# Fereshteh Nayyeri, PhD

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## Summary

AI applied scientist and solutions engineer, specialising in computer vision, machine learning, and data-driven innovation, with hands-on experience designing and deploying end-to-end AI-powered applications across domains including environmental monitoring and civil engineering. Knowledgeable in cloud-based ML platforms practices, and scalable data pipelines. Proven record of delivering high-impact, cross-sector projects in collaboration with government, academia, and industry, including CSIRO, Griffith University, and Central Queensland University. Recognised for advancing responsible AI applications to real-world challenges, from marine litter detection to road safety, and for contributions to STEM leadership, public engagement, and research-led teaching.

## Key Skills

- **AI & Computer Vision**: Deep learning, image analysis, object detection, spatio-temporal modelling
- **Data & Digital Innovation**: Data management, data modelling, forecasting, web-based ML applications
- **Cloud & Infrastructure**: AWS, GCP, HPC, Flask applications, data pipelines
- **Research & Translation**: Research leadership, publication, research-to-practice translation
- **Stakeholder Engagement**: Government, research institutes, SMEs, industry collaborations
- **Teaching & Mentoring**: AFHEA recognised, higher education tutoring, training support
- **Tools & Platforms**: Python, TensorFlow, Shell scripting, HTML/CSS, Tableau, Power BI, Jira

## Professional Experience

**Data61, CSIRO, Australia** | Postdoctoral Research Fellow

01/2023 - present

Project: Using AI and cameras to identify and monitor litter, link

Lead applied AI project to address environmental and sustainability challenges.

- Developed deep learning models for detecting and monitoring marine litter, supporting national efforts to reduce plastic pollution.
- Managed large-scale image datasets, built taxonomies of litter categories, and delivered actionable insights for environmental monitoring.
- Engineered, designed and delivered a **local machine web application pipeline** integrating ML and data visualisation for image analysis, improving accessibility of AI tools.
- Presented research outcomes at the **Ending Plastic Waste Symposium** and engaged with Women in AI, Australia

**Griffith University, Australia** | Casual Researcher

08/2021 -12/2021

Project: Predicting Koala Road Crossing Behaviours using AI-Powered Observation Network, link

AI-powered environmental R&D collaboration.

- Developed deep learning methods for **koala detection and behaviour prediction** using facial recognition techniques.
- Contributed to conservation planning through data-driven insights into koala crossing behaviour

**Central Queensland University, Australia** | Postdoctoral Research Fellow

06/2020 - 06/2021

Project: An Automated System for the Analysis of Road Safety and Conditions, link

ARC Linkage Project with Department of Transport and Main Roads.

- Led AI-based detection and classification of road attributes such as speed signs signs from video datasets.
- Built annotated datasets, conducted deep learning experiments on HPC infrastructure, and delivered insights for transport safety and infrastructure planning.

- Attended regular meetings with DTMR (industry partner in the mentioned ARC Linkage Projects) and made a number of presentations on the progress of the project.

**Griffith University, Australia** | Multidisciplinary Project Collaboration
07/2016 - 11/2018

- Developed computer vision methods for crack detection in infrastructure.
- Published in **Journal of Computer-Aided Civil and Infrastructure Engineering** (impact factor 6.2), link

**National University (UKM), Malaysia** | Graduate Research Assistant
02/2014 - 11/2015

Project: Designing and developing the algorithm to correct respiratory motion from PET/CT lung cancer images

- Researched algorithms for **respiratory motion correction in PET/CT lung cancer imaging**.
- Designed biomedical image reconstruction methods in MATLAB.

**Computer Software Design & Production Manager** | Dadeh-Pardazan Moaser Co., Iran
04/2008 – 03/2010

- Directed the design, development, and maintenance of enterprise-grade software systems.
- Delivered software solutions using C#, ASP.Net, and SQL Server, aligned with quality assurance standards.
- Led testing, debugging, and performance optimisation of deployed applications.
- Consulted with clients on software strategy, financial assessments, procurement, and ongoing updates.

**Software Designer, Programmer & Engineer** | Dadehkavee Tadbir & Tosee Shargh Co., Iran
11/2005 – 03/2008

- Designed and developed software packages in Borland Delphi and SQL Server.
- Installed, configured, and provided technical support for enterprise applications at client sites.
- Executed software testing, debugging, and troubleshooting to ensure reliability.
- Collaborated with client organisations to tailor solutions to operational needs.

## Education

**Phd in Information and Communication Technology (ICT)** | Griffith University, Australia
2016 – 2020

- Thesis: Using deep neural network for foreground-background separation
- Awards: GUPRS & GUIPRS Scholarships

**MSc in in Information Technology** | National University (UKM), Malaysia
2010 - 2013

- Thesis: Image matching using dimensionally reduced embedded Earth Mover's Distance
- Award: University Excellence Award

## Recognition & Certificates

- **DST Women in STEM Award**
- **Women in AI Australia – Keynote Speaker**
- **AFHEA (Associate Fellow, Higher Education Academy)**
- Volunteering:
  - Teaching Assistant for End-to-End LLM Bootcamp (NAIC & NVIDIA);
  - R&D Coach for CSIRO Innovate to Grow program.
- Introduction to AI | TAFE NSW
- AI Fundamentals | DataCamp
- Project Management | (Fundamental level with 3-day intensive Delivery), CSIRO
- CCNA Routing and Switching | Cisco Networking Academy

## Tutoring

1. Big Data and Social Media (7230ICT), Griffith University, Australia | 2019
   - Supported students in analysing large social media datasets using R and RStudio.
   - Provided hands-on instruction in visual analytics with Tableau and Gephi.
   - Recognised for helping students connect technical tools with real-world data insights.
2. Cyber Security Essentials (7905ICT) | Griffith University, Australia | 2019
   - Assisted in teaching key cybersecurity principles including encryption, secure protocols, and data privacy governance.
   - Provided technical support on labs using SEEDUbuntu and Oracle VM VirtualBox.
   - Helped students understand cyber threats and practical mitigation strategies.
3. Computer Systems and Networks (1007ICT, 7611ICT, 1807ICT) Griffith University, Australia | 2018
   - Delivered tutorials covering hardware, software, network fundamentals, and introductory security.
   - Helped students build foundational understanding of modern computer architecture and system integration using simulating tool for digital logic circuits.
   - Received positive feedback for simplifying complex concepts and supporting lab tasks.
4. Computer Networking Essentials (2809ICT) Griffith University, Australia | 2018
   - Delivered lab sessions aligned with the Cisco Networking Academy curriculum,
   - following Cisco's official training standards.
   - Guided students through hands-on simulations and real-world network troubleshooting scenarios.

## Publications

1. Malik, et al. (2025), Evolution of Employee Work Preferences Amidst COVID-19: A Social Media Analysis, Human Resource Management Journal, DOI.
2. Barrett, Justine, et al. (2024), Smarter Cleaner Sydney Harbour: Smart Sensors in Stormwater Management, Report, HANDLE.
3. Do, Brendan, et al. (2023), SkySea: Connecting Satellite, UAV and Underwater Imagery for Benthic Habitat Mapping, Proceedings of the 2023 Workshop on UAVs in Multimedia: Capturing the World from a New Perspective, DOI.
4. W. Xing, J. Zhou, W. L. Tan, F. Nayyeri, D. Kerlin and G. Castley (2022), Dual-stream Convolutional Neural Networks for Koala Detection and Tracking, International Conference on Digital Image Computing: Techniques and Applications (DICTA), Sydney, Australia, 2022, pp. 1-7, DOI.
5. F. Nayyeri, J. Zhou (2021), Multi-resolution ResNet for road and bridge crack detection, International Conference on Digital Image Computing: Techniques and Applications (DICTA), Gold Coast, Australia, DOI.
6. F. Nayyeri, L. Hou, J. Zhou and H. Guan (2019), Foreground-background separation technique for crack detection, Journal of Computer-Aided Civil and Infrastructure Engineering, 34(6): 457-470, DOI.
7. F. Nayyeri, L. Hou, J. Zhou, H. Guan and A. W.-C. Liew (2018), Crack Detection via Salient Structure Extraction from Textured Background, International Conference on Structural Health Monitoring of Intelligent Infrastructure (SHMII-8), Brisbane, Australia, pp.1-8.
8. F. Nayyeri and M. F. Nasrudin (2017), Sketching Method Based on Earth Mover's Distance for Image Contour Matching, International Journal of Soft Computing, 12(1): 79-85.
9. F. Nayyeri, A. A. A. Rahni and A. Ab Aziz (2015), Modelling the GE discovery 690 PET/CT scanner, IEEE International Conference on Signal and Image Processing Applications (ICSIPA): 160-164, DOI.
10. F. Nayyeri (2015), A Review on Motion Correction Methods in PET/CT Images for Detection of Cancer Cells Journal of Acta Medica Bulgarica, 42(2): 68-78, DOI.
11. F. Nayyeri and M. F. Nasrudin (2015), Similarity Comparison of Images Based on Earth Mover's Distance, Book, LAP Lambert Academic Publishing, ISBN: 978-3659697753.
12. F. Nayyeri and M. F. Nasrudin (2013), Image Matching Using Dimensionally Reduced Embedded Earth Mover's Distance, Journal of Applied Mathematics, DOI.