Daniel Omeiza

Post-Doctoral Researcher, Oxford Robotics Institute, University of Oxford
+44 730 751 9284 | daniomeiza@gmail.com | Google Scholar | Website

Research Interests

Fields: Explainable AI, Machine Learning, Human-Computer Interaction, Autonomous Systems, UX Research
Programming Languages: Python (including PyTorch framework), C++, Java, Javascript, R, MATLAB

Education

University of Oxford — Oct. 2019 – Present
Doctor of Philosophy in Computer Science — *Advisors: Dr. Lars Kunze & Prof. Marina Jirotka*

Carnegie Mellon University — Aug. 2017 – Jun. 2019
Master of Science in Information Technology — *Advisor: Prof. David Vernon*

University of Ilorin — Sept. 2011 – Aug. 2015
Bachelor of Science in Computer Science (First Class Honors) — *Advisor: Dr. Kayode Adewole*

Research Experiences

Post Doctoral Research Assistant — Jan. 2023 – Present
Oxford Robotics Institute — *University of Oxford, UK*

- Developing metric for estimating Responsible AI index for AI models, in collaboration with AWS.

Graduate Research Assistant — Oct. 2019 – Sept. 2022
Cognitive Robotics Group — *University of Oxford, UK*

- Investigated & developed transparent explainer models for complex AI agents.
- Investigated driver and passenger behaviour through driving simulator studies, e.g., Carla.
- Supported existing projects and contributed to the groups' code base.
- Co-advised master's students.

Research Intern — Sep. 2018 – Dec. 2018
IBM Research, one of the 5 IBM Great Minds Winners from EMEA — *Nairobi, Kenya*

- Investigated new and efficient algorithms for detecting and explaining anomalous patterns in datasets and neural network activations.
- Developed a novel technique (Smooth Grad-CAM++) to provide visual explanations for anomalous patterns in deep neural network.

Graduate Research Assistant — Jan. 2019 – May 2019
Carnegie Mellon University — *Kigali, Rwanda*

- Conducted research around applied machine learning. I proposed an efficient machine learning approach for large-scale urban land-use forecasting in sub-Saharan Africa.

Professional Software Engineering Experiences

Co–founder and AI Lead — Feb. 2022 – Dec. 2022
N6 Labs — *Remote*

- As a co-founding member and AI Lead for N6 Labs' Tilly Intelligence startup, I led AI product and engineering efforts from ideation to launch. Assisted in securing a pre-seed investment funding of about $400K through the South Park Commons Founders' Fellowship.

Digital Communication and Technology Lead — Jun. 2021 – Apr. 2022
Weidenfeld Hoffmann Trust — *Oxford, UK*

- Setup a better IT infrastructure; developed an efficient digital communication pipeline which led to improved internal and external engagements.

Software Engineering Intern — Jun. 2018 – Aug. 2018
Oltranz — *Kigali, Rwanda*

- Developed efficient monitoring systems for different microservices.

Software Engineer May 2017 – Jul. 2017
SimplePay (now ThankUCash) *Lagos, Nigeria*
- Developed two payment dashboards for payment applications with over 50 thousand users.

Grants, Scholarships & Award

Grants

- ACM SIGCOMM Grant Apr. 2021
- Black in AI Travel Grant Dec. 2019
- Black in AI Travel Grant Dec. 2018

Scholarships

- UK's Engineering and Physical Sciences Research Council (EPSRC) RoboTIPS Fund Oct. 2019 – Nov. 2022
- Mandela Institute for Development Studies Scholarship Aug. 2017 – Jun. 2019
- MTN Foundation Science & Technology Scholarship Sept. 2013 – Aug. 2015

Award

- Best Student Paper: Privacy Papers for Policymakers Award by the Future of Privacy Forum Jan. 2022
- Jeremiah Mpagazehe Rising Researcher Award Jun. 2019

Teaching & Research Mentoring

Teaching Assistance

- CS Undergraduate course: Ethics and Responsible Innovation, *University of Oxford* Feb. 2020
- CS Masters Course: Design Patterns, *University of Oxford* Feb. 2020
- CS & Engineering Masters Course: Academic Skills, *Carnegie Mellon University, Africa* Jul. 2019 – Aug. 2019

Research Mentoring

- Select Erasmus Mundus Masters Graduate students at Universite de Lorraine Oct. 2020 – Present
- Select Undergraduate students at the Federal University of Technology, Akure, the University of Kigali, and the Federal University of Petroleum Resource, Effurun Sept. 2017 – Present

Academic Services

Organising Committees

- Co-organiser, IEEE IV 2023 Workshop on Socially Interactive Autonomous Mobility (SIAM) Jun. 2023
- Co-organiser, NeurIPS 2022 Workshop on Machine Learning for Autonomous Driving (ML4AD) Dec. 2022
- Co-organiser, ICML 2022 Workshop on Artificial Intelligence for Autonomous Driving (AI4AD) Jul. 2022
- Co-organiser, IJCAI 2022 Workshop on Artificial Intelligence for Autonomous Driving (AI4AD) Jul. 2022
- Co-organiser, HRI 2022 Workshop on Fairness and Transparency Mar. 2022
- Co-organiser, NeurIPS 2021 Workshop on Machine Learning for Autonomous Driving (ML4AD) Dec. 2021
- Co-organiser, IJCAI 2021 workshop on Artificial Intelligence for Autonomous Driving (AI4AD) Aug. 2021
- Student Volunteer, IJCAI 2021 Conference Aug. 2021
- Lead-organiser, CHI 2021 workshop on Trustworthy and Explainable Autonomous Physical Systems May 2021
- Programme Committee, AI in Africa for Sustainable and Development Goals Workshop Nov. 2021
- Co-organiser, NeurIPS 2020 Workshop on Machine Learning for Autonomous Driving (ML4AD) Dec. 2020
- Programme Committee, AI in Africa for Sustainable and Development Goals Workshop Nov. 2020
- Student volunteer, NeurIPS Black in AI Workshop Dec. 2019
- Student volunteer, NeurIPS Black in AI Workshop Dec. 2018

Invited Talks

- NeurIPS Workshop on Progress and Challenges in Building Trustworthy Embodied AI Dec. 2022
- IV 2022 Workshop on Human Factors in Intelligent Vehicles Jun. 2022
- IV 2022 Workshop on Naturalistic Driving Data Analytics (NDDA) Jun. 2022

- UK Robotics & Autonomous Systems Network Talk Series — Feb. 2022
- IEEE ARSO 2021 Workshop on Ethics and Responsible Design in Robotics — Jul. 2021

Paper Review

- International Conference on Intelligent Robots and Systems (IROS)
- Robotics: Science and Systems Conference (RSS)
- IEEE Intelligent Vehicles
- Transportation Research, Part C
- International Conference on Advanced Robotics and Its Social Impacts (ARSO)
- Cognitive Systems Research Journal

- CHI Conference on Human Factors in Computing

University Activities

- Member, HCC Symposium Organising Committee — Jun. 2020
- Volunteering member, RoboTIPS Project — Oct. 2019 – Present
- Member, Explainable AI (XAI) Reading Group — Oct. 2020 – Present
- Member, Cognitive Robotics Group (CRG) Reading group — Oct. 2020 – Present

Publications

Conference and Journal Papers

1. Explainable Action Prediction through Self-Supervision on Scene Graphs
   Pawit Kochakarn, Daniele De Martini, **Daniel Omeiza**, Lars Kunze
   2023 International Conference on Robotics and Automation (ICRA)
   PDF
2. Textual Explanations for Automated Commentary Driving
   Marc Alexander Kühn, **Daniel Omeiza**, Lars Kunze
   2023 IEEE Intelligent Vehicles Symposium (IV)
   PDF
3. From Spoken Thoughts to Automated Driving Commentary: Predicting and Explaining Intelligent Vehicles' Actions
   Daniel Omeiza, Helena Webb, Marina Jirotka, and Lars Kunze
   In the Proceedings of the 2022 IEEE Intelligent Vehicles Symposium (IV)
   PDF
4. Effects of Explanation Granularity and Autonomous Vehicles' Perception System Errors on Passengers' Perceived Safety
   Daniel Omeiza, Raunak Bhattacharyya, Marina Jirotka, Lars Kunze
   Submission for Transportation Research Part F Journal
5. Context-based Image Explanations for Deep Neural Networks
   Sule Anjomshoae, **Daniel Omeiza**, and Lili Jiang
   Journal of Image and Vision Computing, 2021
   PDF
6. Assessing and Explaining Collision Risk in Dynamic Environments for Autonomous Driving Safety
   Richa Nahata, **Daniel Omeiza**, Rhys Howard, Lars Kunze
   In Proceedings of the IEEE 2021 International Conference on Intelligent Transportation Systems (ITSC)
   PDF
7. Towards Accountability: Providing Intelligible Explanations in Autonomous Driving
   Daniel Omeiza, Helena Webb, Marina Jirotka, Lars Kunze
   In Proceedings of the IEEE 2021 Intelligent Vehicles Symposium (IV)
   PDF

8. Explanations in Autonomous Driving: A Survey
Daniel Omeiza, Helena Webb, Marina Jirotka, Lars Kunze
In the IEEE Transactions on Intelligent Transportation Systems (T-ITS)
PDF

9. *Why Not Explain?* Effects of Explanations on Human Perceptions of Autonomous Driving
Daniel Omeiza, Helena Webb, Konrad Kollnig, Marina Jirotka, Lars Kunze
In Proceedings of the IEEE 2021 International Conference on Advanced Robotics and Its Social Impacts (ARSO)
PDF

10. Towards Explainable and Trustworthy Autonomous Physical Systems
Daniel Omeiza, Sule Anjomshoae, Konrad Kollnig, Oana-Maria Camburu, Kary Främling, Lars Kunze
In the Proceedings of the CHI 2021 Conference on Human Factors in Computing Systems
PDF

11. Fairness and Transparency in Human-Robot Interaction
Houston Claure, Mai Lee Chang, Seyun Kim, **Daniel Omeiza**, Martim Brandão, Min Kyung Lee, Malte Jung
In the Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction (HRI)
PDF

12. A Fait Accompli? An Empirical Study into the Absence of Consent to Third-Party Tracking in Android Apps
Konrad Kollnig, Reuben Binns, Pierre Dewitte, Max Van Kleek, Ge Wang, **Daniel Omeiza**, Helena Webb, Nigel Shadbolt
In the Proceedings of the 2021 Symposium on Usable Privacy and Security
PDF

13. Realizing the Potential of AI in Africa: It All Turns on Trust
Charity Delmus Alupo, **Daniel Omeiza**, David Vernon
In Towards Trustworthy Artificial Intelligent Systems. Springer, Cham.
PDF

Workshop Papers

13. Towards Explainable and Trustworthy Collaborative Robots through Embodied Question Answering
Lars Kunze, Omer Gunes, Dylan Hillier, Matthew Munks, Helena Webb, Pericle Salvini, **Daniel Omeiza**, and Marina Jirotka
Presented in the ICRA 2022 Workshop on the Collaborative Robots and the Work of the Future
PDF

14. A Step Towards Exposing Bias in Trained Deep Convolutional Neural Network Models
Daniel Omeiza
Presented at the NeurIPS Workshop on Machine Learning for Developing World, 2019
arXiv:1912.02094

15. Deep Convolutional Neural Network for Plant Seedlings Classification
Daniel Nkemelu, **Daniel Omeiza**, Nancy Lubalo
Presented at the NeurIPS Black in AI workshop, 2018
arXiv:11811.08404

Manuscripts and Pre-Prints

16. Smooth Grad-Cam++: An Enhanced Inference Level Visualization Technique for Deep Convolutional Neural Network Models
Daniel Omeiza, Skyler Speakman, Celia Cintas, Komminist Weldermariam
arXiv:1908.01224

17. Efficient Machine Learning for Large-Scale Urban Land-Use Forecasting in Sub-Saharan Africa
Daniel Omeiza
arXiv:1908.00340

18. EEG-based Communication with a Predictive Text Algorithm
Daniel Omeiza, kayode Adewole, Daniel Nkemelu
1812.05945