr 2017 – Nov 2019)

Selected Talks

Digital Skills for the 21st Century, Abuja | *Talk* | *Interview*

- Facilitated a workshop on digital skills and programming for 25 recent graduates, emphasizing the development of practical software engineering skills relevant to academic research and professional growth.

Potentials of Transformer-based AI Models (GDG DevFest 2022, Kano) | *Slides*

- Delivered a talk on transformer architecture and its applications in various domains such as natural language processing, computer vision, and multi-modal AI.

A Primer on Modern Web Development (GDG DevFest 2021, Zaria) | *Slides*

- Conducted an educational workshop with 100+ participants, covering the fundamentals of web development and frameworks.

References

References available upon request.