Abdulrahman Kerim

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Research Interests: Machine learning, computer vision, synthetic data, semantic segmentation.

EDUCATION

PhD, Computer Science 2020∼2024
Lancaster University, School of Computing and Communications
Thesis title: "Synthetic Data for Machine Learning"
Supervisors: Leandro Marcolino, Richard Jiang, and Erickson R. Nascimento (Microsoft)

MSc, Computer Engineering 2018∼2021
Hacettepe University, Graduate School of Science and Engineering
Thesis title: "Synthetic Data Generation for Training and Evaluation of Deep Learning-based Computer Vision Models"
Supervisors: Ufuk Celikcan, Erkut Erdem, and Aykut Erdem
Including modules in Data Mining, Computer Vision, Neural Networks, and Image Processing
GPA: 3.97/4.00

BSc, Computer Engineering 2015∼2018
Ankara Yildirim Beyazit University, Faculty of Engineering and Natural Sciences
Including modules in Applications of Computer Graphics, Operating Systems, Digital Image Processing, and Big Data
GPA: 3.67/4.00 (High Honors)

BSc, Electronics and Communication Engineering 2013∼2017
Ankara Yildirim Beyazit University, Faculty of Engineering and Natural Sciences
First rank in the Faculty and BSc Valedictorian
Including modules in Microprocessors, Control Systems, Process Control, and Signal and Systems
GPA: 3.69/4.00 (High Honors)

RESEARCH EXPERIENCE

EPSRC Research Fellow in Explainable AI August 2024∼Present
University of Surrey, UK

- Researched state-of-the-art semantic segmentation methods in remote sensing with applications in building damage assessment (BDA) and change detection, focusing on robustness under real-world challenges such as occlusion, spectral similarity, and single-temporal data.
- Designed and developed BSNet, an entropy-based adaptive building segmentation network, introducing multi-level weighted aggregation, adaptive downsampling, and entropy-guided reception mechanisms, achieving state-of-the-art performance on four benchmark datasets.
- Proposed PBDANet, a novel end-to-end single-temporal pixel-level BDA method using only post-disaster satellite imagery. Utilized adaptive dual upsampling, structural attention, and entropy-weighted refinement to deliver highly accurate damage maps.

- Advanced explainable multi-view representation learning for remote sensing scene classification by leveraging evolving fuzzy neural encoders and multi-CNN feature fusion.

Research Assistant December 2018∼August 2020
Hacettepe University supported by TÜBİTAK, Türkiye

- Developed NOVA, a procedural 3D rendering framework that synthesises realistic scenes with diverse, procedurally generated humans (varying body shape, age, gender), full pixel-level ground-truth (segmentation/tracking), and controllable environmental factors (weather, time-of-day), and used it to generate large synthetic person-tracking datasets.
- Collected and curated an adverse-weather benchmark (PTAW172Real) and created a matched synthetic counterpart (PTAW217Synth) via NOVA (fog, rain, snow, varying severity); designed annotation, dataset protocols and evaluation pipelines to assess tracker robustness under challenging conditions.
- Performed extensive experiments showing that complementing real data with NOVA synthetic sequences substantially improves the robustness and accuracy of state-of-the-art deep trackers in adverse weather; demonstrated that NOVA synthetic data is an effective proxy for real-world data for training and stress-testing models.

TEACHING EXPERIENCE

Lecturer (Assistant Professor) December 2022∼August 2024
University for the Creative Arts (UCA), UK

- FGCT4016 Gameplay Design and Programming
- FGTE5004 Games Systems Design
- FGCT5017 Tools and Production
- FGTE6003 Final Major Project

Lecturer (Assistant Professor, Part-Time) February 2024∼August 2024
Global Banking School (GBS) - Pearson, UK

- U21 Emerging Technologies (Spring 2024)
- U27 Advanced Programming (Summer 2024)

Lecturer (Assistant Professor, Part-Time) February 2023∼July 2024
Staffordshire University, UK
Supervised, planned, managed, and evaluated MSc projects within the Department of Computing, with a particular focus on the Dissertation module.

Teaching Assistant February 2021∼October 2022
Lancaster University, UK

- Assistant for the undergraduate courses SCC461 Programming for Data Scientists and SCC462 Distributed Artificial Intelligence, with Leandro Marcolino. Gave lectures, marked and developed questions for assignments, besides assisting students at office hours.
- Assistant for the first year undergraduate courses SCC130 Information Systems, with Phillip Benachour. Gave lectures, marked and developed questions for assignments, besides supporting students.
- Stand-alone classes: Assistant with Welcome Week, Introduction to Python Programming with Leandro Marcolino.

TEACHING QUALIFICATIONS & FELLOWSHIPS

- Associate Fellow of the Higher Education Academy (AFHEA), Higher Education Academy & Lancaster University. Awarded July 2023 (Reference: PR268194)
- Associate Teacher Programme (ATP), Lancaster University, October 2022∼July 2023.
- Teaching Assistant Training, Lancaster University, April 2021.

DISTINCTIONS & AWARDS

- EPSRC Research Fellow in Explainable AI, School of Computer Science and Electronic Engineering, University of Surrey. August 2024∼Present.
  Prestigious national fellowship.
- Doctoral Studentship, Faculty of Science and Technology, Lancaster University. October 2020∼October 2023.
  Prestigious and highly selective award.
  A monthly stipend and full tuition coverage.
- My paper "NOVA: Rendering virtual worlds with humans for computer vision tasks", published in the Computer Graphics Forum journal (Wiley, 2021), was recognised among the top-cited papers for January 2021∼December 2022.
- TUBITAK Research Scholarship, Hacettepe University. October 2018∼October 2020.
  National research scholarship supporting postgraduate research.
- Valedictorian, Faculty of Engineering and Natural Sciences, Ankara Yildirim Beyazit University, Graduated top of the cohort. July 2017.

TECHNICAL SKILLS

- Programming & ML Frameworks: Python, PyTorch, TensorFlow, scikit-learn, OpenCV
- Unity, R, MATLAB
- Specialised Tools: LaTeX, Git, Docker, Slurm, Condor, Flask

RESEARCH PUBLICATIONS

Transaction Papers

1. **Abdulrahman Kerim**, Jinghao Zhang, Ce Zhang, Jungong Han, Qiang Shen, Peter M Atkinson, and Xiaowei Gu. BSNet: Entropy-Based Adaptive Building Segmentation Network for Remote Sensing Imagery. In IEEE Transactions on Image Processing (TIP), UNDER REVIEW. **IF: 13.7**

Journal Papers

2. **Abdulrahman Kerim**, Leandro Soriano Marcolino, Erickson R. Nascimento, and Richard Jiang. Multi-Armed Bandit Approach for Optimizing Training on Synthetic Data. In International Journal of Computer Vision (IJCV), UNDER REVIEW. **IF: 15.5**
3. Xiaowei Gu, **Abdulrahman Kerim**, Jinghao Zhang, Jungong Han, Qiang Shen, Peter M Atkinson, Ce Zhang. Self-Organising Explainable Multi-View Representation Learning for Remote Sensing Scene Classification. In Applied Soft Computing Journal, UNDER REVIEW. **IF: 6.6**
4. **Abdulrahman Kerim** and Burkay Genc. Mobile Games Success and Failure: Mining the Hidden Factors. In Neural Computing and Applications. Springer, 2022. **IF: 6.0**
   [Link to Journal]
5. **Abdulrahman Kerim**, Ufuk Celikcan, Erkut Erdem, and Aykut Erdem. Using synthetic data for person tracking under adverse weather conditions. Image and Vision Computing, 2021. **IF: 4.7**
   [Link to Journal]
6. **Abdulrahman Kerim**, Cem Aslan, Ufuk Celikcan, Erkut Erdem, and Aykut Erdem. NOVA: Rendering virtual worlds with humans for computer vision tasks. In Computer Graphics Forum. Wiley Online Library, 2021. **IF:2.5**
   [Link to Journal]

Full Conference Papers

7. Ebtisaam Alharbi, **Abdulrahman Kerim**, Leandro Soriano Marcolino, and Qiang Ni. SD-CSFL: A Synthetic Data-Driven Conformity Scoring Framework for Robust Federated Learning. In IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2026, UNDER REVIEW.
8. **Abdulrahman Kerim**, Washington Ramos, Leandro Soriano Marcolino, Erickson R. Nascimento, and Richard Jiang. Leveraging Synthetic Data to Learn Video Stabilization Under Adverse Conditions. In IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2024. [Link]
9. **Abdulrahman Kerim**, Felipe Chamone, Washington Ramos, Leandro Soriano Marcolino, Erickson R. Nascimento, and Richard Jiang. Semantic Segmentation under Adverse Conditions: A Weather and Nighttime-aware Synthetic Data-based Approach. The 33rd British Machine Vision Conference (BMVC), 2022. [Link]
10. **Abdulrahman Kerim** and Mehmet Onder Efe. Recognition of traffic signs with artificial neural networks: A novel dataset and algorithm. In 2021 International Conference on Artificial Intelligence in Information and Communication (ICAIIC). IEEE, 2021. [Link]
11. **Abdulrahman Kerim** and Burkay Genc. Mobile games success and failure: Mining the hidden factors. In 2020 7th International Conference on Soft Computing and Machine Intelligence (ISCMI). IEEE, 2020. [Link]

Books

12. **Abdulrahman Kerim**. Synthetic Data for Machine Learning (1st Edition). Packt, 2023. [Link to Book]

Workshop Papers

13. **Abdulrahman Kerim**, Leandro Soriano Marcolino, and Richard Jiang. Silver: Novel Rendering Engine for Data Hungry Computer Vision Models. 2nd International Workshop on Data Quality Assessment for Machine Learning, 2021. [Link]

Thesis, Monographs & Dissertations

14. **Abdulrahman Kerim**. Synthetic Data for Machine Learning. PhD Thesis, advised by Leandro Soriano Marcolino, Erickson R. Nascimento, and Richard Jiang. Lancaster University, 2024.
[Link to Thesis]
15. **Abdulrahman Kerim**. Synthetic data generation for training and evaluation of deep learning-based computer vision models ("Derin Öğrenme-Bazlı Bilgisayarlı Göre Modellerinin Eğitimi ve Değerlendirilmesi için Sentetik Veri Üretimi"). MSc Thesis, advised by Ufuk Celikcan, Erkut Erdem, and Aykut Erdem. Hacettepe University, 2021.
[Link to Thesis] (Thesis No: 693816)
16. **Abdulrahman Kerim**. 3D Face Recognition System. Undergraduate Monograph (BSc Computer Engineering), advised by Osman Serdar Gedik. Ankara Yildirim Beyazit University, 2018.
17. **Abdulrahman Kerim**. MIMO-OFDM Simulation with MATLAB. Undergraduate Monograph (BSc Electronics and Communication Engineering), advised by Serdar Özyurt. Ankara Yildirim Beyazit University, 2017.

EDITORIAL EXPERIENCE

Language Editing (Freelance)

- OAE Publishing Inc. November 2021∼Present
Edited journal articles and conference papers in machine learning and relevant fields, for grammar, clarity, and technical accuracy.
Journals include: (1) Journal of Complex Engineering Systems, (2) Journal of Intelligence and Robotics, (3) Journal of Smart Environments and Green Computing, and (4) Journal of Surveillance, Security and Safety

- MogoEdit September 2025∼Present
  Edited academic manuscripts for a major China-based editing service; performed structural and copy edits, standardized LaTeX and notation.

Technical Editing (Freelance)

- Manning Publications June 2025∼Present
  Served on a 325-page book, *Practical Synthetic Data: Foundations, Techniques, and Applications*; collaborated with the author and Developmental Editor Doug Rudder to validate technical correctness of code, figures, and text, and provided substantive feedback on content relevance and clarity.

DELIVERED INDUSTRY TRAINING & CONSULTANCY

- Delivered a 3-day intensive AVEVA PI Vision training for Nigeria LNG Limited in London (27-29 January 2025) through Averest Training, covering real-time data visualization, analytics, a brief into to machine learning, and reporting to enhance operational decision-making.
- Delivered +70 hours of online tutorials via Superprof on Machine Learning and Computer Vision (Python, PyTorch), including hands-on labs and exercises for individual and small groups.

MENTORING & SUPERVISION

MSc Dissertations (Primary Supervisor)

1. Kulwinder Kaur, *Quite Insight: A Parental Monitoring Novel Approach for Online Child Safety*, University of Staffordshire, 2024.
2. Abdul Rehman Zareef, *Web Traffic Anomaly Detection Using a Novel AI-Based Approach*, University of Staffordshire, 2024.
3. Muhammad Abid, *A Novel AI-Based Hybrid Approach for 5G Network Slicing*, University of Staffordshire, 2024.
4. Biju Beethu Sara, *Enhancing Cancer Detection Using Machine Learning: A New Hybrid Model*, University of Staffordshire, 2024.
5. Ojomo Anuoluwapo, *A Cloud-Based AI-Driven Pricing Intelligence Dashboard for Simplified SME Financial Management in Nigeria*, University of Staffordshire, 2024.
6. Pasindu Kukulakoralage, *Prediction of day-to-day app ratings and downloads depending on ad support, in-app purchases, and minimum purchase price*, University of Staffordshire, 2023.
7. Tharushi Dinelka Fernando, *Privacy-Preserving Technique for Medical Data Sharing in Cloud Environment*, University of Staffordshire, 2023.
8. Busayo Ezekiel Adefajo, *Canteen Ordering System Using Kotlin and Blockchain*, University of Staffordshire, 2023.
9. Oluwatobi Jeremiah Ajepe, *Performance Evaluation of Permissioned Blockchain: Cloud Hyperledger Fabric in Fintech Systems Using Machine Learning*, University of Staffordshire, 2023.
10. Dinelka Fernando, *Implementing a Privacy-Preserving Technique for Sharing Medical Information in Cloud*, University of Staffordshire, 2023.

MSc Dissertations (Secondary Supervisor)

11. Chenqi Weng, Lancaster University, with Leandro S. Marcolino, Summer 2023.
12. He Shencheng, Lancaster University, with Leandro S. Marcolino, Summer 2023.

Research Visitors (Co-Mentor)

13. Charchit Dhawan, Undergraduate Research Visitor at Lancaster University (remote) from IIIT Naya Raipur (India), with Leandro S. Marcolino, Spring 2021∼Summer 2021.

PARTICIPATION IN COMMITTEES (SELECTED)

PhD Admissions Panel (Computer Science)

- Served as a panel member for the selection of potential PhD candidates in the Department of Computer Science, University of Surrey, 2025. Evaluated research proposals, conducted interviews, and assessed academic fit, supervisory alignment, and funding suitability to recommend candidates for admission.

MSc Dissertations Viva (Internal Examiner)

- Meena Taniza, MSc in Computer Science, internal examiner, University of Staffordshire, 2024.
- Irfan Shameem, MSc in Computer Science, internal examiner, University of Staffordshire, 2024.
- Usman Raza, MSc in Computer Science, internal examiner, University of Staffordshire, 2024.
- Nosa Otimenyin, MSc in Computer Science, internal examiner, University of Staffordshire, 2024.
- David Ukap, MSc in Computer Science, internal examiner, University of Staffordshire, 2024.
- Faisal Rehman, MSc in Computer Science, internal examiner, University of Staffordshire, 2024.
- Ayodeji Olayiwole, MSc in Computer Science, internal examiner, University of Staffordshire, 2024.
- Arooj Fatima, MSc in Computer Science (Business Computing), internal examiner, University of Staffordshire, 2023.
- Mir Muhammad Junaid Ashraf, MSc in Computer Science (Business Computing), internal examiner, University of Staffordshire, 2023.
- MUMORU Momoh Saliu, MSc in Computer Science, internal examiner, University of Staffordshire, 2023.

Course Validation

- Served as an internal examiner on the validation panel for two new courses: MSc Games Engineering, BSc Computer Science, and BSc Creative Computing, University for the Creative Arts, 2023.
- Served as an external examiner on the validation panel for two new courses: PgD Artificial Intelligence (AI) Data Specialist and PgD Game Programmer, Teesside University, 2023.

Appointment of New Lecturer Panel

- Served as a panel member for the appointment of a Lecturer in Computer Programming at the School of Games & Creative Technology, University for the Creative Arts, May 2023.

Final Project Shortlisting Panel

- Served as a panel member to shortlist final-year student projects for admission to the University for the Creative Arts Games Incubator Studio, evaluating proposals for technical merit, creativity and suitability for incubation. 2023∼2024.

LEADERSHIP & ENGAGEMENT

- Co-founder and organizer (with Edmond Prakash) of Research Seminar Series at School of Games & Creative Technology, University for the Creative Arts, February 2023∼July 2024
- Lead open and applicant days for BSc Games Development and BA Games Design courses, University for the Creative Arts, February 2023∼June 2024.
- Participated in calling campaign for BSc Games Development course, University for the Creative Arts, January 2023∼July 2024.
- Participation in school, department, and students representatives meetings, University for the Creative Arts, December 2022∼June 2024.

PROFESSIONAL & RESEARCH TRAINING

- Artificial Intelligence and Games Summer School, modl.ai and Microsoft Research, June 2023.
- Oxford Machine Learning Summer School, University of Oxford & AI for Global Goals, June∼August 2022.

SYMPOSIUM ORGANIZATION

- BMVA Synthetic Data for Machine Learning [Link] November 2023
  Co-chair with Leandro S. Marcolino (Lancaster University) and Erickson Nascimento (Universidade Federal de Minas Gerais & Microsoft)

CONFERENCE ORGANIZATION

- Creative AI Research Conference [Link] June 2023
  Co-chair with Edmond Prakash and Daming Shi

REVIEWING

- Reviewer for CVPR 2025
- PC member and reviewer for AAAI 2025
- PC member and reviewer for ICMLA 2024 [Link]
- Reviewer for Neural Computing & Applications 2024
- Reviewer for BMVC 2023 [Link]
- Reviewer for SIBGRAPI 2023 [Link]

INVITED TALKS (SELECTED)

- "Leveraging Synthetic Data to Learn Video Stabilization Under Adverse Conditions" at Laboratory of Computer Vision & Robotics (VeRLab), Federal University of Minas Gerais, 2023
- "Semantic Segmentation under Adverse Conditions using Synthetic Data" at Data Science Group, Lancaster University, 2022
- "Introduction to Computer Engineering" at Industrials Talks (Mesleki Tanıtım Konuşmaları), Ankara Yildirim Beyazit University, Türkiye, December 2021 [Link]
- "DREAM BIG: Introduction to Computer Engineering" at Industrials Talks (Mesleki Tanıtım Konuşmaları), Ankara Yildirim Beyazit University, Türkiye, December 2020 [Link]

MEDIA COVERAGE

- Featured as the valedictorian speaker representing international students. Quoted for achievements and reflections on resilience and academic excellence. Ankara, Türkiye, July 2017.
  Published by *Milliyet* [Link]