KARATINA UNIVERSITY

Inspiring Innovation and Leadership

Dr Thomas Njoroge Profile

Biography

Dr. Thomas Kinyanjui Njoroge is a PhD-trained Artificial Intelligence researcher and applied machine learning engineer specializing in deep learning, edge-optimized AI, and multimodal intelligence systems. He holds a PhD in Artificial Intelligence and focuses on designing intelligent systems that balance predictive accuracy, computational efficiency, and real-world deployability in resource-constrained environments.

Currently serving as Lecturer and Head of the Computing Department at Karatina University, Dr. Njoroge has over 15 years of experience teaching, supervising, and mentoring undergraduate, master's, and PhD students in Artificial Intelligence, Software Engineering, Machine Learning, and Information Systems. His technical expertise spans supervised and unsupervised learning, convolutional neural networks (CNNs), Vision Transformers (ViTs), transfer learning, attention mechanisms, feature engineering, explainable AI, and multimodal fusion architectures.

His research is particularly centered on intelligent agriculture and healthcare applications, where he integrates computer vision with IoT sensor streams such as temperature, humidity, and environmental telemetry for robust predictive modeling. He developed AgriScan, an edge-optimized multimodal crop disease detection framework combining lightweight CNN backbones, transformer encoders, and gated cross-attention modules for deployment on Android devices. He also developed SemaDeep, an AI-powered research assistant built using Retrieval-Augmented Generation (RAG), advanced prompt engineering, and agentic reasoning workflows.

Dr. Njoroge has published extensively in Scopus-indexed journals on hybrid CNN-Transformer systems, statistical validation of AI models, efficiency-accuracy trade-offs, and real-time intelligent decision support systems. His mission is to advance ethical, explainable, and human-centered AI through scalable machine learning solutions that

create measurable impact in food security, healthcare, and intelligent automation.	

Academic Qualifications	1. **PhD in Artificial Intelligence)** 2. **MSc in Information Technology** (Information Systems Security Audit & Software Engineering) – Strathmore University, Kenya 3. **BSc in Information Technology** – Kenyatta University, Kenya 4. **IMIS Higher Diploma in Information Systems Management** – KCA University, Kenya
Professional Qualifications	1. Associate Member – Institute of Management Professional Studies (IMIS-UK) 2. Affiliate Member – Kenya Institute of Management
External Links/Affiliations	1. ORCID – 0009-0000-2147-9848 2. Scopus ID: 60090694300 3. https://www.researchgate.net/profile/Thomas-Njoroge-4/research

Journal publications

1. Njoroge, T. K., Omol, E., & Nyangaresi, V. O. (2025). *Deep learning and IoT fusion for crop health monitoring: A high-accuracy, edge-optimized model for smart farming*. **IET Image Processing, 19(1)**. https://doi.org/10.1049/ipr2.70208

2. Njoroge, T. K., Mugoye, K., & Kibuku, R. (2025). *Comparative and edge-hybrid modeling of EfficientNetV2 and MobileNetV2 for multi-class crop disease classification with statistical validation*. **Journal of Edge Computing**. https://doi.org/10.55056/jec.905

3. Njoroge, T. K., Mugoye, K., & Kibuku, R. (2025). *Multi-head self-attention fusion network for enhanced multi-class crop disease classification*. **Journal of Artificial Intelligence and Data Mining, 13(2), 227–240**. https://doi.org/10.22044/jadm.2025.15689.2687

4. Njoroge, T. K., Mugoye, K., & Kibuku, R. (2025). *Multiscale fusion at what cost? Quantifying efficiency-accuracy trade-offs in hybrid models*. **Journal of Information Systems Engineering & Management, 10(54s), 227–241**. https://doi.org/10.52783/jisem.v10i54s.11055

5. Njoroge, T. K., Kibuku, R., & Sindu, K. M. (2025). *Edge-enabled mobile app for smart agriculture using multi-sensor inputs and a hybrid CNN–Vision Transformer model*. **iJIM, 19(21), 145–162**. https://doi.org/10.3991/ijim.v19i21.55919

6. Njoroge, T. K., Kibuku, R., & Sindu, K. M. (2025). *Edge-optimized multimodal cross-fusion architecture for efficient crop disease detection*. **International Journal of Science, Technology, Engineering and Mathematics, 5(2), 1–37**. https://doi.org/10.53378/ijstem.353186

7. Njoroge, T. K., Mugoye, K., Sindu, K. M., & Kibuku, R. (2025). *Edge-optimized multimodal cross-fusion model with statistical validation for multi-crop disease detection*. **International Journal of Advances in Intelligent Informatics, 11(3), 439–458**. https://doi.org/10.26555/ijain.v11i3.2051

8. Njoroge, T. K., Mugoye, K., & Kibuku, R. (2024). *Feature extraction and segmentation methods in plant disease detection: A multimodal approach*. **Andalasian International Journal of Applied Science Engineering and Technology, 4(3), 206–223**. https://doi.org/10.25077/aijaset.v4i3.182

Conference publications

1. Njoroge, T. K. (2025, April). Deep Learning and IoT Sensors for Real-Time Crop Disease Detection and Field Condition Monitoring. *International Conference on Sustainable Knowledge Systems*.
2. Njoroge, T. K. (2025, March). Comparative Performance and Statistical Validation of ShuffleNetV2 and MobileNetV2 for Multi-Class Crop Disease Classification. *Kirinyaga University 8th Annual International Conference*