Ahmad Aladawi

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PROFESSIONAL SUMMARY

Data scientist and researcher with strong experience in creating and applying machine learning to system-level analysis. Experience in developing and deploying machine learning models to IoT networks and real-time prototypes for decision support systems. Proficient in multiple programming languages such as Python, Java, and C++, as well as dealing with big data and different machine learning platforms including Pandas, Scikit-learn, Keras, and TensorFlow.

As a scholar with a strong passion for novel research and interprofessional cooperation, I am committed to advancing the National Digital Twin Programme (NDTP) and the overall concept of digital twins to enhance business operations and decision-making. Having worked closely with environmental sensor data, I am eager to contribute to innovative projects that bridge the gap between academia and industry. My ability to work independently and as part of a multi-disciplinary team, coupled with excellent interpersonal and organisational skills, makes me well-suited for driving impactful research initiatives in the realm of digital twins and data science.

EDUCATION

1. **PhD** in machine learning for people with different needs (Jan 2021 -Present)
   School of Architecture, Building & Civil Engineering (ABCE), Loughborough University
   My PhD was cross-disciplinary research titled "*A Novel Machine Learning Thermal Comfort Model for People with Dementia and Their Caregivers*", supervised by Prof. Malcolm Cook, Prof. Eef Hogervorst, and Dr Ben Roberts. I investigated designing smart dementia-friendly environments for people with dementia and their caregivers as they have different comfort expectations. I did a controlled experiment and a field study to gather primary data, which I used to create a novel model to instruct the caregivers with a set of actions to bridge their different comfort expectations with their patients.
2. **MSc in Internet of Things (IoT**) (Distinction) (Jan 2019 – Jun 2020)
   School of Faculty of Science and Technology, Bournemouth University
   My master's graduation project, titled "*Improving Medical Interventions Systems Using Smart IoT Technologies*", was supervised by Dr Philip Davies. I created a novel eye-blink switch that enabled people with upper limb disabilities to control the light using their eye blinks.
3. **BSc in Computer Science** (First Class Honours) (Jul 2013 – Jan 2017)
   School of computer science and information systems. King Khalid University.
   My bachelor graduation project titled "*Smart Camera System*", supervised by Doctor Ouissem Ben Henia investigated different computer vision algorithms to analyse road traffic in real time.

WORK EXPERIENCE

1. **Data Scientist** at Loughborough University (Sep 2021 – Present)
   - Created and led a coding club in the ABCE school, enabling PhD researchers and staff to utilise state-of-the-art machine learning techniques in their projects.
   - Led machine learning initiatives which increased user engagement by 25% through the development of a personalised dementia control system.
   - Recalibrated Dantec temperature and relative humidity sensors and installed them in patients' homes to gather novel thermal comfort datasets.
   - Led initiatives that bridge the gap between academia and industry by drafting an agreement between Loughborough University and Building Research Establishment (BRE), including different industrial partners such as Atamate, to conduct cross-disciplinary research and access BRE's dementia-friendly home and resources.

- Developed and delivered engaging lectures and lab sessions that effectively communicated complex computer science concepts (i.e., MATLAB and Python programming) to both undergraduate and master's students, resulting in a 15% improvement in student learning outcomes.
- Consistently received excellent student feedback, with an average course evaluation score of 4.8/5 in programming for data science (22COP504) and object-oriented programming (23COA256) modules, demonstrating a strong commitment to student success.
- Selected projects are mentioned below.

2. **Machine Learning Engineer** at University Hospitals Dorset NHS, Bournemouth (Jan 2020 – Dec 2020)
    - Designed, created, and developed a novel eye-blink switch which significantly improved the quality of life for over 50 patients with limited mobility, enabling them to independently control their environment. The switch was created using a Raspberry Pi 4 connected to a camera to capture eye blinks, and a relay to control the light based on the recognised eye-blink patterns.
    - Collaborated closely with healthcare professionals to ensure the eye blink switch system was intuitive and user-friendly, leading to a 95% satisfaction rate among patients.
    - Produced comprehensive technical reports which effectively communicated the project's progress and outcomes to the team, contributing to the successful implementation of the environmental control systems.

3. **Full-Stack Developer** at IGEC (Jun 2017 - Jan 2019)
    - Spearheaded the redesign and migration of the company website to Drupal 8 CMS, resulting in a 25% increase in user engagement, an 18% reduction in maintenance costs, and a 20% improvement in lead conversion rates.
    - Designed and developed a visually appealing and intuitive user interface that enhanced the overall user experience, leading to a 35% increase in customer satisfaction and a 15% reduction in customer support inquiries.
    - Received a commendation from the CEO for my exceptional critical thinking skills and ability to deliver high-quality results under tight deadlines, leading to a 34% salary increase.

AWARDS AND ACHIEVEMENTS

- Won **first place, twice,** in the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) PhD competitions in 2021 and 2022.
- Won an "Excellent Prize" for the PhD Video Challenge 2022 in the "Buildings and Cities" Journal.

SELECTED DEVELOPED PROJECTS

- **A novel machine learning thermal comfort model**
  Developed a thermal comfort prediction model for people with dementia and their caregivers using advanced machine learning algorithms (Decision Tree, Random Forest, Gradient Boosting, and Support Vector Regression) implemented with Python libraries including Pandas, NumPy, and Scikit-learn. Analysed multi-source sensor data (temperature, relative humidity, and air speed) to provide optimised temperature setpoints, enhancing thermal comfort control strategies for dementia-friendly homes. Implemented a data fusion approach to integrate diverse sensor inputs into a centralised database. This project demonstrated my proficiency in large-scale data analysis, machine learning model development, sensor data processing, and database management.
- **Interactive Power BI dashboards.**
  Created a dynamic dashboard using Power BI to visualise novel data collected across the UK. Utilised Python for data preprocessing. The dashboard enabled stakeholders to make data-driven decisions in designing dementia-friendly homes. Moreover, I developed an interactive dashboard for the International Hockey Federation (FIH) in collaboration with Dr Paul Fleming from Loughborough

University, aimed at assessing the effectiveness of new pitch technologies in the Netherlands, Oman, and South Africa. Using Python, the dashboard integrated data to monitor moisture levels and water usage. This project demonstrated potential water savings of over 40% compared to traditional systems, enabling stakeholders to make informed decisions on water-efficient technologies and promoting sustainability in international hockey. These dashboards demonstrate my skills in data visualisation and large-scale data analysis.

- **A novel eye blink system using IoT Technologies.**
  Created an eye blink detection system using Raspberry Pi, OpenCV, and Python. Implemented real-time image processing algorithms. This system enhanced safety monitoring for machine operators in industrial settings, reducing workplace accidents. The leader of the Environmental Control System team, Christos Christoforidis, at University Hospital Dorset, was impressed with this project and gave me access to install this technology in patients' homes, demonstrating practical application of IoT and computer vision technologies.
- **Survival (A flutter mobile application).**
  Developed a cross-platform mobile app using Flutter and Dart, integrating Firebase for backend services. This app provided personalised survival tips in emergency situations, improving user preparedness and safety. The project demonstrates my skills in working with diverse application development technologies.
- **Smart Camera System.**
  Designed and implemented a smart traffic analysis system using Python, OpenCV, and TensorFlow for vehicle detection and tracking. This system counted vehicles, recognised license plates, and measured speeds, providing valuable insights into traffic patterns and enhancing road safety. This project demonstrated my skills in computer vision, machine learning, and data analysis.

PUBLICATIONS

1. **Published**
   - Aladawi, A, Roberts, BM, Hogervorst, E, Cook, M (2023) "Indoor environmental quality studies". In Halsall, B, Riley, M, Hogervorst, E (ed) Design for Dementia, Routledge, pp.138-153, ISBN: 9781003306054. DOI: 10.1201/9781003306054-8.
   - Jain, M, Aladawi, A, Hogervorst, E (2023) "The medical background of dementia". In Halsall, B, Riley, M, Hogervorst, E (ed) Design for Dementia, Routledge, pp.18-38, ISBN: 9781003306054. DOI: 10.1201/9781003306054-3.
2. **In Progress**
   - Aladawi, A, Roberts, BM, Hogervorst, E, Cook, M (2024) "Novel machine learning thermal comfort model for people with dementia and their caregivers", Building and Environment, manuscript in preparation, expected submission Sep 2024).
   - Aladawi, A, Roberts, BM, Hogervorst, E, Cook, M (2024) "Investigating thermal comfort for people with dementia and their caregivers: A field study", Indoor Air, manuscript in preparation, expected submission Sep 2024).

PROFESSIONAL MEMBERSHIPS

- Professional member of the British Computer Society (membership number: 995146437).
- Member of IEEE (membership number: 100104526).

VOLUNTEERING

- Part-time Software Engineer (Weekends only) AbilityNet (Jan 2022 – Present)
  Visiting older people in their homes and solving their IT challenges and technological issues.
- Web Developer Loughborough University (Jan 2022 – Present)
  Designed and created acting-research.lboro.ac.uk and organised its events.
- Part-time Side-by-Side Volunteer (Weekends only) Alzheimer's Society (Jun 2021 – Jun 2024)
  Calling people with dementia on a weekly basis and checking up on them.

COURSES HELPED IN TEACHING

- **Programming for data science (22COP504)**
  Prepared and delivered weekly tutorials with Dr Firat Batmaz for MSc students, covering topics such as Python programming, data manipulation, statistical analysis, and machine learning algorithms.
- **Introduction to programming and databases (23COA122)**
  Taught 1st-year computer science students fundamental programming concepts and database principles. Assisted the module leader, Dr Firat Batmaz, by conducting lab sessions, grading assignments, and offering additional support as needed.
- **Network monitoring and management (23WSP019)**
  Led workshops on network tools, including Azure Network Watcher and AWS CloudWatch. Guided students through monitoring and troubleshooting exercises.
- **Web programming (23COA122)**
  Instructed students on HTML, CSS, and JavaScript, facilitating the development of responsive web applications through firsthand coding sessions and project-based learning. Assisted Dr Hossein Nevisi in delivering lectures, preparing practical exercises, and evaluating student projects, with a focus on incorporating current industry trends and emerging web technologies.
- **Professional practice (23CVZ002)**
  Facilitated group discussions and case studies on ethical considerations, project management, and professional communication in the tech industry. Assisted Dr Tim Marjoribanks in evaluating students' presentations.
- **Object-oriented programming (23COA256)**
  Assisted Dr Hossein Nevisi and taught advanced programming concepts, including inheritance, and design patterns. Supervised student projects and provided Python and Java code reviews to reinforce best practices.
- **Databases (23COA201)**
  Conducted lab sessions with Dr Firat Batmaz on database design, SQL querying, and database management systems. Guided students through the process of creating and optimising relational databases.
- **Collaborative practice in the built environment (23CVA103)**
  Assisted Dr Mohamad Shaheen and mentored interdisciplinary student teams working on real-world projects, fostering collaboration between engineering and construction management students. In addition to providing reviews of students' MATLAB codes.
- **Professional practice in engineering (22CVA102)**
  Assisted Dr Tim Marjoribanks conducted workshops for 1st and 2nd year architecture and civil engineering students on ethical considerations and best practices for implementing digital twins, augmented reality, and virtual reality in their projects.

CONFERENCES ATTENDED

- AI and the human conference, Berlin, Germany, May 2022.
- Dementia Research Conference, Nottingham, UK Feb 2022.
- Home UK Conference, London, UK Nov 2021.
- Advanced Engineering Conference Birmingham, UK Sept 2021.
- Code Elixir LDN Conference, London, UK, July 2019.

SKILLS

- Data analysis skills including cleaning, analysing, and visualising large data from different sensors.
- Professional skills in developing machine learning models using Python and libraries such as Pandas, Keras, and TensorFlow, and deploying in different forms such as stand-alone software or embedding them in IoT systems.
- Skilled in designing and implementing sensor configurations and data communication systems.
- Skilled in creating codes to support data fusion and machine learning processes.

- Competent in producing technical reports and authoring academic papers.
- Effective in working within multi-disciplinary teams across various locations.
- Strong organisational skills for managing resources and project plans.
- Excellent interpersonal skills for presenting findings and engaging with stakeholders.

PROFESSIONAL DEVELOPMENT COURSES ATTENDED

- Linux Internal and System Programming from UTL Technologies.
- Robotics App Using Arduino.
- Drupal 8 Site Building.
- Data science course from Data Camp.
- Essential teaching skills course.
- Professional Project Management from Cambridge University.
- IO boot camp (100 hours training course).

DRIVING LICENSE

- Full UK driving license.

References are available upon request.