

Daniel Azubuike Udekwe

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EDUCATION

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- **Master of Science (MSc) Control Engineering;** December 2022
Ahmadu Bello University *Kaduna, Nigeria*
Thesis: Development of a Deep Reinforcement Learning Controller for Trajectory Tracking of Classical Control Systems
Courses: Optimal Control, Robotics and Autonomous Systems, Machine Learning, Advanced Optimization Techniques, Linear and Digital Control Systems, System Modeling and Identification
 - **Bachelor of Engineering (B.Eng) Electrical Engineering;** September 2017
Ahmadu Bello University *Kaduna, Nigeria*
Project: Implementation of Timing and Synchronization in Digital Clocks: A Wireless Communication Design
Courses: Circuit theory, Electrical Machine, Digital Electronics, Digital Signal Processing, Communication Networks, Energy Systems, EM Fields and Waves, Reliability and Maintainability

RESEARCH INTERESTS

Human-Robot Interaction, Virtual/Augmented/Mixed/Extended Reality, Robotics, Control/Autonomous Systems, Optimization, Deep Learning, Reinforcement Learning

SKILLS SUMMARY

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- **Languages:** Matlab, Python, PHP, C++, JavaScript, SQL, Bash
 - **Frameworks:** Scikit, TensorFlow, Keras, Django, Flask, NodeJS
 - **Tools:** Docker, GIT, PostgreSQL, MySQL, SQLite
 - **Robotics:** ROS, Unity3D, RViz
 - **CAD:** SOLIDWORKS, CATIAv5, Shapr3D
 - **PCB Design:** EAGLE, Proteus Design Suite, Genmitsu CNC 3018-PRO Router
 - **Platforms:** Linux, Web, Windows, Arduino, Raspberry,
 - **Soft Skills:** Leadership, Event Management, Writing, Public Speaking, Time Management

EXPERIENCE

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- **Graduate Assistant - Aerospace Engineering Department** Full time
Air Force Institute of Technology, Nigeria *April 2020 - August 2022*
 - : Assisted professors and senior researchers in conducting aerospace engineering research projects.
 - : Assisted in the preparation and submission of research proposals and grant applications.
 - : Presented research findings at conferences and assisted in the preparation of research papers for publication
 - : Assisted in teaching undergraduate courses, grading assignments, and providing feedback to student
 - : Mentored undergraduate students, providing guidance and support in their research projects.
 - **Trainee - Concept to Product Lab** part time
Ahmadu Bello University, Nigeria *November 2016 - September 2017*
 - : Collaborate with fellow trainees on projects related to computer engineering concepts and product development
 - : Assisted in the design, development, and testing of hardware and software prototypes.
 - : Participate in brainstorming sessions and contributed creative ideas for improving existing products or developing new solutions.
 - **Intern - Cisco Networking Academy** full time
Ahmadu Bello University, Nigeria *July 2016 - November 2016*
 - **Course Completion - CCNA 2:** CCNA Routing and Switching: Routing and Switching Essentials
 - **Course Completion - CCNA 1:** CCNA Routing and Switching: Introduction to Networks

PROJECTS

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- **Design and Production of an Electric Utility Vehicle Integrated with Onboard Synchronized Charging Systems:** I developed the charging systems of an electric ambulance developed for the Air Force Institute of Technology, Nigeria. These charging systems were based on regenerative braking as well as solar power.
 - **Design of Onboard Power Generation and Autostart Systems for the "AH-25" UAV:** I developed the power generation system for a hybrid wing UAV using a BLDC motor. This power generation system had the advantage of serving as an autostart mechanism for the UAV's engine

PUBLICATIONS

- **Journal Article:** Udekwe, D., Ore-ofe, A., Ubadike, O., Ter, K., & Okafor, E. (2023). Comparing actor-critic deep reinforcement learning controllers for enhanced performance on a ball-and-plate system. *Expert Systems with Applications*, 123055.
- **Journal Article:** Adetifa, A., Okonkwo, P., Muhammed, B. B. & Udekwe, D (2023) Design and Performance Evaluation of a Deep Reinforcement Learning Based Longitudinal Control Augmentation System. *Nigerian Journal of Technology*
- **Journal Article:** Ubadike, O., Udekwe, D., Bonet, M. U., Momoh, M. O., Makinde, O.M., Omada J. E., Mohammed, A. (2022). Development of a BLDC Motor Starter-Generator for an Experimental UAV. *FUW Trends in Science and Technology*, 7(2), 932-937
- **Journal Article:** Okafor, E., Udekwe, D., Ibrahim, Y., Bashir Mu'azu, M., & Okafor, E. G. (2021). Heuristic and deep reinforcement learning-based PID control of trajectory tracking in a ball-and-plate system. *Journal of Information and Telecommunication*, 5(2), 179-196.
- **Journal Article:** Okafor, E. G., Udekwe, D., Ubadike, O. C., Okafor, E., Jemitola, P. O., & Abba, M. T. (2021). Photovoltaic System MPPT Evaluation Using Classical, Meta-Heuristics, and Reinforcement Learning-Based Controllers: A Comparative Study. *Journal of Southwest Jiaotong University*, 56(3).
- **Journal Article:** Okafor, E. G., Okafor, E., Ubadike, O. C., Abba, M. T., Jemitola, P. O., Shinkafi, A. A., ... & Udekwe, D. (2021). Electric Vehicle Integrated with PMSM and Regenerative Braking System Speed Evaluation based on Diverse Control Strategies. *Journal of Southwest Jiaotong University*, 56(6)
- **Conference:** Okafor, E.G., Udekwe, D., Muhammad H., Ubadike, O., & Okafor, E.C. (2021). Solar System Maximum Power Point Tracking Evaluation Using Reinforcement Learning. In *2021 Sustainable Engineering and Industrial Technology Conference*
- **Journal article:** Mohammed, A., Sule, G., Ahmad, R., Yahaya, J., Zango, M., Okuneye, A., Udekwe, D., Suleiman, N., Idris, M., (2021). Applications of unmanned aerial robots for precision agriculture: An Overview. *Nigerian Journal of Tropical Engineering*.
- **Journal article:** Ajayi O., Zaharuddeen H., Idakwe M.A., Usman N.S., Udekwe D.A. (2020). Development of a modified simple event function for event based control of inverted pendulum on a cart. *Zaria Journal of Electrical Engineering and Technology*. 9(1), 10-14
- **Journal article:** Ajayi O., Idakwo M.A., Udekwe D.A., Usman N.S. (2020). Development of an improved hybrid low energy adaptive clustering hierarchyiii (hybrid leach) protocol for wireless sensor network. *Zaria Journal of Electrical Engineering and Technology*. 9(1), 40-46.
- **Journal article:** Ajayi O., Idakwo M.A., Udekwe D.A., Adekale M.A. Usman N.S. (2020). Design of a Graphical User Interface Based System Administrative Tool. *Zaria Journal of Electrical Engineering and Technology*, 9(1), 95-100.
- **Conference:** Garba, S., Yahaya, B., Sadiq, B. O., Udekwe, D. A., & Abubakar, Z. M. (2019, October). Implementation of Timing and Synchronization in Digital Clocks: A Wireless Communication Design. In *2019 2nd International Conference of the IEEE Nigeria Computer Chapter (NigeriaComputConf)* (pp. 1-4). IEEE.

CONFERENCES ATTENDED

- Sustainable Engineering and Industrial Technology Conference - July, 2021
- Second International Conference of the IEEE Nigeria - May 2019

PROFESSIONAL SERVICE AND MEMBERSHIPS

- Honor Society of Phi Kappa Phi ($\Phi\kappa\Phi$)
- National Society of Black Engineers (NSBE)
- American Society of Agricultural and Biological Engineers (ASABE)
- Black in Robotics (BiR)
- Nigerian Society of Engineers (NSE)

VOLUNTEER EXPERIENCE

- **General Tutor** Ahmadu Bello University, Nigeria
Tutored electrical engineering courses 2016 - 2017
- **Mathematics Subject Teacher** National Youth Service Corps (NYSC), Nigeria
Instructed students in Mathematical principles and concepts 2018 - 2019