

OSAZEE ERO

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Professional summary

PhD in Mechanical and Mechatronics Engineering with a robust background in machine learning, computer vision, and software development. Over five years of research and practical experience in developing AI algorithms for real-time quality assurance in manufacturing. Proficient in designing and implementing image processing pipelines and optimizing algorithms for production environments. Recognized for contributions to the field through publications and awards.

Education

University of Waterloo

Waterloo, ON

Doctor of Philosophy (Ph.D.) in Mechanical and Mechatronics Engineering,

Sep. 2020 – Jul. 2024

Thesis: In-Situ Monitoring and Quality Assurance Algorithms for Laser Powder-Bed Fusion using Optical Tomography

Relevant Courses: Advanced Image Processing (99/100), Pattern Recognition (94/100), Additive Manufacturing (96/100)

University of Lagos

Lagos, Nigeria

Master of Science in Systems Engineering, GPA: 4.67/5.00

May 2015 – Jun. 2016

Thesis: Modeling and optimization of an electric power distribution network planning system using mixed binary integer

University of Benin

Benin, Nigeria

Bachelor of Engineering in Electrical/Electronic Engineering, GPA: 4.36/5.00

Nov. 2006 – Nov. 2011

Experience

Machine Learning Researcher

Sep. 2020 – Jul. 2024

Multi-Scale Additive Manufacturing Lab, Mech. & tron. Eng., University of Waterloo

Waterloo, ON

- Investigated and addressed challenges in in-situ quality assurance methodologies for laser-powder bed fusion (LPBF) Additive Manufacturing (AM) process, leveraging advanced artificial intelligence techniques.
- Applied various machine learning techniques, including supervised and unsupervised learning, to enhance defect detection and quality assurance in LPBF AM.
- Developed and implemented custom deep-learning models for detecting defects in LPBF AM fabricated parts, collaborating closely with a multidisciplinary research team.
- Analyzed large volumes of scientific image data using advanced computer vision methods, improving defect detection accuracy by 96%.
- Conducted comprehensive data preprocessing and feature engineering, leading to a 15% increase in model performance and reliability.
- Published research findings in two top-tier journals, contributing to the advancement of knowledge in the field of additive manufacturing and machine learning.
- Presented research at international conferences, garnering attention from leading experts and fostering collaborative opportunities.
- Mentored junior researchers and graduate students, guiding them in machine learning methodologies and

contributing to the lab's overall research output.

Lead Software Developer (Part-Time)
Optifab Technologies, University of Waterloo

Jan. 2023 – June 2024
Waterloo, ON

- Led the development of advanced AI-driven software solutions for 3D printing, ensuring defect-free manufacturing and enhancing production efficiency by 85%.
- Provided expert knowledge on AI and machine learning techniques, facilitating the integration of cutting-edge technology into manufacturing processes.
- Collaborated with cross-functional teams to define software requirements, leading to a successful rollout of applications that increased operational efficiency by 60%.
- Conducted thorough code reviews, resulting in a 90% reduction in bugs and improved code quality.
- Oversaw the deployment and maintenance of applications, ensuring a 95% uptime and quick resolution of issues.
- Presented technical insights and progress reports to executive leadership, aiding in strategic decision-making and securing additional funding for research and development.

Electronics Lecturer
Electrical/Electronic Department, University of Benin

Jul. 2013 – Aug. 2020
Benin, Nigeria

- Taught and developed curriculum for multiple courses including Programming with C, Python, MATLAB, Instrumentation, Electric Circuits, Microprocessors and Microcontrollers, educating over 650 students annually.
- Supervised and mentored over 100 final-year student projects, guiding research and development in intelligent control of autonomous systems, resulting in 75% of projects achieving top grades.
- Collaborated with colleagues to review and improve departmental curriculum, leading to a 65% improvement in course content and structure.

Technical skills

Programming (12+ years): Python, JavaScript, C#, C++, SQL, MATLAB

Machine Learning Tools (5+ years): TensorFlow, PyTorch, OpenCV, Scikit-Learn, Pandas, NumPy, SciPy, Django

Data Analysis: (5+ years): Data Visualization (Matplotlib, Seaborn), Big Data Platforms (Hadoop, Spark), Statistical Analysis (SPSS, SAS)

AI Specializations: Computer Vision, Natural Language Processing, Reinforcement Learning, Deep Learning, Generative Models.

Developer Tools (5+ years): Git, Eclipse, VSCode, PyCharm

Infrastructure (3+ years): AWS SageMaker

Awards

- OpenCV AI Competition 2021 Phase 1 Winner
- Iranian Student Memorial Engineering Graduate Scholarship based on academic excellence on June 2024
- University of Waterloo Graduate Research Studentship, April 2017
- University of Waterloo International Doctoral Student Award, April 2017
- National Information Technology Development Agency (NITDA) Scholar, Nigeria, September 2020
- University of Lagos Second Best Graduating Student - Systems Engineering Graduate Class (4.67/5.00), June 2016.

Professional certifications

- **Machine Learning Engineer Nanodegree (Udacity) - November 2021**

Certificate: [Udacity](#)

- Software Engineering Fundamentals, Machine Learning in Production using Amazon SageMaker,
- Training and deploying a Sentiment analysis and Plagiarism detection model based on XGBoost
- Neural networks and Random Forest classifier using Amazon SageMaker
- Train a custom Convolutional Neural Network Model for distinguishing between dog breeds.

Publications

1. Optical tomography and machine learning for in-situ defects detection in laser powder bed fusion: A self-organizing map and U-Net based approach. *Additive Manufacturing*
2. An Integrated Fuzzy Logic and Machine Learning Platform for Porosity Detection using Optical Tomography Imaging during Laser Powder Bed Fusion". *International Journal of Extreme Manufacturing*.
3. On the application of in-situ monitoring systems and machine learning algorithms for developing quality assurance platforms in laser powder bed fusion:A review.". *Journal of Manufacturing Processes*,
4. Topology optimization for metal additive manufacturing: current trends, challenges, and future outlook." *Virtual and Physical Prototyping*

Conference presentations

1. **Ero, O**, Taherkhani, K., & Toyserkani, Optical tomography and machine learning for in-situ defects detection in laser powder bed fusion: A self-organizing map and U-Net based approach (Poster). *Holistic Innovation in Additive Manufacturing*, 1-2 June 2021
2. **Ero, O**, Taherkhani, K., Yasmine Hemmati & Toyserkani, An Integrated Fuzzy Logic and Machine Learning Platform for Porosity Detection using Optical Tomography Imaging during Laser Powder Bed Fusion (Oral). *Holistic Innovation in Additive Manufacturing*, 27-28 June 2023

Volunteer services

Machine Learning Instructor and Mentor

University of Benin, Electrical/Electronic Department

Sep. 2016 – Present

Nigeria

- Developed comprehensive lesson plans and instructional materials covering fundamental and advanced machine learning concepts, ensuring accessibility for students with diverse backgrounds.
- Led interactive workshops on key machine learning topics such as supervised and unsupervised learning, neural networks, and data preprocessing, engaging over 40 participants per session.
- Provided personalized mentorship to students, offering guidance on projects, helping troubleshoot coding issues, and advising on career paths in machine learning.
- Guided students through hands-on projects, including building and deploying machine learning models, which enhanced their practical skills and understanding of real-world applications.
- Fostered a supportive learning environment by organizing study groups and facilitating discussions, encouraging peer-to-peer learning and collaboration among students.