Ishara Paranawithana

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IsharaP • Ishara Paranawithana • Personal Website

Proficient engineer with 8+ years of experience translating advanced imaging, computer vision, and applied AI/ML research into scalable solutions across the medtech, robotics, and process automation industries. Demonstrated ability to design, validate, and deploy intelligent systems that enhance workflow accuracy, efficiency, and safety while reducing operational costs. Skilled in bridging research, technology, and business needs to accelerate innovation across cross-functional teams and deliver impactful solutions in high-performance environments.

Core Competancies

Programming	Python, MATLAB, C++, Bash scripting; Linux-based development environments; High-performance & parallel computing (HPC, GPU/CUDA clusters, SLURM)
Tools & Platforms	Containerisation (Singularity, Docker); Environment & dependency management (Anaconda); Code & data version control (GitHub, DVC); Interactive computing (VS Code, Jupyter)
Medical Imaging & Computer Vision	Multi-modal imaging (MRI, PET, CT, Ultrasound, fNIRS); Multi-dimensional data formats (DICOM, NIfTI); Image processing and analysis (NiBabel, Nilearn, SimpleITK, Scikit-image, OpenCV, SPM); Visualisation and annotation tools (3D Slicer, ITK-SNAP, Mango, ImageJ)
Applied AI & Data Analytics	Supervised & unsupervised machine learning; Deep learning (CNNs, 3D U-Net); Feature engineering; Frameworks & libraries (PyTorch, MONAI, TensorFlow, Scikit-learn)

Work Experience

○ **CERC Fellow – Biomedical Informatics Group/Neuroimaging Team (full-time)** **Aug 2024 – Present**
Commonwealth Scientific and Industrial Research Organisation (CSIRO) *Australia*

- **AI-Enabled Clinically Deployable Imaging Biomarkers for Early Detection & Treatment Monitoring in Alzheimer's Disease**, in collaboration with *Austin Health*, *Edith Cowan University* and *Eli Lilly & Company*.
  - Designed shorter amyloid-PET acquisition protocols, cutting scan time up to 50% and uptake time by 20% (FBP)/40% (NAV) at repeat-scan accuracy, boosting clinical throughput and reducing patient burden.
  - Led a tracer comparison study with AI-enabled quantification, improving sensitivity in low–moderate amyloid cases (achieved a lower positivity threshold of 15CL vs 46CL) and raising visual reader confidence.
  - Deployed containerised 3D U-Net segmentation on HPC/GPU and built automated MR biomarker analytics, enabling reproducible cohort-scale processing and safety metrics for treatment monitoring.
  - Operationalised & harmonised end-to-end imaging pipelines across large datasets (ADNI/AIBL/OASIS-3), delivering analysis-ready datasets on schedule, meeting milestones and securing $100k+ external funding.
  - Implemented rapid iterative feedback cycles to set requirements and deliver project outcomes, building trusted relationships with national and international collaborators and industry partners.

○ **Research Engineer – Engineering Product Development (full-time)** **Jun 2016 – Dec 2019**
Singapore University of Technology and Design (SUTD), one of the "Big 4" universities *Singapore*

- **Ultrasound-Guided Involuntary Motion Compensation of Kidney Stones in PCNL Surgery**, in collaboration with *Changi General Hospital*, patented technology licensed to *Creative Medtech Solutions Pte Ltd, Singapore*.
  - Developed a surgical assistance procedure via pre-operative anatomical modelling, intra-operative image registration, and image-guided needle insertion, improving initial needle puncture accuracy.
  - Designed a two-step ultrasound out-of-plane tracking workflow (pre-scan + template/block matching), achieving visual tracking error of ≈ 1 frame.
  - Established compliant human–robot operation by variable-admittance + adaptive control, ensuring stability with moving contacts, particularly relevant to ultrasound probe handling.
  - Maintained safe probe–tissue contact via position-based control algorithm, keeping force deviation below 0.2 N.

- **Low Cost, Portable & Automatic Vision-Guided Micromanipulation for Flexible Real-World Deployment**, in collaboration with *Massachusetts Institute of Technology, USA* and *National Institute of Education, Singapore*.
  - Developed a calibration-less, self-initialising micromanipulation workflow, delivering sub-pixel tool-tip localisation with a low-cost & portable microscope setup.
  - Designed a tool-tip auto-focus algorithm, preserving image quality by moving tip 95.3% closer to the focal plane.
  - Implemented a self-initialisation & recovery algorithm to ensure uninterrupted visual tracking in unforeseen conditions, improving localisation from >50% error to <10% of specimen size.
  - Built a confidence-weighted hybrid tracking workflow with visual & motion data fusion, improving reliability of tracking in complex scenes (cell occlusion and uneven lighting), reducing error by 18%.

○ **Research Intern – SUTD-MIT International Design Centre (full-time)** **Oct 2014 – Mar 2015**
Singapore University of Technology and Design (SUTD) *Singapore*

- **Automating IVF Procedures with Computer Vision-Based Blastomere and Micropipette Tracking**
  - Built a workflow to auto-detect/track blastomeres and micropipettes using cell segmentation & robust feature-based visual tracking, enabling continuous visual guidance during embryo biopsy.
  - Demonstrated reliable multi-frame tracking under variable lighting/partial occlusions, supporting steadier cell handling and fewer re-acquisitions.

Education

○ **Doctor of Philosophy (PhD) in Electrical & Computer Systems Engineering** **2020–2024**
Monash University/Bionics Institute *Australia*
Thesis title: Objective measures of functional connectivity to investigate language development in infants

○ **Bachelor of Science of Engineering (BSc Eng) in Electronic & Telecommunication Engineering** **2011–2016**
University of Moratuwa *Sri Lanka*
First-Class Honours, Overall GPA: 3.9/4.2 (92.86%)

Selected Awards & Honours

○ **MTPConnect BridgeTech Fellow** **2024**
Clinical Translation and Commercialisation Medtech Program – Medical Research Future Fund, Australia

○ **MedTech Actuator Menzies Scholarship** **2022**
The MedTech Actuator/Menzies Foundation, Australia

○ **Geographic Finalist for the Asia-Pacific Region** **2023**
Student Paper Competition – IEEE Engineering in Medicine and Biology Conference (EMBC), Australia

○ **First Place – "Overall Best Paper" Category** **2022**
Student Conference/Journal Paper Competition – IEEE Victorian Section, Australia

Volunteering & Mentoring

○ **R&D Coach – CSIRO Innovate to Grow Program** **2025**
Guided 3 SMEs in developing R&D plans, funding & collaboration strategies to accelerate product development

○ **IMNIS Catalyst – Australian Academy of Technological Sciences and Engineering (ATSE)** **2024–2025**
Served as an IMNIS STEM ambassador and led programs to engage with schools, industry and academia, moderated "STEM Careers in Industry" - health technology panel discussion

○ **HDR Mentor – Monash Graduate Association (MGA)** **2021–2022**
Mentored 6 early-stage research students, offering support and guidance to uplift student experience

Referees

– Available upon request –